BI Norwegian School of Management

Master Thesis

- Supply Strategies in the Construction Industry -

Authors:
Matias Mäkiperä – 0805157
Per Marius R. Skarstad – 0821501

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Supervisor:
Lena Bygballe

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Per Marius R. Skarstad Matias Mäkiperä

Abstract

The competitive nature and complexity inherent in the construction industry is the outcome of long standing arm's length and adverse relationships. Still, actors are becoming more and more aware to the fact that successful supply strategies necessitate a balanced approach to supply management. The majority of research instigated within this context suggests that closer collaboration and subcontractor involvement could be the means to improve supply chain efficiency. Although there seems to be an apparent interest in closer collaboration with selected parties, such relationships essentially remain traditional and at arm's length.

Our study has sought to scrutinize the conventional supply strategies from the viewpoint of a Norwegian main contractor. The findings indicate that even though the tendering process and negotiations between a subcontractor and main contractor is primarily based on achieving the lowest price, the underlying risk and uncertainty inflate the price since the subcontractor adds a risk premium to their bid. The case methodology is applied to contrast our theoretical implications with the practical and hands-on characteristics of subcontracting. By segmenting the supplier base based on two distinct portfolio models, we propose a differentiated approach to supplier management where materials and services can be unbundled to increase supply chain efficiency. The logic is based on the rationale of core competencies, where actors should focus on their own core activities to increase the overall competitiveness. However, such a strategy is contingent upon the technical complexity of the given trade and to what extent the main contractor is organized to assume the increased risk. In situations where the main contractor is reliant upon expertise knowledge to reach efficient solutions, strategic partnerships and extended contractual agreements are favorable governing structures. In other words, our thesis departs from traditional academia in the sense that it provides a balanced view to inter-firm collaboration. We conclude our study with some suggestions for future research as well as limitations.

Keywords: construction industry, competitive advantage, supply management, supply risk, purchasing, supply strategy

1. Introduction

"*It's a very sobering feeling to be up in space and realize that one's safety factor was determined by the lowest bidder on a government contract.*"
– Alan Shepherd, First American in space (1961)

The above quote is just as relevant today as it was in 1961 when Allen Shepherd was shot into space in a ship built by the lowest bidder. When considering the risks involved, it might seem paradoxical that one of humankind's greatest endeavors was contingent on the outcome of a government request for tender. Competitive tendering is still the dominant method of government procurement. This practice is also common in the private sector. Clients invite tenders from contractors on everything from defense systems design- and build contracts to separate trade contracts on the construction of a new school or home. This conventional method of purchasing has received much criticism both from researchers and governmental reports. As we will see, there are good reasons for this. This thesis aims to investigate supply strategies in the construction industry which to a large extent is characterized by competitive tendering.

As business becomes more and more competitive, the trend has been to focus on core competencies to reduce cost and rationalize operations. Managers have acknowledged that these two areas are crucial drivers in this respect. As a result, the supply side has become of high strategic importance for most companies (Dubois and Gadde 2000).

The notion of supply chain management (SCM) has received much attention from researchers and managers alike. There is an abundance of definitions. However, the key principles are similar; the logic of SCM is that there exists cost benefits in adapting and coordination of the activities carried out in sequence between the various actors in the supply chain (Håkansson and Persson 2004). One of the most commonly used definitions is provided by Lambert, Cooper, and Pagh (1998: 1): "*Supply chain management is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders*". There has been a shift in the view of how competitiveness is created and managed. Previously, the focus was mainly internal (i.e. businesses

were mostly concerned about what happened within the boundaries of the firm). In the later years, this view has evolved to encompass the entire supply chain from raw materials to the end product in the hands of the customer. Purchasing of goods and services emerges as a key activity within supply chain management.

Arjan J. van Weele (2005: 12) provides a broad definition of purchasing: "*The management of the company's external resources in such a way that the supply of all goods, services, capabilities and knowledge which are necessary for running, maintaining and managing the company's primary and support activities is secured at the most favorable conditions*". From the provided definitions we now see that SCM and purchasing are related. SCM is concerned with all activities from the supply of raw materials, through to transformation activities and to the end product. Thus, it encompasses the purchasing function which to a large extent is concerned with the supply of inputs.

Furthermore, from the definitions above it follows that supplier relationships emerges as an important issue in purchasing and SCM. There has been a realization about the benefits that can be gained from closer cooperation with suppliers (Gadde and Snehota 2000); that is supplier relationships have received an increasing strategic attention. Davis (1993) refers to this acknowledgement as a shift from purchasing to supply management. According to van Weele and Rozemeijer (1996) the traditional approach to supplier relationships, arm's length relationships, has slowly been abandoned for a more interactive approach. We now observe an emphasis on the benefits of collaborative and long-term supplier relationships (Araujo, Dubois, and Gadde 1999; Gadde and Snehota 2000).

Dyer and Singh (1998) argue that the competitive advantage resides in the relationship between companies, not only within the boundaries of the specific company. This view is supported by Lavie (2006), arguing that alliance-transferred resources through direct inter-firm interactions have a considerable impact on firm performance. Combined with the concept of core competencies, the sustainable competitiveness might then essentially exist in the company's ability to exploit the competences accessible through the network (Prahalad and Hamel 1990). Still, strategic cooperation is not without its difficulties. Successful group efforts require good communication to facilitate for sustainable interfaces. As the scope or intensity between the partnering firms increases, so does the information-processing needs that, in turn, require greater information-processing

capabilities (White and Lui 2005: 916). To be able to make use of the underlying prospects of collaboration, it is important for a company to occupy an 'information-rich position' in the network so that prolonged learning improvements enhance the value of the combined resources (Gadde, Huemer, and Håkansson 2003). Consequently, from a strategic point of view, the effect of supplier relationships on firm performance becomes even more evident.

Despite the general industrial trends of establishing closer relationships with suppliers, seeking collaboration and long term relationships, the construction industry is still to a large extent characterized by adversarial relationships between contracting parties (Cox and Ireland 2002). According to Cox and Ireland (2002: 409), the conflicting nature of supply and demand is the root cause for the fragmentation and adversity of the construction supply chain. These claims are supported by Love, Irani, and Edwards (2004) who draw upon the findings of several governmental-initiated investigations. Competitive tendering, price-based supplier selection, lack of customer-supplier relationship focus, lack of coordination and communication between participants and ineffective use of technology are among the findings of these reports (Love, Irani, and Edwards 2004: 43). If one considers how dependent the large main contractors are on subcontractors and materials suppliers, the state of the construction industry appears paradoxical. Miller, Packham, and Thomas (2002) explain that conflicting interests and barriers to innovation is a constraint regarding harmonization the relationship between mains contractor and subcontractors.

Countless research papers on customer -supplier relationships in the construction industry conclude that a SCM approach should be adopted, focusing on long-term collaborative relationships between main contractor and subcontractors (Dubois and Pedersen 2002; Holmen, Pedersen, and Jansen 2007). Despite of this, the construction industry has been slow to change (Lê and Brønn 2007).

Why are the construction industry participants so reluctant to change? The relational literature presented above seems to evade or go around the element of risk in construction. Few if any articles dealing with customer-supplier relationships in the construction industry regard the inherent risks in construction projects explicitly. Contractual risk allocation is a deeply embedded practice in this industry. This practice can also be viewed as an antecedent to the adversarial relationships as described by Miller, Packham, and Thomas (2002) and Cox and

Ireland (2002). In effect, main contractor and subcontractor have opposing interests when regarding risk allocation in construction contracts. Adversity in this respect will automatically put a strain on the relation between the contracting parties, further hampering the evolution of close relationships and collaboration between main contractor and subcontractor, leading to a transactional relation between the parties.

1.2 Research problem

When it comes to SCM and supply management issues the construction industry lags behind other industries, such as the automotive- and the electronics industry. There are several reasons for this, some of which we will explore in detail in our thesis. Due to these problems, we see supply strategies in this particular context as an interesting area of research. We will link supply management to the 'competitiveness of the firm'. This provides us with a great opportunity to conceptualize how a firm can change its supply strategy, and for what reasons this might be a rational strategic move.

Moreover, we will consider risk as an explicit factor in this regard, as this is "the" decisive factor in many situations. This factor seems to be omitted or not thoroughly considered by many researchers who have studied purchasing and supply strategies in this particular industry. We believe that the consideration of risk will add extra value to our thesis.

With a basis in these issues we can establish our first research question:
Which supply strategies are common in the construction industry, and what is their rationale?

The two following research questions can be derived from the previous:
Why do conventional practices, based on competitive tendering, remain the dominant strategy in the construction industry?

What benefits can be obtained through a differentiated approach to supply strategies in the construction industry?

Through the first research question we want investigate how the supply of materials and services in the construction industry is handled by studying the

common practices of a Norwegian main contractor. This part will be answered throughout the case presentation and analysis in chapter 4 and proceeds as the basis for responding to the secondary research questions. The second research question aims to create a deeper understanding for the context in which these strategies are being pursued. The third research question will lead us to suggest a differentiated approach to supply management based on the implications drawn from the theoretical framework. This method is alternative in the sense that it proposes a balanced approach to the traditional dichotomy between markets and collaborative activities.

1.3 Thesis structure

The structure of our thesis is anchored in the three foregoing research questions and is logically ordered to study these areas. Initially we present and discuss the theoretical framework which will support the ongoing analysis and discussions throughout the thesis. Following this we establish the methodological issues of our study, including topics from the data collection phase and the empirical context of the case analysis in section three. In section four we present the case analysis and make out the most significant findings from our data collection process. As a basis in this analysis, we combine the theoretical framework and case study and propose a differentiated approach to supply management in section five. Lastly we recapitulate the discussions with our concluding remarks and suggest some topics for future research.

2. Theoretical framework

From the introductory discussion and our following problem statement and research question, the scope of our theoretical framework has been defined. In the following sections we will explore the most interesting and important research that is found to be relevant for our area of research. We have divided our review into three parts, structured to cover the problem area in a logical succession. First, we discuss the concept of competitive advantage, with particular attention on the extension of firm boundaries and implications of inter-organizational arrangements. In the next section we review the notions of outsourcing and subcontracting, and how these relate to the topic supply risk management. Finally, we present a discussion on supply management and strategies for supplier relations.

2.1 Competitive advantage

The concept of competitive advantage has a variety of definitions in the strategic literature. Intuitively, the concept encourages a perception of improved capacities to compete and the utilization of such positions to one's own advantage in relation to competitors. Peteraf (1993) stated that the competitive advantage primarily resides in the organizational competences and resources. When these are superior relative to those of rivals, the competitive advantage emerges as they are matched appropriately to environmental opportunities (Ibid). This idea is founded in the resource-based view of the firm, where resources are applied and combined to create sustainable interfaces. The crux of obtaining competitive advantage is said to reside in the way that a firm extracts 'rents' and how these are defended over time (i.e. Ricardian or monopoly rents). Such an approach includes both ex post limits (before), as well as the ex ante limits (after) to competition. In other words, the rents have to be extracted in such a way so that the competitors are not able to copy the activity. A final condition to competitive advantage is the mobility of the resource. If the resource is easily accessible (i.e. there is a boundless supply), then the position is not justifiable over time.

The resource-based perspective of a competitive advantage has received support from other researchers as well. An alternative definition is given by Barney (1991), stating that "a firm has a competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors". Building on the assumption of resource heterogeneity, he proposes that, in order to embody a competitive advantage, a

resource must have four distinct attributes: 1) it must be valuable; 2) it must be rare; 3) it must be imperfectly immobile; and lastly 4) it cannot be substituted with others. These four attributes gives rise to the framework known as the VRIO. If a resource (e.g. knowledge or competence) entails all of these attributes, it is said that it will help generate a sustainable competitive advantage.

Boguslauskas and Kvedaraviciene (2009: 78) distinguish between core competencies and core activities, proposing that non-core activities do not use a company's core competence while core activities do. Since companies traditionally outsource non-core activities, then outsourcing practices operate at a different level than core competencies. Consequently, a company's definition of core competence does not have any clear-cut implications for a company's outsourcing policy. Even so, a central issue at this point is the process of identifying those activities that are not "at the core". According to Goddard (1997), core competences can be identified based on seven critical characteristics. We consider the most relevant. As a starting point, a core competence is tacit and consequently impossible to imitate. Secondly, it is something the company does better or differently from competitors. Thirdly, they are rare, meaning that they limited to two or three activities in the value chain based on the future success of the company. And lastly, they are said to be flexible, in the sense that they are able to straddle a variety of functions and are not tied into existing ways of doing business. Following on that, Pralahad and Hamel (1990) define core competence as the "collective learning in organizations, and the coordination of diverse productions skills and integration of multiple streams of technologies". These characteristics materialize the concept of core competence and can help managers identify critical and central activities in organizations, as well as the division of roles and responsibilities in a supply chain.

While further exploring the resource-based view of the firm, Dyer and Singh (1998) found that the perspective in fact overlooked one important aspect. According to the authors, the (dis)advantages of an individual firm are often related to the (dis)advantages of the network of relationships in which the firm is embedded. This means that the search for competitive advantage has traditionally been confined to the resources located within the firm, and not accessible through business relationships. In such a fashion, the authors suggest a 'relational view' of competitive advantage. By the introduction of relational rents, that is a supernormal profit jointly generated in an exchange relationship that cannot be

generated standing alone, a dyad or a network of firms can develop relationships that result in sustainable competitive advantage (Ibid). For instance, firms are said to generate relational rents when the volume of exchange episodes increases. Additionally, synergy-sensitive resource interfaces (i.e. resource combinations that increase in value when they are connected) that entail the attributes projected by Barney (1991), will also generate relational rents. These are both relevant sources of relational rents in business relationships.

One interesting point at this juncture to note is that the resource-based view and the relational view are contradictory views. According to Peteraf (1993), critical resources that represent opportunities for competitive advantage should be protected against other firms rather than being shared in a dyad or network. On the other hand, the relational view of competitive advantage can also be seen as an extension of the resource-based view since it expands the boundaries of a firm. A dyad generating sustainable competitive advantage through a particular resource interface should adapt both the ex post and ex ante limits to competition and the attributes of the VRIO. In this fashion, the perspectives are complementary as well. Following on that, Lavie (2006) argues that the RBV in and of itself cannot explain how firms gain competitive advantage in an environment in which firms maintain frequent and multiple collaborative relationships with partner firms. In fact, the lack of emphasis on collaboration in traditional theories of competitive advantage has left a theoretical gap that is not able to clarify observations concerning the strategic behavior and performance of interconnected firms. The underlying assumptions in the studies by Peteraf (1993) and Barney (1991) state that the generation of rents requires ownership, or at least complete control of the rent-generating resources (i.e. a firm should be valued based only on the contributions of internal resources). However, Lavie (2006: 641) states that ownership and control are not necessary conditions for competitive advantage. In fact, firm valuation should not only be based on the internal resources, but also the resources of the alliance partners. On the other hand, the RBV could also be viewed as an appropriate theory for examining strategic alliances because firms essentially use alliances to gain access to other firms' valuable resources (Das and Teng 2000). Equally, alliances in competitive markets are said to improve strategic positioning by supplying resources, and by allocation of costs and risks (Eisenhardt and Schoonhoven 1996).

Nevertheless, the scheme of sustainable competitive advantage predominantly exists in such a way that the advantage is valid over time. Porter (1996) argues that rivals can quickly copy any market position, thus any competitive advantage is temporary. This approach is conceptualized through the activity-based view of the firm. As competitors continuously benchmark and adapt each other's positioning in the market, they reach a state of 'hypercompetition', which is said to be the path predestined for a mutually destructive state. The key then becomes to outperform competitors, either by focusing on operational effectiveness, strategic positioning in the market, or both. The latter suggests establishing different activities from their rivals, or performing the same activity differently or, otherwise, to do it better.

2.2.1 Competitiveness in the construction industry

Alliances between organizations have recently received momentum in the construction industry. The term 'alliance' in this context can be used interchangeably with another well known expression within construction, which is the concept of 'partnering'. Alliances provide opportunities for transferring skills and resources, which helps reduce uncertainties and accelerate learning (Ingirige and Sexton 2006). The alliance participants engage in a continuous process of trust building supported by 'openness' and 'mutual alignment', facilitating for sustainable competitive advantage. This way, the benefits of collaborative efforts can be rationalized through the combination of the resource-based, the activity-based and the relational-based views of the firm, which we assume in our thesis. However, in project-based organizations such as those found in the construction industry, the potential long-term learning benefits have been substituted with notions of short-term productivity and cost savings (Ibid). This is primarily because the projects postulate 'one-off' characteristics which promote barriers to learning from earlier experiences. Consequently, we observe a crucial differentiation between the concepts of 'long term partnering' and 'one-off project partnering', based on the anticipated longevity of collaboration. Because of the very nature of project-based organizations, the rationality of partnering is restricted to discontinuous learning and feedback loops among the different project teams, thus obstructing the potentials for creating competitive advantages (Ibid).

According to March, Sproull, and Tamuz (1991), the strategy of seeking short-term benefits (e.g. discontinuous collaboration between the different

construction project teams) reduces the opportunities for alliance project teams to add value in the future. Linking this to Peteraf's notion of competitive advantage (1993), there should be a natural trajectory embedded in a firm's knowledge base (e.g. continuous learning), to facilitate for competitive advantage. Following on from this, Mesquita, Anand, and Brush (2008) highlight the need for managing in supplier networks, explaining the emergence of supplier development programs. These are efforts of transferring knowledge where the buyer educates the supplier on the principles of collaborative strategies. This view is supported by Love et al. (2002), proposing that the key to successful partnering initiatives lies with the ability of main contractors to structure 'learning alliances'. Alliances formed for discrete construction projects may not be useful because of the lack of joint learning, which is established by the short-term work environment (Ibid: 4). Also, with respect to Porter's activity approach (1996), competing solely on the basis of operational efficiency (e.g. achieving excellence in individual activities) is not really a viable strategy because the competitive advantage would not be sustainable over time. Strategy is about combining activities better than one's rivals. In this way, there is a significant gap between the strategic theory and frequent business practices, and is therefore a concept that needs further assessment in our master thesis.

For a main contractor within the construction industry, we argue that the core competence resides in the capacity for it to create value through its subcontracting activities. For apparent reasons, a main contractor cannot have full tenure of all associated activities in a project, and has to rely on third parties for creating value. Ellison and Miller (1995) posit that long-term relationships in the construction industry can promote a sense of there being less competition. A synergistic relationship can then be used to develop the core competencies. This perception gives rise to the importance of managing supplier relations, which we discuss in more depth in section 2.3.

2.2 Outsourcing and subcontracting – The make or buy decision

van Weele (2005) explains that most companies today spend over 50 % of their total turnover on purchased goods and services. According to Persson and Håkansson (2007), the cost of purchased goods and services is in the area of 60 – 80 % of a company's total costs. One contributing factor here is that we observe an increasing specialization of the individual companies. As companies are

increasing their attention on what is considered as core activities and competencies, there is also an ever increasing need to purchase certain goods and services from external actors as these are not available in-house.

van Weele (2005) and Hindle (2008) argue that the drive for identifying core competences has led to an increased popularity in outsourcing practices. Rapidly, companies are becoming aware of the fact that almost any process can be outsourced to a third party. Increased awareness towards critical activities and specialization has also raised a central question for strategizing managers: "should non-critical activities be allowed to consume valuable resources?" (Ibid: 42).

Subcontracting is common in the construction industry. As we shall see, there are good reasons for this practice. Subcontracting shares some characteristics with outsourcing, and in many respects these two concepts are alike. The classic make or buy decision is the starting point for both. The make or buy decision is usually associated with outsourcing. Thus, we start by introducing this concept before moving on to further describe the difference between outsourcing and subcontracting. Finally we provide a discussion of the primary characteristics of subcontracting.

van Weele (2005) presents the following definition of outsourcing:

> *Outsourcing means that the company divests itself of the resources to fulfill a particular activity to another company to focus more effectively on its own competence. The difference with subcontracting is the divestment of assets, infrastructure, people and competencies*.

According to van Weele (2005) companies are increasingly turning to outsourcing in their attempts to enhance competitiveness. Outsourcing can be the result of a 'make or buy' decision. This author explains that the rationale behind this division can be different for different companies. There can be both tactical and strategic reasons for this decision. With regards to the strategic reasons, the most important are: 1) to gain access to resources that are not available internally; 2) to increase flexibility and share risk (Ibid). Tactical reasons might be: 1) to reduce control and operating costs; 2) to improve performance (Ibid). Other authors such as Simchi-Levi, Kaminsky, and Simchi-Levi (2004), classify reasons for outsourcing into two major categories: 1) a dependency on capacity; 2) a dependency on knowledge. The latter category is the most interesting in our context, providing us as it does with a link to the subcontracting practice that we observe in the construction industry. Dependency on knowledge can easily be

translated into subcontracting. The focal company is not in possession of the people, skills, and knowledge needed to produce a good or service, so the activity is outsourced in order to access this particular capability (Ibid). Further, the focal company must have the knowledge and skills to evaluate the needs of the customer and translate these into functional characteristics of the good or service. Thus, the focal company more or less functions as a coordinator.

If we now turn to the concept of subcontracting, a definition can be found in the Business & Management Dictionary:

> The delegation to a third party of some, or all, of the work that one has been contracted to do. Subcontracting usually occurs where the contracted work (for example, the construction of a building) requires a variety of skills. Responsibility for the fulfillment of the original contract remains with the original contracting party. Where the fulfillment of a contract depends on the skills of the person who has entered into the contract (for example, in the painting of a portrait), then the work cannot be subcontracted to a third party. The term subcontracting is sometimes used to describe outsourcing arrangements.

Although subcontracting and outsourcing share some characteristics, there are also some principal differences between them. Outsourcing is usually a decision by the buying company to buy a certain good or service which the company itself at some stage had the assets, knowledge and resources to perform the activity in question internally. Whereas in subcontracting, the buying company usually has not been in a position where it can produce the good or service internally. Leenders et al. (2002) describes subcontracting as a special class of the make or buy decision; the main contractor bid out part of the contract to other contractors, and in accordance with the discussion above, acts more like a coordinator of the project than a producer.

Another characteristic of subcontracting is the frequent bundling of both product and service. For example electricians working on a construction project will in most cases supply their own materials as well as performing the installation service.

In this context, the four reasons listed above are believed to be the main driving factors in the decision to subcontract parts of construction projects to external actors. Further, a construction company will, in most, cases not be able to internalize all functions and competencies needed to complete complex construction projects. In this particular industry, one can argue that the main contractor has no choice but to subcontract parts of the project.

2.2.1 Supply risk management

As have been discussed in the preceding chapter, companies outsource activities for several reasons. However, according to Boyce (2003) subcontracting has both risks and potentials for the involved actors. The main contractor has the opportunity to share and/or delegate risk, as well as obtaining new experiences and skills in areas for which it has little knowledge. On the other hand, deficiencies such as uncertain responsibilities, conflicting priorities, disputes, overhead costs and geographic locality represent elements of risk in subcontracting that should be taken into account whenever assessing a 'make or buy decision' (Ibid: 104). Such considerations become even more evident as the boundaries of the firm expand beyond the traditional lenses of the focal company. This observation is supported by Ellegaard (2008: 426), suggesting that procurers and supply chain managers are confronted with risky business decisions when extending the scope of analysis. Due to the fact that risk is inherent in all construction projects, the goal of risk management should be to: 1) minimize the total cost of risk in the project, and 2) minimize risk (Rahmann and Kumaraswamy 2002). Moreover, since the amount of risk elements varies significantly across different projects, the process of identifying all risk related aspects appears to be an impractical undertaking. Even so, a consideration of the eight largest risks will usually cover as much as 90 % of the total risk (Barnes 1983), thus simplifying the investigation. In the following section we review contemporary literature on risk management, more specifically risk management issues in cooperative activities, and map out the most significant determinants of risk in construction. Essentially, risk can be managed either through the contract governing the transaction (Reve and Levitt 1984; Winch 2001) or the relation between the contracting parties (Ring and van de Ven 1992).

Governance structures

According to Reve and Levitt (1984: 18), transaction cost analysis takes the transaction as the unit of analysis and matches it with either markets or hierarchies to economize on the transaction. Since construction activities are often unique, custom designed and built, immobile, expensive and require specialized firms to employ specific competences, markets offers a large production cost advantage over the hierarchy in many construction projects (Ibid). However, increased exploitation of markets leads to higher uncertainties (e.g. opportunism, bounded

rationality or environmental complexity) which have to be managed. The notion of control becomes at this point a central factor since it is believed to influence the perceived levels of risk. Winch (2001) points out that the major issue within horizontal governance and subcontracting is the changing of roles. At one point the subcontractor is increasingly involved in the design phase, whereas at another point the subcontractor has less influence. This leads to increased uncertainties, which needs to be handled through contractual arrangements. For instance the turnkey approach, where the subcontractor assumes complete responsibility, passes the risk downwards in the chain. Conversely, the main contractor can chose between maximum control (i.e. retaining the contractual risk) or minimum control (i.e. delegating risk), both encompassing dissimilar inferences (Boyce 2003). In such a sense, the risk on a specific project could be minimized by retaining maximum control through purchasing only a service or distributing parts of the work at a time (e.g. design or make). Figure 1 illustrates this point.

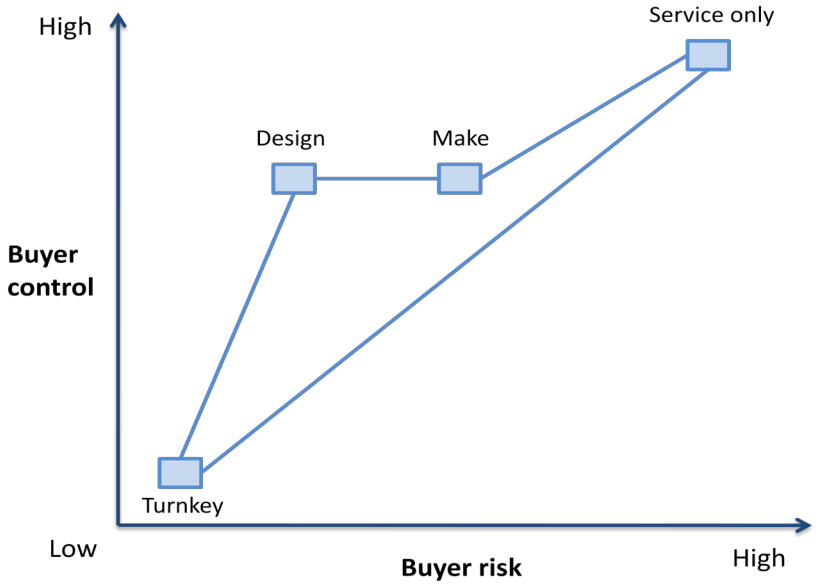

Figure 1 - Contract strategy (Boyce 2003)

In contrast, with this approach the main contractor will have a greater extent of accountability (e.g. risks of failure on the subcontractors account); in this way risk is repositioned rather than eliminated. More control over the process through regulatory and governance structures will enable the main contractor to influence the behavior of the subcontractor, thus reducing the likelihood of undesirable outcomes (Das and Teng 2001: 254).

Relational risk and performance risk in construction

A competitive advantage through inter-firm cooperation and the relational-view of the firm shifts the awareness towards the examination of risk management at the level of supply chains (Harland, Brenchley, and Walker 2003). Issues of risk are particularly important for the managing of strategic alliances because alliances are an inherently risky strategy (Das and Teng 2001). These authors advocate that alliances primarily face two distinct types of risk: 'relational risk' and 'performance risk'.

Relational risk includes risks associated to the probability and consequences of not having adequate cooperation (e.g. opportunistic behavior, conflicts, and hidden agendas). Performance risk comprises the probability and consequences of not reaching the negotiated objectives (e.g. intensified rivalry, lack of competence of the partnering firms, demand fluctuations, and sheer bad luck). The distinction between these two types of risks is important because, depending on which type of risk is more threatening, it will be the basis from which the partnering firms structure their strategies (Ibid: 254). This division is present in other studies as well. For instance, Harland et al. (2005) argue that an outsourcing decision runs the risk of a lack in skills and competence to manage the outsourcing relationship (i.e. relational risk). Olsen and Osmundsen (2005) propose that a main contractor can reduce the risk of construction projects through the project design and contract design (i.e. performance risk). A common feature between these studies is that, implicitly, they consider underlying variables of trust and control. Trust entails a positive expectation about the outsourcing partner, thus reducing the likelihood of unpleasant outcomes, while control is about influencing the behavior so that undesirable outcomes are less likely (Das and Teng 2001).

According to Ring and van de Ven (1992), the level of trust in a relationship will improve as the history of successful transactions increases over time. As the parties experience situations of recurring equity and fairness they loosen the constraints and screening of opportunistic behavior. Following this rationale, the authors propose that relationships may exist between the degrees of risk, reliance on trust and the structure governing the transaction (Ibid: 490).

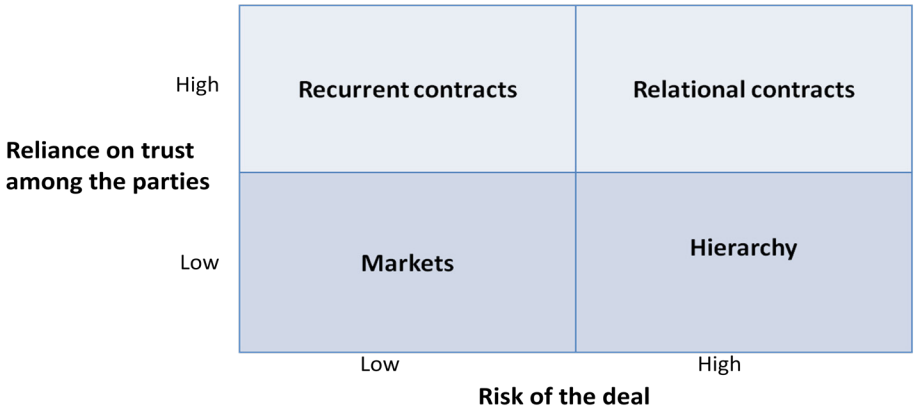

Figure 2 - A typology of governance structures (Ring and van de Ven 1992)

As illustrated in figure 2 (Ring and van de Ven 1992), an assessment of 'reliance on trust' and 'perceived risk' can help identify the optimal governance structure. We consider the four outcomes in turn.

In transactions where the actor has the necessary information to evaluate the risk involved, and there exists an abundance of suppliers, discrete and classical contracts provide an ideal governance structure. When such information is not accessible and the reliance on trust is low, the parties can create a hierarchy through a unified governance structure (e.g. a joint venture). In this way, opportunism is controlled because both actors have invested in an internalized undertaking. This is in line with the findings of Reve and Levitt (1984) who argue that there exist less opportunistic behavior within a hierarchical governance structure. The principle of recurrent contracts holds that the parties engage in low-risk transactions to build trust and equity, so that over time the experimental behavior will become a set of standardized processes which can help safeguard future transactions with high risk. Lastly, transactions of high asset specificity, uncertainty and mutual reliance, can be controlled through relational contracts. Unlike in market governance, sustaining the relationship becomes a concern, and market governance is replaced by modes of governance that in effect create a bilateral monopoly (Reve and Levitt 1984: 19). This can be viewed as a coordination of information flows, where the authority and control systems are loosely specified in a contract. Such contracts can be exemplified as joint R&D functions, technology or product development ventures, all intended at continuously educating each other. Still, harmonization between main contractors and subcontractors is often constrained by conflicting interests and barriers to innovation (Miller, Packham, and Thomas 2002: 67).

Compared to relational risk, performance risk is more measurable since it is concerned with realizing the objectives of the partnering firm. Relating to the issue of control, it is important that performance risk is allocated to both parties so that each has an incentive to minimize negative impacts (Barnes 1983). Therefore the allocation of risk among the contracting parties in a construction contract is an important decision leading to a project's success (Lam et al. 2007: 486).

In a study by Rahmann and Kumaraswamy (2002) the perceptions of present risk and risk allocation in construction projects were examined. They found that, apart from some exceptions, the contracting parties had inherently different perceptions of both present and preferred risk allocation, which in turn can lead to conflicts. On the more positive side, they also found that there was an apparent interest in joint risk undertakings among the parties (e.g. decreasing the liabilities of the present risk), indicating a paradigm shift from the existing confrontational and adversarial construction environment to a friendly and teamwork based culture of a win-win scenario (Ibid: 149). Following on this, Bender and Septelka (2002) argue that risks must be identified early in the project process and assigned to those best able to control them. Those taking added risks should be adequately compensated. Conversely, Barnes (1983) hypothesizes that the attitude towards risk taking is one important factor when allocating risk. Since construction contracts are believed to encompass a risk-averse position, they will strive to allocate risk towards the client or subcontractor, and allow these parties to add a contingency premium to the bid as compensation (Ibid: 25).

Towards uncertainty management

In the recent years there has been a shift in focus from risk management to uncertainty management. With this shift, there is also a shift in terminology. Uncertainty is taken to include both risks and opportunities (Ward and Chapman 2003; Olsson 2007). There are several reasons for this shift in focus. One of the reasons is the realization of the fact that potentially considerable gains in terms of cost reduction, project effectiveness and efficiency etc. have been missed out on due to the one sided attention that has been given to negative risk. We now follow the argumentation of Hillson (2002) to understand why uncertainty management is a more preferred approach than risk management. Risk and opportunities could of course be managed as two separate processes, but it is questionable if this would be appropriate. Hillson (2002) clearly points out that it is highly probable

that project managers will see a separate opportunity management program as an additional burden, and thus, they are less likely to pay these issues the attention they deserve. Hillson (2002) and Ward and Chapman (2003) emphasize that risk- and opportunity management should be considered as a single process, focusing on both upsides and downsides at the same time.

What will be important for a project organization is to reflect upon how to proactively manage and exploit opportunities that can be identified in the uncertainty identification stage, as well as how to manage and exploit opportunities when they present themselves during the project. A general awareness and attitude towards uncertainty that includes both upside and downside risk will be required.

Traditionally, three general responses to risk have been advocated: 1) avoidance or reduction; 2) transfer; and 3) retention (Perry 1986). With the uncertainty management approach, these responses have to be reconsidered. Hillson (2002: 238-239) suggest that an extended set of responses has to be considered by the project organization. Threat handling strategies would be: 1) avoid; 2) transfer; 3) mitigate; and 4) accept. Strategies for responding to opportunities would be: 1) exploit; 2) share; 3) enhance; and 4) ignore.

As has been shown, several researchers have examined the field of risk management and risk allocation. As supply networks are becoming significantly messier and more complex, the risk involved increases (Harland, Brenchley, and Walker 2003: 60). Since our level of analysis goes beyond the traditional dyadic relationship, we believe it is important to acknowledge this distinction. Also, supply risk management in construction should be occupied with developing strategies for handling the impacts of risk in supply chains. In the following chapter we explore the area of supply management and discuss models for managing the supplier base. This will give the reader a better understanding of the complexity in supply chains and what inferences that can be drawn from a supply chain management approach in our context.

2.3 Approaches to supply management strategies

The goal of every company is to develop a distinctive, sustainable competitive advantage (van Weele 2005). As a result, purchasing and supply management emerges as a key strategic tool for developing a competitive advantage. In light of this, it is natural to claim that suppliers emerge as an important part of the buying

firm's value creation and that buyer-seller relationships are becoming of high strategic importance as well.

Management of the firm's supply base has received much attention from practitioners and academics during the last decades. A variety of approaches towards this issue have been developed. In the later years, several alternative portfolio approaches for supplier segmentation have emerged. The following table summarizes the characteristics of the alternative models.

Model	Dimensions
Kraljic (1983)	Importance of purchase Supply risk
van Stekelenborg / Kornelius (1994)	Control need of internal market Control need of external market
Olsen / Ellram (1997)	Difficulty of managing the purchase situation Strategic importance of the purchase
Bensaou (1999)	Buyer's specific investments Supplier's specific investments
Gelderman & van Weele (2000, 2001)	Supplier's dependence Buyer's dependence

Table 1 - Supplier segmentation models (Persson and Håkansson 2007: 28)

Kraljic's Purchasing Portfolio

Perhaps one of the most well-known approaches is the purchasing-portfolio model developed by Peter Kraljic (1983). This approach is based on two variables: 1) purchasing impact on the bottom line; and 2) the complexity of the supply market. The first variable concerns the importance of purchasing in terms of the economic impact of a supply item measured against total cost, cost of materials, total volume purchased and the item's impact on profitability (Ibid: 110). The complexity of the supply market can be evaluated by applying criteria such as supply scarcity, market conditions, substitutes and the like. The supply risk is associated with the availability of the supply item in the long-term and short-term as well as the number of potential suppliers.

This model is an effective tool for segmenting suppliers according to the importance of the supply item and complexity of the supplier market.
The result is four different product categories that require their own unique strategy for effective supply handling.

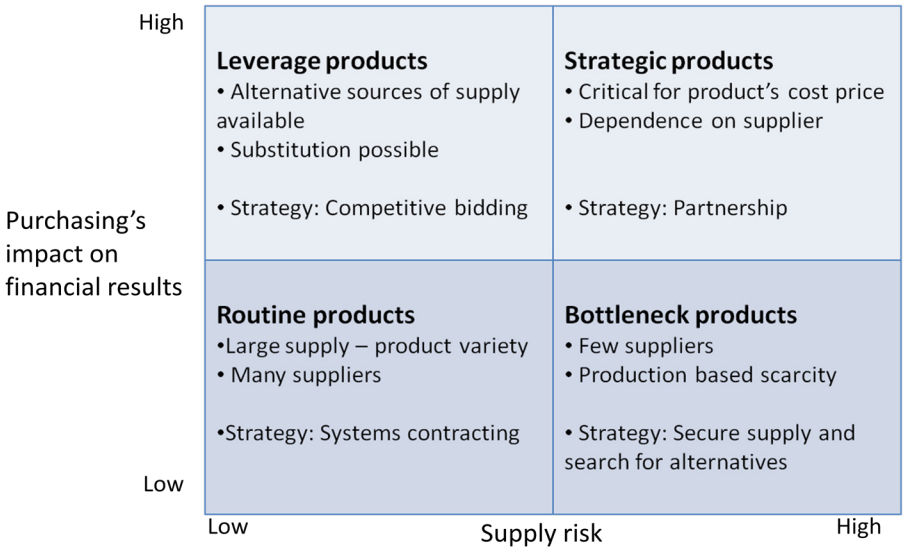

Figure 3 - Purchasing portfolio (adapted from Kraljic (1983) and van Weele (2005))

The basic characteristics of the proposed strategies can be summarized as follows;
Partnership – create mutual commitment and long-term relationships.
Competitive bidding – obtain the best deal in the short-term.
Secure supply – Reduce supply risk by searching for alternative sources of supply.
Systems contracting – Reduce supply base and increase operational efficiency.
Basically, the goal is to develop a purchasing strategy that minimizes supply risk and exploit buying power.

Bensaou's Contextual Profiles

The framework developed by Bensaou (1999) represents a different approach to supplier segmentation. This approach is based on buyer-supplier relationships, and applies this dyad as a starting point for the analysis. This portfolio approach is based on two variables: 1) buyer's specific investments; 2) supplier's specific investments. Investments refer to both the tangible and the intangible. Intangible investments are typically aimed at learning the other party's business practices, routines and knowledge. The goal will be to further develop the relationship. Time and people are the primary inputs in these activities.

Bensaou identified four contextual profiles based on the framework presented above. The contextual profiles explain the conditions where the various types of relationships are likely to appear. With basis in the contextual profiles, four corresponding management profiles can be formulated. A brief review is in order.

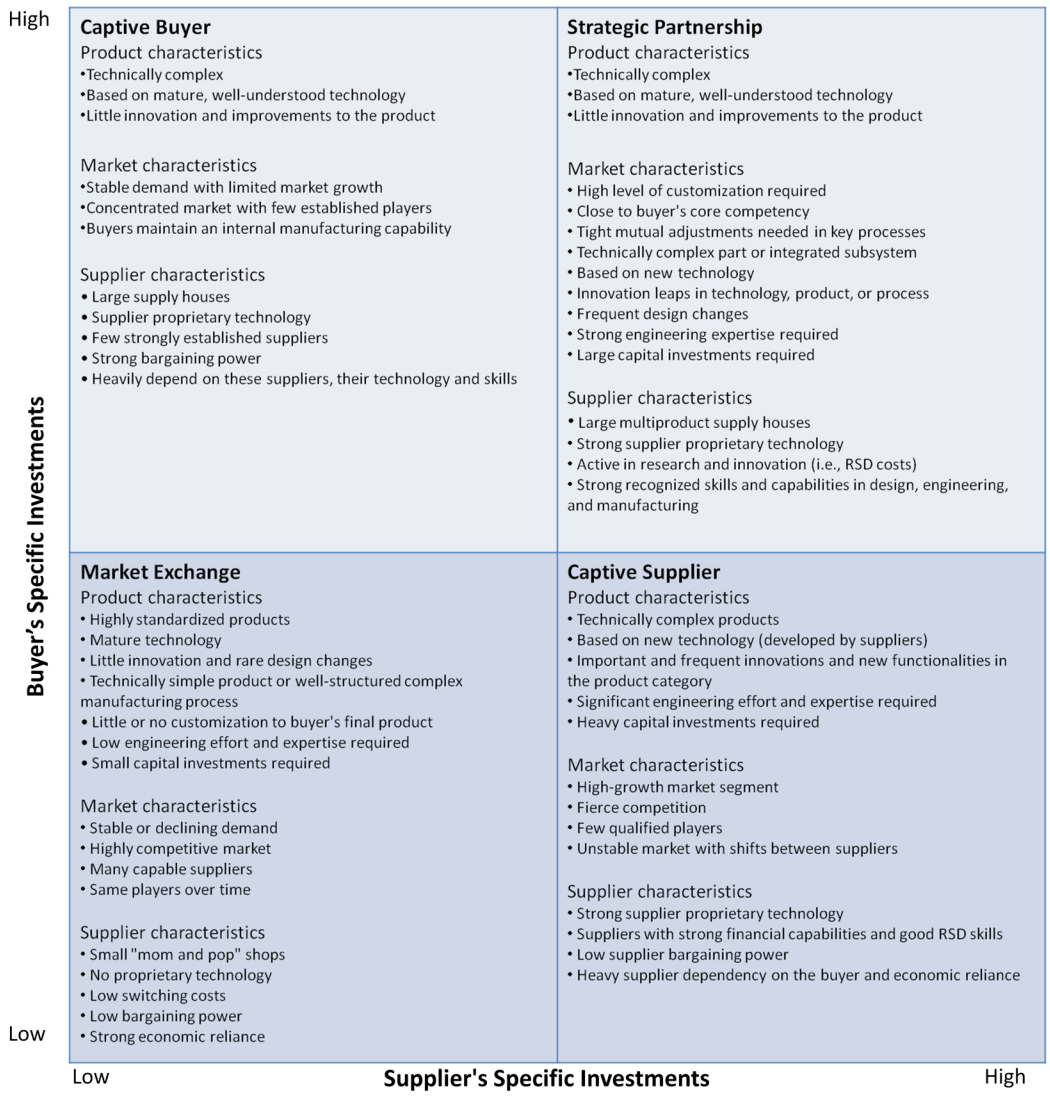

Figure 4 - Contextual profiles (Bensaou 1999: 38)

Market Exchange – limited time and resources are spent on meeting supplier staff and management. Tasks are highly standardized and are guided by routines. These relationships are often guided by formal short-term contracts. In spite of low trust and commitment, a positive social climate is characteristic of these types of relationships.

Captive Buyer – due to product complexity and the need for customization and adaptation, interaction between the parties is broken down to steps and procedures. Detailed information is continuously shared between buyer and seller. Bensaou (1999) terms this "broadband" communication. Tasks are structured and guided by routine, but a lot of time is spent with the supplier. The social climate is often tense and characterized by mistrust.

Strategic Partnership – close relationships with continuous exchange of information and standardized rules and procedures is typical in these types of relationships. Trust and collaboration is the most prominent characteristic. Benefit and risk is mutually shared between the collaborating parties, and the supplier is to a great extent involved in planning and decision making.

Captive Supplier – although characterized by mutual trust, planning and development is not necessarily part of the interaction between the parties. Communication is primarily concerned with coordinating activities.

With a basis in this, Bensaou (1999: 43) claims that there are two kinds of successful relationships. Relationship requirements should be matched to relationship capabilities. Over or underdesigned relationships are the path to failure. The following figure can help explain this notion.

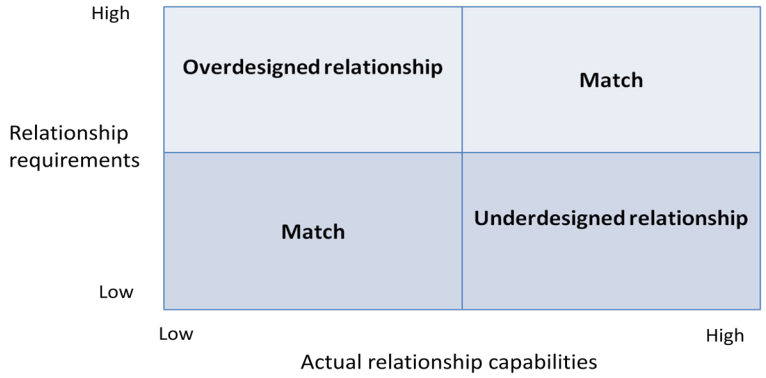

Figure 5 - Managing a portfolio of relationships (Bensaou 1999: 43)

Design or redesign of a relationship would consist of three steps:

1) Strategic selection of relational type to match the conditions given by the product, technology and the market.
2) Identification of an appropriate management profile for each type of relationship design.
3) Matching the design of the relationship. This last step will help a company find the desired management profile so that over- or underdesigned relationships can be avoided.

The key to an effective approach is to match the actual relationship capabilities to the relationship requirements. For example investing too heavily or putting more resources than necessary into a relationship would not only be costly, but also potentially very risky.

Criticism of the portfolio approaches

The two alternative portfolio approaches discussed in the previous sections provide the company with different approaches for segmenting and structuring their supply base. The assumptions underlying these models have recently been questioned by several authors, i.e. Dubois and Pedersen (2002), Persson and Håkansson (2007).

Dubois and Pedersen (2002) discuss supplier relationships with regards to purchasing portfolio models, such as the framework presented by Bensaou (1999). They argue that the portfolio models do not account for interdependencies between relationships, and further that this is a major weakness with this approach as these models regard relationships in isolated dyads. The industrial networks approach regards relationships between buyer and seller as being embedded in a larger network of actors. Thus, the interdependencies between various relationships becomes of interest due to the focal unit of analysis being inter-firm relations, not companies. To clarify, what takes place in one relationship will automatically affect other relationships in the network of actors. Dubois and Pedersen (2002: 38) state that relationships are considered as organizing living units that evolve over time, changing in content and function. This approach is clearly in contrast to the static portfolio approach. Persson and Håkansson (2007: 29) elaborate on this discussion stating that the portfolio models are situation oriented and do not consider or address the possibility that situation do change. These authors point out that in fact it takes "two to tango", and that suppliers also have a choice; customers can be more or less attractive. The potential fit between the parties, and willingness to collaborate are relevant factors to consider.

According to Gadde and Snehota (2000), making good use of suppliers is a complex task. They argue that there are at least two reasons for this. First, the economic consequences are difficult to assess, and second, a company can only exercise limited control over a supplier. Buyer-seller relationships are interactive and continuously changing, and thus there exists inherent uncertainties (Ibid). Gadde and Snehota (2000: 314) conclude that there is no such thing as a generally best type of relationship. Furthermore, Bensaou (1999) found that there is no significant difference in performance between the various types of relationships. No relationship is inherently more effective than another, be it a strategic partnership or a market exchange based relationship. This would then suggest that

the performance of a relationship is dependent on how well it is managed. Bensaou (1999: 37) proposes that:

> *Successful supply-chain management therefore requires the effective and efficient management of a portfolio of relationships; first the firms must match the optimal type of relationship to the various product, market and supplier conditions; second, they must adopt the appropriate management approach for each type of relationship.*

Gadde and Snehota (2000) point out that effective management within relationships would also entail modifying the posture of that relationship in light of changing conditions, and that this is a critical issue in supply management. Thus, the posture of a relation should not be locked and static until the relationship dissolves, but should rather be dynamic and organic.

Considering the different approaches

We believe that the portfolio and the industrial networks approach are not mutually exclusive, and that they both have valuable lessons to teach. Further, it seems unlikely that a company has the time and resources to evaluate the consequences of the actions in one relationship in terms of extended network effects. Of course, it would be natural to evaluate the consequences for relationships that are somewhat closely connected in the network, but simplifications must be made in order to handle the information effectively. Thus, the task becomes to manage in relationships, and at the same time paying attention to the relationships that surrounds the dyad.

Further, we believe that a company must create some sort of structure in their supply base. In example, segment their suppliers in order to develop a strategy for coping with and handling the relationships with their supply base. Differentiated supplier strategies can be viewed as a source for competitive advantage (van Weele 2005). Holmen, Pedersen, and Jansen (2007) performed a literature review on supply base management and conclude that the following points are important issues in supply base management:

- the number of suppliers in the supply base
- reducing the number of suppliers in the supply base
- management of supply performance
- how suppliers are organized
- the nature of the relationship between buyer and supplier
- how buyer-supplier relationships can change over time

(Holmen, Pedersen, and Jansen 2007: 179)

If we look at supply management in our particular empirical context, many researchers have called for close collaboration, early involvement and partnerships with subcontractors (Eriksson, Dickinson, and Khalfan 2007; Humphreys, Matthews, and Kumaraswamy 2003). These strategies imply high involvement and mutual adoptions and investments as well as integration of processes. Cox and Ireland (2002) do not necessarily agree that this is an optimal approach. These authors state that it is worrying that relational practices based on collaboration are advised all too often when these, in fact, have little opportunity for being implemented successfully (Ibid: 412). Due to the historical and well established adversarial nature of buyer-supplier relationships in the construction industry, the collaborative approach will have a limited chance of success in many circumstances. Cox and Ireland (2002) further argue that the key is to recognize in which circumstances an integrated supply chain management approach has the opportunity to work successfully. This proposition can be seen as slightly more balanced in contrast to those who suggest that partnership and long-term relationships are the answer to more or less all the inherent problems of the construction industry. The point is that there is no single way of handling the supply base as the external environment, situations and circumstances regarding projects and suppliers are continually changing. This way of thinking is in line with what Persson and Håkansson (2007) suggest.

Cox and Ireland (2002) propose an alternative approach towards relationship management.

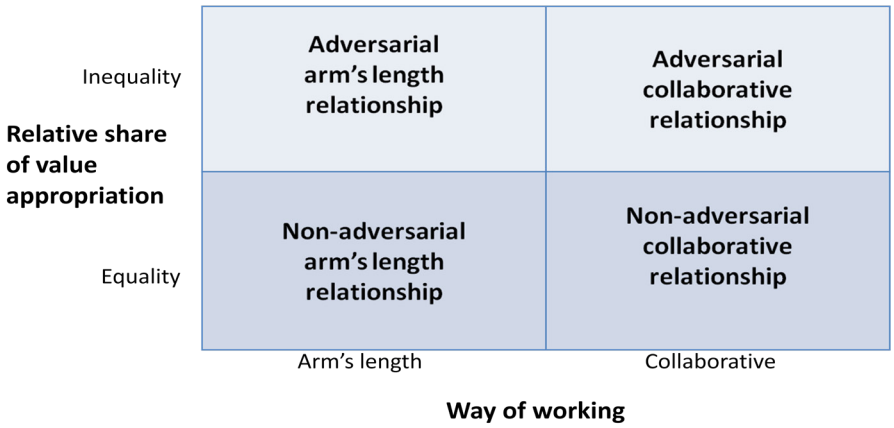

Figure 6 - Alternative relationship management choices (Cox and Ireland 2002: 414)

This is a simplified model that illustrates the different relational profiles. Choices are made along two dimensions (Cox and Ireland 2002: 413). Firstly, one must determine how much conflict over value appropriation is likely to occur between

the parties. In other words, what is the level of adversarialism? Secondly, how close will the parties need to work together in order to achieve their goals. Typically this is profit maximizing or, in real life, goal 'satisficing'. This approach is regarded as being complimentary to those previously discussed. It provides the opportunity for looking at supply management from a different perspective where arm's length relationships are an actual and viable strategy. This might prove to be useful in an industry which is, as we shall discuss later, characterized by a high level of adversarialism and conflicting goals in buyer-seller relationships.

Throughout this theoretical review we have discussed different and alternative approaches towards supply management and their implications. We have learned that supplier relationships are two sided, both buyer and seller have choices regarding the posture of the relation. Furthermore, it is clearly an important task for a buying company to identify the structure in its supply base and develop a strategy for how to handle the different relationships.

2.4 Theoretical implications

The preceding review of theoretical areas constitutes the basis for the discussion on how supplier relationships can be handled effectively. The implications of our study will be derived from a joint consideration of these topics. Our review covers several perspectives, including the resource- and relational based view, risk and uncertainty management, industrial networks, and supply chain management. By extracting the essence of each perspective and implementing these into our empirical context, we have fashioned a nuanced academic establishment for investigating the research questions. As we will discuss during the course of our case presentation and analysis, the different perspectives alone only capture parts of the problem. It is the integration of the different perspectives that gives our discussion its value. We believe that the failure to implement theoretical implications in the industry is principally a structural problem and not because there is a lack of knowledge amongst the practitioners. However, we argue that our review can shed light on how to actually overcome such structural problems by a closer examination of the current business practices and inter-organizational

attributes. The outline of our theoretical framework is presented in figure 7.

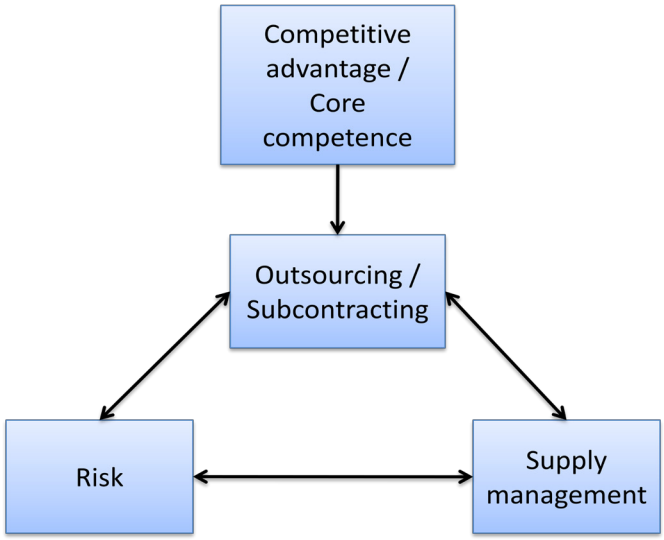

Figure 7 – Theoretical framework

A brief description of the key implications follows. The underlying proposition of our study is that a main contractor can achieve a competitive advantage through its relationships with subcontractors. By applying the relational view of the firm subcontractors are considered as an extension of the main contractor, this way extending the boundaries of the traditional resource-based view of the firm. Each of the participating actors endows a subset of its resources to the alliance with the expectation of generating common benefits from the shared resource interfaces (Lavie 2006: 643). Since subcontracting is the dominating value creating activity in the construction industry we suggest an approach of combining both operational effectiveness and strategic positioning through leveraging on subcontractor alliances and involvement. Furthermore, our theoretical conceptualization is positioned away from the usual cost-driven practice in the industry when arguing for a balance between operational effectiveness and strategic positioning. The rareness of resources will depend less on the characteristics of the resource and more on the nature of the connection between the main contractor and the subcontractor. Because of this, we argue that the existing theories on competitive advantage are highly context dependent and subject to change in dynamic environments. Relating this to the issue of sustainability, the projected longevity of collaboration between the cooperating actors facilitates a tacit and non-imitable interface.

Having defined the scope of competitiveness, one central challenge comes to light: if a main contractor can essentially create a sustainable competitive

advantage by leveraging on subcontractor resources, why do we observe discontinuous collaborative efforts in the construction industry? As discussed, there can be several reasons for this practice. However, a key factor is that the motivation for long-term supplier relationships will change over time as the characteristics of the relationships vary. Consequently, relationships are not static or fixed but rather dynamic interdependencies that necessitate different strategies depending on the situation. The theoretical implications at this juncture are that such supplier strategies should not be arbitrary, but as a result of continuous investigations of the supplier base. In that sense, segmentation appears as a promising strategy for efficiently managing the supplier base.

Finally, our theoretical review has found numerous arguments urging for closer collaboration in the construction industry. Yet, little of the literature mentions risk management as a separate concept to improve inter-firm performance. On the other hand, the majority of studies conducted within the construction industry implicitly deal with risk when considering governance structures, opportunistic behavior and transaction costs. The above review has argued for a closer scrutiny of risk in alliances, and the formation of supplier strategies in the view of performance and relational risks.

3. Methodology

In order to meaningfully answer our research question, we need to understand how subcontracting and purchasing in the construction industry functions. The qualitative research methodology seems to be appropriate in this regard. According to Berg (2007), qualitative research refers to such areas as meanings, concepts, definitions, characteristics and description of things. Further, qualitative research seeks to answer questions by examining contextual settings and the actors who inhabit these settings (Ibid: 8).

Within the qualitative research methodology there are several different methods of carrying out a study. According to Yin (2009), the case study method is relevant when trying to explain how some social phenomena work. Further, when in-depth description of the phenomena is required, the case study method becomes even more relevant (Ibid). We believe that both these conditions are present in our proposed research question. Thus, we choose a qualitative methodology – more specifically, we will apply the case study method.

3.1 Case studies

We have applied a case study method as an approach to obtain the information and understanding needed to answer our research question. This method has enabled us to investigate, describe and understand the empirical area. According to Berg (2007), case studies provide extremely rich, detailed, and in-depth information about the empirical setting of a study. Nuances, patterns, and latent elements that might be overlooked through applying other research methods can be captured through case studies. From our research question it followed that a broad investigation was in order. Moreover, the case method has been showed to be an appropriate method for investigating relationships and behavior (Dubois and Araujo 2007). Following the arguments of Yin (2009), we can further justify why the case study method fits our research topic and question. A case study can be said to be an empirical in-depth examination of a phenomenon within its real-life context. Case studies are especially useful when the boundaries between phenomenon and context cannot be clearly distinguished. Further, the case study method copes with situations where there are a variety of variables emerging from multiple sources of evidence, with data needing to converge in a triangulation fashion (Ibid: 18). Finally, the case study benefits from an a priori development of a theoretical framework, which guides the data collection and the following analysis.

In relation to our area of study, these are good arguments for the choice of method. Purchasing in the construction industry is a complex task due to a range of factors such as: technical specifications and requirements of the goods and services purchased, interdependencies between goods and services in relation to the iron triangle (cost, time and quality), the risk such projects entail, human relations, and the amount of finances involved etc. A case study can help us account for factors such as these. Further, these are examples of elements that have a large impact on purchasing strategies.

With regards to the design of the case study, Yin (2009: 27) proposes five components for creating a formal design for case studies:

- Study questions
- Theoretical framework
- Identification of the units of analysis
- Logical linking of the data to the theory
- Criteria for interpreting the findings

These elements have guided our design process.

Berg (2007) distinguishes between several case study design types. The type fitting our purpose is the type termed 'descriptive case studies'. "*This approach implies the formation and identification of a viable theoretical orientation before enunciating research questions*" (Ibid: 293). This was considered before the formulation of our stated research question.

Before we move on to further discuss our research methods and process, we need to present the empirical context and the company that is our unit of analysis in more detail.

3.2 Empirical context – The construction industry

The following description of the construction industry rests on two pillars. Firstly, the authors' own observations during field research and in-depth interviews with construction professionals, and secondly, observations from previous research in this particular industry.

The most prominent characteristic of the construction industry is the extensive use of subcontracting. Main contractors, who are responsible for the completion of a construction project, subcontract large portions of the project to special trade contractors (Eccles 1981). Special trade contractors, or subcontractors as they have been named, will then take on specific responsibilities

within a given project and carry the responsibility for the completion of their part of the contract. Approximately 65 % of the full cost of a typical construction project is related to the procurement of subcontractor services. Eriksson, Dickinson, and Khalfan (2007) point out that in spite of the volume subcontractors account for, main contractors remain relatively unsophisticated in their approach towards them. Moreover, Dubois and Gadde (2000) emphasize that main contracts are heavily dependent on subcontractors. This practice relies on competitive tendering for the subcontracted work (Briscoe, Dainty, and Millett 2001). The main contractor issues a request for tender on parts of a construction process. Based on the description provided by the main contractor, the special trade contractors submit sealed bids for the contract. Many have criticized the main contractors for automatically selecting the lowest tender by measuring it based solely on price (Love, Irani, and Edwards 2004). But one should keep in mind that main contractors are also subject to price-based selection. The clients tend to choose the lowest bidder for the construction project. Thus, the one sided focus on low prices is more a systematical bias within the entire industry, not just with the main contractors. According to Dubois and Gadde (2002 a), competitive tendering leads to market-based short-term interactions between the contracting parties.

Furthermore, the construction industry is characterized by one-off projects. Temporary project organizations are established and dissolved when the project is finished. This temporary organization consists of the main contractor's project manager and officials, various subcontractors and suppliers of building materials. The relationship between the client and main contractor, main contractor and subcontractors are regulated by normative contracts who establish the division of labor and responsibilities. The contracts are also a vessel for division and transference of risk and uncertainty that affects the project and contracted work. There exist a number of different standard contracts that regulates the various relationships in accordance with the different organizational project structure. The Norwegian contract form is named "Norwegian Standard" (NS).

This rigid contractual standardization along with price-based selection can be viewed as an obstacle for developing long-term collaborative relationships with subcontractors. Relationships are thus, according to Miller, Packham, and Thomas (2002), primarily of a transactional nature.

Many have also pointed out the inherent complexity of the construction industry. Gidado (1996) distinguishes between complexity due to uncertainty and complexity due to interdependencies. Uncertainty originates from the environment, the task and the resources employed (Ibid: 216). Interdependencies within a project originate from the rigidity of the sequences of work and the overlapping elements that go to make up any particular construction project. Moreover, Miller, Packham, and Thomas (2002) point out that management in the construction industry is characterized by highly complex relationships, high interdependence between organizations, people and methods. This complexity influences the industry and how it works. The challenge is to overcome the complexities and obstacles to innovation in order to evolve in the future.

3.2.1 AF Gruppen ASA

We chose to focus on a large Norwegian construction and civil engineering company as our data sampling frame. AF Gruppen ASA (AF), founded in 1985, is one of Norway's largest construction companies. AF is an abbreviation for the two words Addressing Future. AF is listed on the Oslo Stock Exchange. According to AF's company presentation, since its formation, AF has been an independent company, proud of its own strength and ability to perform complex tasks. The entrepreneurial spirit at AF has been characterized by the ability and willingness to think differently and find better, more future-oriented ways in which to generate value (AF Gruppen ASA 2009). 2009 turnover was NOK 5.4 billion, and result before tax was NOK 366 million. AF has approximately 2 100 employees in Norway, Sweden, Poland and China. The operative enterprise in Norway is primarily organized in the company AF Gruppen Norge AS.

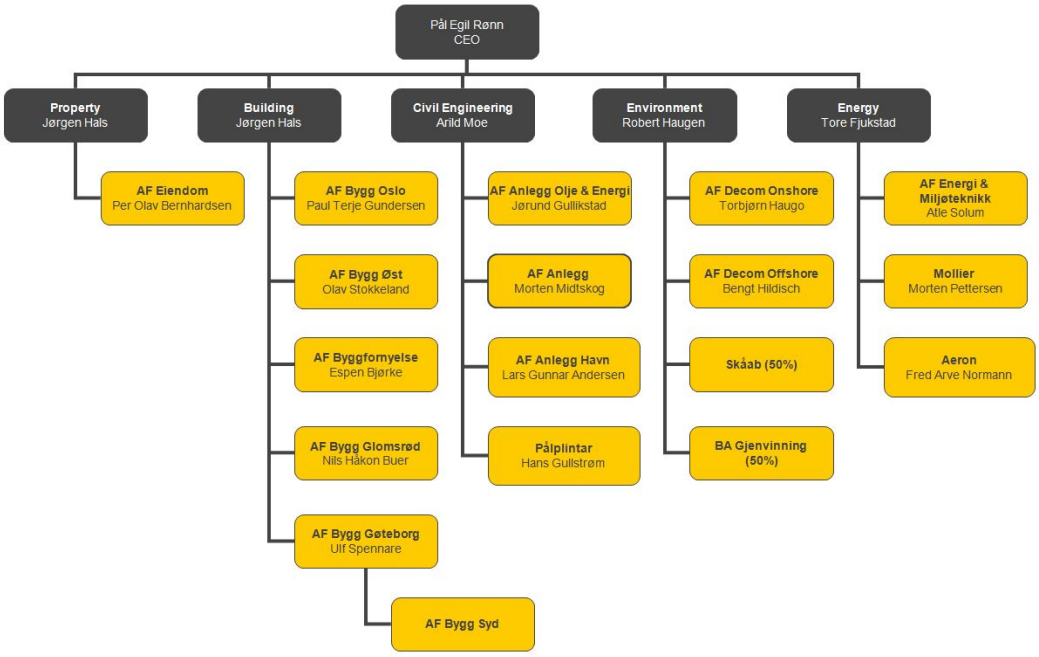

Figure 8 - AF Gruppen ASA Organization chart

The organizational chart shows that AF is organized around five key business units, each with their own distinctive core competence. The core business areas are services in property development, building services, construction and civil engineering services, energy optimization, demolition/recycling and offshore services (AF Gruppen ASA 2009).

As a property development company, AF identifies, acquires and develops residential and commercial building projects. Furthermore, AF carries out all types of building services for private and public clients. Rehabilitation of residential and commercial buildings has become a lucrative niche in the later years, especially in Oslo and the central eastern areas of Norway. AF also has a strong position in Gothenburg and southern Sweden.

AF is a turnkey supplier of construction services. With 20 years experience, AF carries out everything from small construction projects to large and demanding facilities projects. AF Construction's core competence lies within the areas of oil and gas, infrastructure such as roads, tunnels and harbors. In recent years, AF has also acquired competence in the construction of power plants and complementary power infrastructure.

AF has identified a market in demolition and environmental clean-ups both onshore and offshore. The onshore division is primarily concerned with the demolition of buildings and other constructions, as well as demolition in connection with rehabilitation work. The offshore division supply services within

dismantling and recycling of aging oil installations and rigs. AF owns and operates a modern decommissioning yard for the environmental clean-up of structures at Vats outside Haugesund.

The energy division offers services within energy rationalization and optimization. AF Energy's competencies are within the area of district heating and renewable energy. Furthermore, this division offers technical administration, operation and maintenance services of energy facilities.

In 2009, AF purchased goods and services for 3.69 billion NOK (68 % of annual turnover), where materials accounted for approximately 35 % and subcontracting accounted for approximately 65 %.

We believe that this company is fairly representative for the general large main contractor, and that they, to some extent, share the same traits and characteristics as other construction companies of a similar size. Our research is primarily concerned with the building and civil engineering divisions of AF.

3.3 Research process and analysis

In this section we present our research process; the development of the theoretical framework, data collection and analysis. Moreover, we emphasize the interdependencies between these stages. But first we establish the level of our analysis.

Prior to the data collection stage of a study the researcher should determine the level of analysis in the project (Benbasat, Goldstein, and Mead 1987). Overall, the perspective employed should be linked to the scope of the research question. Considering the question of our study, we focused on the relationship between main contractors and subcontractors / suppliers at the organizational level. This implies that the relationships between individuals are not given any specific consideration. This can also be viewed as a limitation of our study. Moreover, our viewpoint is at the top level of management where decisions are taken by those having the necessary level of authority to formulate and change supply strategies.

An important distinction should be made at this point. Although our attention is at the top management and organizational relations level, the unit of observation is primarily on the individual level. The information collected through interviews with practitioners at AF is to some extent influenced by individual experiences and one-to-one interactions with the different subcontractors. As the

level of analysis is established, we can now turn to describe the patterns of the research process.

Our research process has been characterized by continuous movement back and forth between the empirical and the theoretical domain. The figure below is illustrative of our research process.

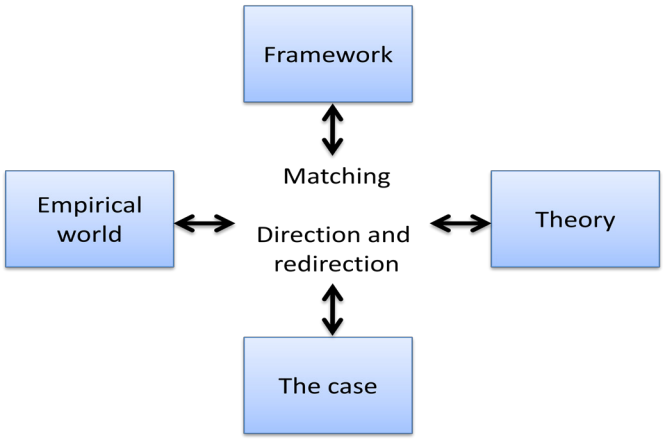

Figure 9 – Systematic combining (Dubois and Gadde 2002 b)

Dubois and Gadde (2002 b) identify this process as systematic combining. Further, these authors state that research issues and the analytical framework are successively reoriented when they are confronted with the empirical world (Ibid: 554). This is in line with our experiences of the entire process.

Initially, a theoretical scope was defined. As the data collection progressed, unanticipated and highly relevant issues was revealed. Based on these issues, the theoretical framework was redirected and expanded. This was necessary to properly understand and explain the findings. Furthermore, these steps were taken to ensure that the collected data was not forced to fit with our preconceptions of the empirical context. The resulting framework incorporates different perspectives and schools of thought with the purpose of providing the opportunity to view the findings from different angles.

The entire research process has implications for the structure of the case presentation. Due to the nature of the process, the case findings are discussed and analyzed continuously throughout the case presentation of chapter 4.

3.4 Data collection methods

This section outlines the process of putting the case together. Case studies entail a variety of data gathering techniques. We distinguish between primary- and secondary source data. Primary data was obtained mainly through two sources: 1) interviews with key personnel in the focal organization; 2) company documents

such as annual reports, accounting reports, strategy statements, project reports, purchasing reports etc. Secondary data, to the extent it was needed, was obtained through news media articles and interviews, industrial surveys, and data collected in other studies. We now move on to consider the two main data collection methods.

3.4.1 Interviews

One can distinguish between three main types of interviews: 1) standardized interviews; 2) semi-standardized interviews; and 3) unstandardized interviews (Berg 2007). The main difference between these approaches is the rigidity with regard to structural formality. The main characteristics of the three types are presented in the following table;

Standardized interviews	**Semi-standardized interviews**	**Unstandardized interviews**
Formally structured	More or less structured	Completely unstructured
No deviation from question order	Questions may be reordered during the interview	No set order to any question
Wording of every question is asked exactly as written	Wording of questions is flexible	No set wording to any question
No clarifications	Interviewer may answer questions and make clarifications	Interviewer may answer questions and make clarifications
No additional questions may be added	Interviewer may add or delete probes to interview between subsequent subjects	Interviewer may add or delete probes to interview between subsequent subjects

Table 2 - Interview structure and formality – adapted from Berg (2007: 93)

We primarily applied the semi-standardized approach as this allowed us some flexibility in interaction with the interviewees. Flexibility is important in several respects. One of the main benefits is that through remaining flexible, we will be able to capture and obtain information about crucial elements that was not considered during the preparation of the interview guide.

A short discussion of the advantages and disadvantages of the interview method will be in order.

The main benefits to be enjoyed are;

- Interviews produce a more concentrated interviewee, thus allowing full attention to the questions at hand.

- Interviewer is able to spend more time with the respondent, allowing for collection of more data.
- Interviews facilitate for improvisation and adaption of the interviews to the respondent.

The main disadvantages are:

- Interviews are time consuming.
- It can be hard to create interest and commitment from the respondent.
- It can be harder to synthesize and analyze information due to the nature of the data collected.

(Askheim and Grennes 2000: 91-92)

The data collection

During the period from January 2010 to the present date, the authors of this thesis have been part-time employees in AF as purchasers. We have gained invaluable knowledge, experience and understanding of how the purchasing function operates on various levels, including negotiations, contract formulation, and supplier relations. Our work in this area has greatly benefited this thesis and has further provided us with a practical perspective in addition to our theoretical foundations. Furthermore, our temporary position in AF has provided us with access to large amounts of information as well as informal contact with organization employees.

During the data collection phase we had more than ten meetings and interviews with key personnel at AF. The main source of information has been the Vice President Purchasing and Contract. Several semi-structured and unstructured interviews and meetings were held in the period from April 2009 to June 2010. The VP Purchasing and Contract helped us identify the inherent limits of the traditional tendering and supply management practices in the construction industry, and how contemporary research can contribute to a better understanding of the topic. Moreover, he arranged for interview sessions with persons in key position within purchasing and risk management.

Semi-structured interview sessions were held with the following people:

- Manager Quality and Business Improvement – AF Group Management
- Purchasing Manager – AF Construction
- Purchasing Manager – AF Byggfornyelse (a division of AF Building)

These people were selected based on their background knowledge and experience within their respective areas. A brief presentation of these sessions follows.

The Vice President Quality and Risk Management is responsible for the continuous evaluation of risk issues throughout the various projects and supplier relationships in the company. Our interview with the VP Quality and Risk Management took place at the AF headquarters on April 30 2010 and lasted about 1 ½ hours. The semi-structured meeting investigated risk and supplier development issues at the levels of suppliers, projects and portfolios. His information gave us a valuable contribution to the case presentation and analysis chapter, and aided us to identify new risk trends in the industry, particularly in the market of demolition and recycling.

The interviews with the two purchasing managers both took place at AF headquarters on May 20, 2010, each lasting about 1 ½ hours. The Purchasing Manager at AF Construction worked with numerous subcontractors and suppliers during his employment at AF. He is also responsible for the development of the IT system Synergi, which we discuss in detail in chapter four and five. The Purchasing Manager at AF Byggfornyelse presented his approach to competitive tendering and negotiations with subcontractors and suppliers. His take on negotiations is somewhat different to the traditional tendering practices at AF and perspectives on long-term collaboration, but gives our discussion an added dimension.

Before and after these interview sessions we have also discussed questions and thoughts with these people on several occasions. During the entire process we have exchanged ideas and received an enormous amount of information from AF, both through formal and informal channels.

3.4.2 Company documents – data collection

Through the entire process we had access to company documents as described above. Company records and documents were imperative in putting the case together. Documents have provided us with factual information about a variety of factors and elements. The written documents have enabled us to create a more comprehensive picture of the empirical setting and case facts. A brief but non exhaustive list of documents we have obtained through our data collection is as follows:

- Annual reports

- Subcontractor survey by AF Bygg Oslo
- Internal newsletters and magazines
- Purchasing contracts
- Strategy formulation
- AF's code of conduct
- Internal notes, memo's and e-mail's

3.5 Determining the quality of the research design and the study

There are several concepts that can be used to determine the quality of research; trustworthiness, credibility, confirmability, etc. (Yin 2009). Four tests are commonly used in social science to determine the quality of a study: 1) construct validity; 2) internal validity; 3) external validity; and 4) reliability. These tests can be challenging with regards to qualitative methodologies. Pedhazur and Schmelkin (1991) provide definitions of these tests that are directed towards quantitative research. Yin (2009) and Berg (2007) on the other hand, have to some extent adopted the definitions to fit qualitative research methodologies.

The following discussion will focus on two of these issues; 1) external validity, and 2) reliability.

A central question related to the choice of research methodology is to what extent our findings can be generalized to other similar settings. This is an important question in all types of research. External validity is a concern for all researchers. This term can be defined as: "… the generalizability of findings to or across populations, settings, times and the like" (Pedhazur and Schmelkin 1991: 229). There are conflicting views in the literature regarding the generalizability of the findings emerging from case studies (Berg 2007). One of the main arguments against the generalizability of findings is that the study is performed in the object's natural context. The context is seen to be unique and specific for each and every object. Thus, one can argue that conclusions from one study cannot be generalized to be true for other objects.

However, Berg (2007) argues that case studies will provide valuable insight to the object of study, and that findings can to some extent be generalized to other, similar objects. Yin (2009) explains that generalization from case studies does not come automatically, but rather through replication of findings through multiple case studies. Thus, we cannot draw broad statistical generalizations based on the findings of our research. We will, however, be able to draw some

inferences from our findings in relation to similar objects in similar contexts based on analytical generalizations. According to (Dubois and Gadde 2002 b), logical coherence is the foundation for analytical generalizations. Logical coherence is related to the adequacy of the research process. Thus it becomes important to provide information that makes it possible to evaluate the adequacy of the research procedure (Ibid).

Reliability in qualitative studies is about demonstrating the operations of a study, so that later investigators can replicate the study and arrive at the same findings and conclusions (Yin 2009). Thus, procedures related to the design of the study and data collection methods must be documented. Further, Pedhazur and Schmelkin (1991: 81) explain that reliability is a necessary but not a sufficient condition for validity.

Construct and internal validity will be important concerns in many types of studies and research. However, these forms of validity will not be of major consequence in this case due to the nature of our research design.

Steps taken to ensure the quality of the study

The authors have used multiple sources to obtain the information presented in the case, as described above. We argue that this is in line with the data triangulation principle explained by Yin (2009). Furthermore, our case is characterized by continuously shifting between presentation, analysis and interpretation. This would further indicate data triangulation. The findings has been questioned and double checked through the entire process.

External validity has been sought through the choice of organization (AF Gruppen), and the following sources of information. We believe that AF is a representative example of a main contractor in the construction industry. We previously stated that we cannot draw broad statistical generalizations based on our findings, but we argue that our study provides insight into how an average main contractor handles purchasing and supply strategies.

The reliability of our study has been safeguarded by careful and diligent recording of our methods and interviewees' responses together with the extended use of company documents to support and validate our findings. Through the discussion of our methodological choice and our research and data collection methods, we have carefully documented the procedures followed.

4. Case presentation and analysis

In this chapter we present the case. The structure of the presentation will be as follows. First we present the traditional competitive tendering system. Main contractors participate in these tenders to win contracts for construction projects. The main contractors supply strategies will largely be adapted to this system. Thus, the competitive tendering system provides the backdrop for our case and the discussion of supply strategies.

With this in mind, we move on to discuss supply strategies in relation to subcontractor services. Risk and uncertainty was identified as a prominent factor that influences the relationship between main contractor and suppliers / sub contractors. As a result, this will become an important area in relation to subcontracting in particular. Following on this we discuss AF's purchasing and supply strategy. We distinguish between two distinctive parts of supply strategies in this industry. Firstly, construction companies purchase goods such as building materials, machinery and equipment. Secondly, they purchase subcontractor services. This is reflected in our case presentation as we have divided the discussion into two parts.

The case findings are discussed and analyzed continuously. These analyzes will provide the basis for the discussion of the theoretical and practical implication of chapter five.

4.1 The traditional system – competitive tendering

The point of this initial discussion is to create a basic understanding of how AF experiences the process of competitive tendering and the steps involved. This traditional system defines the rules of the game that main contractors are forced to play by the clients and property development companies. The figure below presents an overview of the process from request for tender from the client to eventual approval and granting of contract and to the renegotiation of tenders submitted by the selected subcontractors.

A brief description of the process is in order. The client starts by inviting contractors to submit tenders for the completion of a specific project. A project description with technical specifications is usually provided. The main contractors will then calculate their full cost. Full cost is what the construction work will cost including the contractor's risk and profit mark-up.

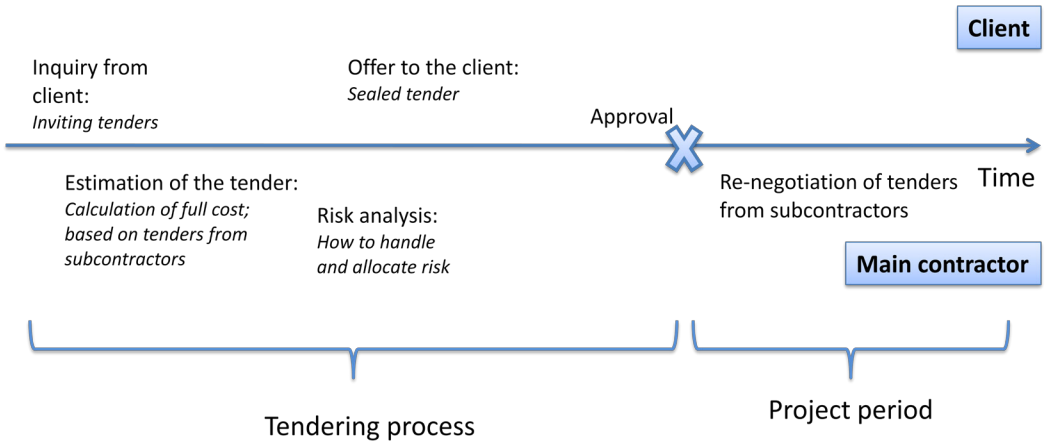

Figure 10 - The tendering process

The main contractor usually divides the project into smaller packages, e.g. concrete framework, carpentry, plumbing, roofing, etc. Special trade contractors submit tenders to the main contractor for the separate parts. Based on the accepted tenders, the main contractor calculates the full cost. A risk analysis of the project, including suppliers of building materials and subcontractors is then performed. This risk analysis provides the basis for the risk mark-up that the main contractor adds to the full cost.

A sealed tender is then submitted to the client, who will then choose which contractor should be awarded the contract for the project. After a contractor has been awarded the project, there are often renegotiations between the main contractor and the subcontractors in order to further specify prices, account for variations in prices and raw materials etc. Partly the goal is also to further reduce the full cost in order to increase the main contractor's profit margin.

This process seems simple enough. However, things are slightly more complicated than they might appear at first glance. There are also an abundance of different contractual arrangements between client and main contractor(s), and main contractor and subcontractors. In Appendix 1 we offer a brief review of some of the most common contractual arrangements.

4.2 Subcontracting

An introduction to the empirical context and the subcontracting practice has been provided in the previous section. As was already mentioned, subcontracting accounts for approximately 65 % of AF's purchasing costs, putting it at the top of critical purchasing issues.

The standard format of subcontracting in construction projects is regulated through the contract formats provided though NS 8415, Norwegian contract for

sub-contracts concerning the execution of building and civil engineering works, and NS 3406, General conditions for design and construct sub-contracts. NS 8415 regulates every aspect of the contracted work and the relationship between main contractor and subcontractor. The primary areas that are covered through this NS contract are: 1) the subcontractor's workmanship, performance and responsibilities; 2) the main contractor's subcontractor's workmanship, performance and responsibilities; 3) alterations and additions to the contract, and 4) delay and deficiencies. Furthermore, a whole range of other issues are covered by the NS 3406 contract. These two NS contracts together make up the standard model for subcontracting.

The standard model has some interesting characteristics. First of all, the subcontractor provides a fixed price for the execution of his part of the project. The subcontractor will in most instances provide his own building materials and supplies. This model transfers most of the risk to the subcontractor.

For AF, this model has both benefits and disadvantages. Among the benefits is the fact that this standard model is fairly simple in the sense that the subcontractor assumes responsibility for a fixed fee. Also, AF assumes limited risk. A clear disadvantage is that the subcontractor will include a mark-up to cover risk in his price, thus setting the price at a higher level than the true cost of the contract. In addition, clever subcontractors are able to take advantage of the main contractor if changes to the contract need to be made. This is fairly common. As most projects are of a unique nature, customizations to standard installations are common. Furthermore, the client might demand that certain materials are used. This will also pass as a chance for the subcontractor to demand a higher price than was initially agreed upon. To get a better understanding of this problem we need to explore the sources of the subcontractor's profits.

A subcontractor basically has two sources of revenue. As mentioned, subcontractors will in many instances provide their own building materials. Thus, this becomes a source of profit for the company. Adding a mark-up to the materials price is common, sometimes as much as 20 – 30 %. Secondly, if the project is going according to plan, the subcontractor will earn a profit by adding a mark-up to labor cost and/or by completing the contract before the deadline.

AF has, in many situations, poor knowledge about what the "correct" price of certain building materials should be. Thus, it becomes easy for the subcontractor to extract additional profit from charging a premium on materials.

This is also fairly evident if one investigates the profit margins of the supplier tier in this industry. Main contractors usually earn a profit of 5 – 6% of total turnover, whereas suppliers and subcontractors can have a profit rate of 10 – 15 %.

4.2.1 Supply risk management at AF

The standard model of subcontracting has some interesting characteristics. First of all, the subcontractor provides a fixed price for the execution of his part of the project. The subcontractor will in most instances provide his own building materials and supplies. This model transfers most of the risk to the subcontractor. However, as we discussed in section 2.2.1, subcontracting entails increased risks and costs both to the main contractor and the appointed subcontractor. The tendency to allocate risk downwards in the supply chain stimulates the subcontractor's behavior when adding a risk premium to the tenders and in the renegotiating stages of the project. By recognizing this fact, more awareness has been put towards the process of locating the optimal distribution of risk between main contractor and subcontractor.

Management of risk and uncertainty is a key issue in both subcontracting and project execution. AF has a separate function at the top level that exclusively administers uncertainty management and corporate development issues. This department consists of two permanently engaged managers, both experienced with risk governance in and between projects. Since the beginning of 2006 AF has had a strong focus on risk management to improve profitability and secure a competitive position in the market. As stated by the vice president of purchasing, "there exists a strong connection between the price on subcontracted services and risk. This had led to the importance of having a standardized allocation of risk through the contract structures governing the transaction". Historically AF has been involved in several projects that it lost money on. This was quite common in industries characterized by small margins and large volumes. The goal then became to turn around this industry development by focusing on risk issues in projects. As a response, AF instigated a methodical and standardized approach to risk management, viable for all projects and undertakings inside the company. The method of analysis is based on the approach developed by Professor Steen Lichtenberg at the Technical University in Copenhagen (Lichtenberg 2000). As a guiding principle, the company policies state that all tenders above NOK 25 million and/or projects with high levels of anticipated risk are subject to extended individual examinations. Projects with a net worth of over NOK 2 million are

subject to a simplified risk analysis based on the same method. For tenders above NOK 100 million it is also expected that the corporate president participates in the risk assessment. Moreover, tenders of value have to be verified either by an internal or external contractual advisor before submitting a binding tender to the client. These events progress as control mechanisms to identify, analyze and manage risk in a uniform manner across all engaging projects.

On construction projects worth over NOK 25 million, the project managers are also required to hand in quarterly reports that consist of risk parameters associated to the construction project's goals. Through frequent meetings with the on-site project manager group, the risk governing function at AF is able to transcribe the ongoing activities, rectifying any divergence vis-à-vis the overall goals. An outline of the risk analysis is presented in figure 11;

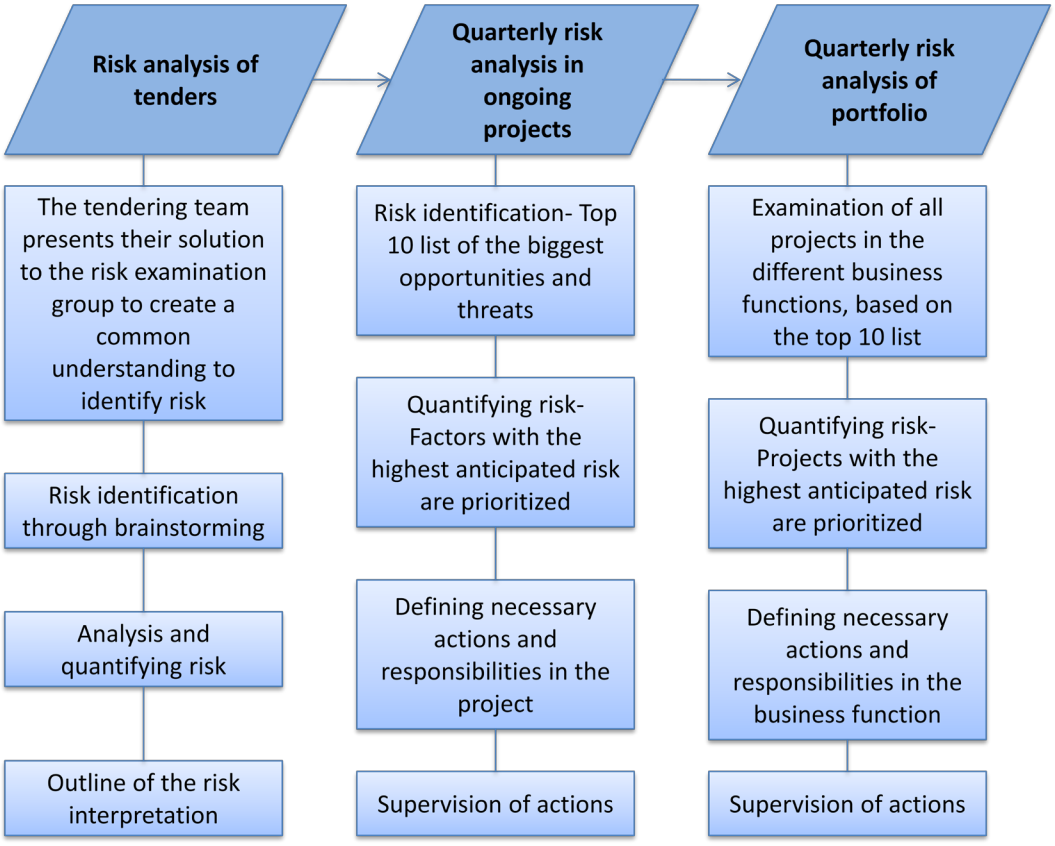

Figure 11 – AF's risk analysis process

In essence, the evaluation of risk and uncertainty in a specific construction project is based on the prior experiences and acquaintances with the engaged subcontractors. The risk examination groups comprise people with their own distinctive knowledge bases that in total cover all (assumed) risk-related aspects of the project. Based on a methodical evaluation of the situational factors involved, the group concludes with a figure denoting the calculated risk of the

project. This number is subsequently multiplied by a predetermined factor, constructing the absolute risk of the project. The object of the examination is to calculate the full cost of the project. An important question at this point is: what is the true price of the service rendered? Typically, the calculated risk associated to a subcontractor tender is more an approximation than a true price, in the sense that there are a lot of softly founded opinions/qualified guessing involved in the process. An apparent problem here is the fact that the individual subcontractor will perform a similar evaluation of the involved risk in their tender, consequently winding up with an overstated estimation of risk. However, recent practices suggest a more professional attitude to this process, both in terms of main contractor and subcontractor examinations.

4.2.2 Subcontractor selection

Subcontractors heavily influence both price and quality of the final product. Thus, subcontractor selection becomes one of the more important activities before work on the project can start. Generally, the selection takes place at two points in time: first during the tendering process and project calculation, and secondly after the project has been awarded.

During the tendering process, the main contractor invites tenders from a number of different special trade contractors. Already at this point there is a selection of which contractors are invited to participate in the tendering process. The geographical location of the project is the first determining factor for which contractors are invited to participate in the tendering process. In construction there is a tradition for employing local companies in projects. Thus, the subcontractor's location relative to the project location is a selection criterion. Although it can be sidestepped, this is the exception that serves to prove the rule. Next, tenders from the various subcontractors are evaluated according to a range of selection criteria such as price/cost, experience, financial situation and ability to deliver.

Ability to deliver according to specification is the most critical factor. Subcontractors are carefully evaluated in order to ensure that they possess the capacity needed to complete the project on time and with the expected quality. Technical expertise is also a relevant factor in ability to deliver; the subcontractor must possess the required skills to carry out the subcontracted work. Main contractors carefully evaluate the various subcontractors' abilities before awarding contracts. Ability to deliver is also closely tied to the economic situation of the company. A healthy and stable economic situation over time is preferred.

Large construction projects can run over two or three years. If a subcontractor runs bankrupt during the project phase, it can have serious consequences for the project and the main contractor.

Past experience with the particular subcontractor is another selection criterion that is employed during the selection process. AF has implemented an IT tool, Synergi, for supplier and subcontractor evaluation. Through Synergi the entire organization can share experiences of different suppliers and subcontractors that have been involved in the various projects. Both experiences on the business unit and the project level are reported into Synergi. The system collects information regarding deviations in quality, HMS issues and a total evaluation of the specific company with regards to overall performance and experiences. The reports aim to expose positive and negative experiences as well as the strong and weak sides of the company in question. These reports contain important issues with regards to supplier and subcontractor selection in future projects.

First and foremost, Synergi enables AF to remove subcontractors who deliver poor quality and are weak on HMS. Thus, Synergi has become an important tool for quality improvement. Furthermore, this IT tool aids to reduce risk related to the actual choice of subcontractor. As the project management can draw on actual past experiences, the choice can be made with confidence. Secondly, Synergi provides an opportunity for reducing the supply base as poor performers can be prevented from getting new contracts.

Researchers have devoted much attention to price based selection and the lack of long term perspective in purchasing of subcontractor services. These topics were discussed with several purchasing professionals in AF. Experience shows that researchers are right in their criticism to a certain extent. However, there is a very interesting issue that seems to be forgotten. In many areas, subcontractors are highly specialized in the types of services that they provide, and there is a limited number of competing firms operating in the market. As was previously discussed, it is customary to use subcontractors in close geographical proximity to the construction site. In the local markets, the number of possible suppliers is limited. In practice this means that the main contractor shifts his business between three or four different subcontractors, within a particular trade, over time. The main contractor and the subcontractor will then, to a large extent, be quite familiar with each other's business processes and have shared experience of previous projects. Our point being, the way of thinking about relationships and

relational benefits is not absent in the construction industry, but it is not explicitly admitted to, such as in other industries. However, the word "relationship" seemed to provoke a slightly negative response is several interviewees, and problems related to the contractual arrangements between the parties were brought up on more than one occasion. The problem seems to be embedded in the way that strict contractual arrangements regulate the relationship between main contractor and subcontractor for the duration of a project.

As the discussion illustrates, subcontractor selection is nuanced by factors such as past experience, ability to deliver and the financial situation. But in the end, price is the determining factor.

Appendix 2 presents an interesting approach towards negotiation of contracts with suppliers and subcontractors. As this particular approach is quite unique and to the extent of our knowledge not commonly applied, we have exempted this from our case data.

4.3 AF's supply management strategy

Purchasing plays an important part in calculating the full cost of a construction project. The work performed in this function will in many instances decide whether the company is awarded the contract or not. As was commented during the interview session with the Purchasing Manager at AF Construction, "this specific function is characterized by continuous learning transfers and improvements. Any miscalculations or mistakes in one project will be dealt with and the new knowledge is transferred to the next project. This includes both the typical supply of goods and services, as well as the selection of subcontractors".

4.3.1 Subcontractor survey

Thus far we have presented and discussed subcontracting from the viewpoint of a main contractor. However, this is not a one sided affair. The business partners also have a say in the matter. Suppliers and subcontractors have opinions and choices. In order to get a clearer view of the whole picture we believe that it is important to include an analysis of the attitudes and perception of the subcontracting companies as well.

In the following we present results from a subcontractor survey, which have had an impact on the development of AF's supply strategy. The development of the supply strategy is elaborated in the next section. In 2008 AF Bygg Oslo completed a survey of 28 subcontractors situated in the Oslo area. Selected

respondents included providers of technical services such as plumbing, ventilation and electrics. General building services such as providers of cement and concrete, carpentry and engineering were also included in this survey. The goals of the survey were to record subcontractor's general attitudes towards the main contractor and assess those factors that influence the calculation of prices on contracted services. The respondents were presented with a set of questions and asked to evaluate their answers on a scale ranging from not important to decisive.

The main findings of the survey can be divided into four variables, each consisting of sub-questions:

1. Degree of specification in the project description
2. Relation with main contractor
3. Early involvement/interaction in the planning phase
4. Subcontractors own workload and economic conditions

Also, four additional variables where identified but these were not as significant as the foregoing:

5. Geographic proximity to the project
6. Negative past experiences
7. Time frame for submitting the tender
8. Coincidences and luck

There can be several reasons why these variables were not as important. First of all, the survey was conducted on subcontractors exclusively located in the Oslo area. Since AF Bygg Oslo only takes on projects closely situated to this area (i.e. Oslo, Akershus and Vestfold), few or none are anticipated to evaluate this as a decisive factor for the estimation of price. However, 10-25 % of the subcontractors viewed accessibility to construction site and fair transportation conditions as decisive in this context. Also, subcontractors tend to focus more on the positive past experiences with a main contractor rather than the negative ones. Conversely, having a bad relationship with the main contractor is covered in variable number two. Only a few subcontractors viewed the time frame for submitting the tender as important. Generally the subcontractors are given a time limit of three weeks to respond to a contract, which is thought to be adequate time to calculate the bid. Coincidences and sheer luck are also less important in this context. Even though some subcontractors are awarded a contract out of pure coincidence, such events were not decisive for the calculation of price.

Factors influencing the price

In this section we evaluate the most prominent variables affecting the price, and how a main contractor can help obtain a better understanding of the subcontractor's perceptions.

Degree of specification in the project description

This part of the survey encloses questions intended at the level of transparency and understanding of the project complexity. Problems here include missing, late or inaccurate data, and the inability to provide necessary information about the design. If the subcontractor does not have a clear understanding of the job requirements, it is difficult to calculate the true price. Consequently, subcontractors add a risk premium to the bid to cover the increased uncertainty. To avoid an added risk premium, the job description should be detailed, comprehensible and organized.

75 – 100 % of the respondents answered that the understanding of details in the project, both in terms of the main contractor and subcontractor, has a decisive influence on the estimation of price. 50 – 75 % of the subcontractors answered that the opportunity to perform a full assessment of the contract and construction site was decisive. On the lower level of the distribution, 10 % answered that an organized and tidy contract with regards to industry standards was very important.

Relation with main contractor

The second part of the survey focuses on the relation between the main contractor and subcontractor. Recurrent and positive experiences will improve the level of trust in the relationship, as discussed in section 2.2.1.

A trusting and including atmosphere between main contractor and subcontractor was viewed as a decisive factor for 75 – 100 % of the respondents. In addition, the equivalent selection answered that past, positive experiences with the main contractor and the capacity to estimate the price was very important. 50 – 75 % considered the chemistry and/or personal relationship with the project manager and client as very important. 25 – 50 % said that main contractors who were able to utilize the subcontractor's abilities in the planning, and who do not exploit the availability of subcontractors to their own benefit, was very important.

Early involvement/ interaction in the planning phase

The third part of the survey is aimed towards a different, but important organizational level. The case here is that the main contractor should accept the added value of involving subcontractors at an earlier stage than the delivery phase. Subcontractors can contribute to improved and more efficient solutions that increase performance and reduce costs.

75 – 100 % answered that early involvement in the planning phase was a decisive factor in calculating the prices. Also, 10 – 25 % measured cost-benefit solutions as decisive, whereas the same selection considered projects with recurrent and standardized work processes as very important.

Subcontractors own workload and economic conditions

For 50 – 75 % of the respondents, finance and economic conditions in the market was very important for estimating the price. 10 – 25 % viewed their own workload and order book as very important and knowledge of which main contractor has won the contract as important. Finally, < 10 % answered that the competition in the industry is very important for calculating the final price.

An obvious weakness with the survey is the fact that it only considers a selection of subcontractors connected to AF Bygg Oslo. Variables such as geographic proximity and closeness to the project will most likely be influenced when extending the scope to other divisions such as AF Construction or AF Byggfornyelse, who operate at a national level. Still, as discussed in section 4.2.2, there is a tradition for employing local companies in projects, thus playing down the anticipated consequences on the factors in question.

4.3.2 Development of AF's supply strategy

We previously acknowledged the fact that the construction industry appears to fall behind other industries with regards to a professionalization of the purchasing function. The deeply embedded and conventional organizational routines drive the arm's length approach, abetting a 'one-off project partnering' behavior. More recently, however, AF has worked out a clear purchasing strategy that offsets this general industry trend. According to the Vice President Purchasing and Contract, "AF had to establish a more structured and diligent system of handling the supply of goods and services". The strategy, which AF actively shares with its subcontractors, seeks to illustrate the importance of integrated activities that can

reduce inefficiencies in the supply chain. Combined with a subset of key performance indicators (KPI's), the objective is to enhance the joint competitiveness of the actors. As shown in figure 12, the strategy consists of five key elements that are continuously evaluated alongside predetermined goals and performance indicators.

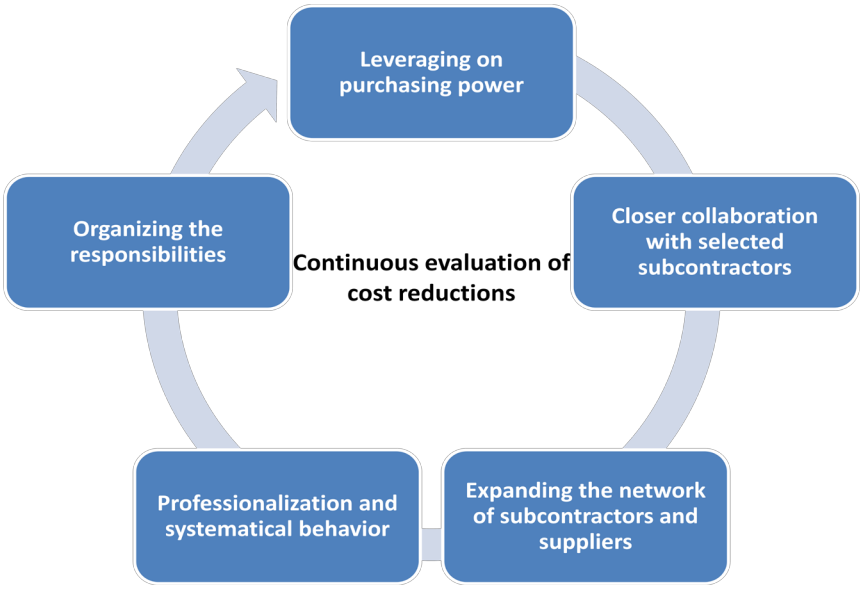

Figure 12 - AF's supply strategy

The first factor we consider is the organization of responsibilities. The main point here is that the subcontractors must have a clear perception of the project requirements. A detailed clarification and better utilization of subcontractor knowledge can alleviate the planning phase of the project. Next is the leveraging on purchasing power. By exploiting its international capacity and industrial outstretch, AF has access to a huge pool of resources which it can leverage on. For instance, some common subcontractor segments are highly competitive, allowing AF to play the market and obtain a lower price. Also, AF is able to combine its array of subcontractor agreements onto a specific project which gives definite cost savings. In contrast, some trades are more specialized and have fewer actors than others. These segments are harder to play and require closer collaboration efforts to attain a fair price. For that reason, AF strives to enter long term collaborative agreements with selected subcontractors that have superior market power (e.g. through general agreements and earlier involvement). Closely connected to this is the expansion of the subcontractor network. AF continuously monitors its pool of subcontractors and incorporates new actors when seen as appropriate. These relations serve as memorandums of understandings, implicitly affirming that the subcontractors in AF's pool are to be

regarded when new projects come up. If AF is loyal towards its pool it can reduce the negative effects of discontinuous knowledge transfers across the different projects and increase the trust between the actors. As a final point, AF strives to operate as a 'strategic hub', in the sense that it is determined towards managing the resource interfaces in a professional and systematic way to construct synergies within the group.

4.3.3 Purchasing of goods and small services

Purchasing of goods can in many instances be standardized through routines and procedures in the buying company. As we discussed in the previous section, AF will inspect the criticality and accessibility of the goods and determine how the supply should be best secured. For standardized products of a certain volume, contracts with selected suppliers are used to ensure favorable conditions throughout the organization.

AF operates with two primary categories of contracts for the purchasing of goods: 1) extended partnership agreements; 2) simple purchasing contracts.

The extended partnership agreements are used with suppliers of critical products. Normally, these are products of which AF requires larger volumes. Examples can be insulation, lumber, concrete, construction machinery, computers, etc. The extended partnership agreements cover a variety of factors related to the relationship and business between the parties. The objective of the contracts is for both parties to regard themselves as partners, to secure optimal prices and conditions for the buyer, and to ensure that the seller receives a certain amount of business. Furthermore, agreement on order and delivery routines, terms of invoicing and payment, product returns and capacity are imperative for standardizing purchasing procedures and making it easy for both companies' employees to handle the day-to-day operations.

Simple purchasing contracts are used with suppliers of less critical products and services. That is not to say less important, but rather easier to acquire. Examples can be carpentry tools, spare parts, service on certain types of machines and vehicles. Simple purchasing contracts cover primarily issues such as payment terms, terms for changes in prices and renegotiations and invoicing routines. In a large organization such as AF, there are many different people ordering from the same vendors. Prices, discounts and payment terms have a tendency to vary from order to order according to who puts in the order.

Therefore, we see that formal contracts with the most important suppliers are important in reducing purchasing costs.

During the second quarter of 2009, AF outlined a project for establishing enhanced levels of interactions and teamwork between the main contractor and subcontractor. With the purchasing strategy as the underlying motive, the plan was to identify the critical success factors, measure the prospects of 'win-win' situations, systemize each other's learning, and to incorporate internal work process. They found that some distinct premises had to be met if such projects where to succeed. First and foremost, all the implied subcontractors and partners have to feel a sense of inclusion and transparency in the project to create 'win-win' situations. By utilizing the external resources (e.g. involving subcontractors in the decision making), there is a possibility of creating enhanced trust and receptiveness. If the main contractor has a history of excluding the subcontractors, interaction spin-offs are harder to validate. Furthermore, the project manager group was identified as a critical success factor. The main contractor should endeavor to act as a role model, exerting the necessary values and motivational influence to promote integration and learning in the group. Conversely, egoistic and suboptimal behavior would suspend the prospects of 'win-win' conditions.

4.4 Comments on the case findings

We see our case as an example of what Dubois and Gadde (2000) found when exploring purchasing behavior in the construction industry. These authors conclude that the role of various subcontractors vary to a great extent. The activities performed can range from including everything from design and production, to one of these. The main determinant of the activity scope is the contractual form (Ibid: 211). Several problems arise from this fact:

1) The actors can develop their own *objectives, goals and value system* without regards for the impact this can have on other actors involved in the project.
2) The contracts can be seen as nothing more than a way to transfer risk to other parties. Thus, they do not contribute to coordination of the various actors activities.

The result of this is that the current practice in the industry facilitates for a more competitive than collaborative behavior between actors involved in a project, thus constraining efficiency and performance. One of the main findings of the study in

question is that transactional exchange is the dominant form of business in this industry (Ibid: 213). Business relationships are contractual, not relational.

Simchi-Levi, Kaminsky, and Simchi-Levi (2004) explain that business relations tend to be of a formal nature, relying on formal contracts to ensure adequate supply, prices, lead times, quality etc. These authors further explain that the actors tend to disregard how its decisions affect the other parties in the supply chain. According to Thompson, Cox, and Anderson (1998), the standard contract applied in this industry is designed to transfer risk, thus leading to arm's length relations.

Dubois and Gadde (2000) explain that there exists temporary networks within the construction industry. This is related to the nature of the projects, which are restricted in the time dimension. This temporariness hampers long term thinking. Thus, the creation of long term relationships and strategies that can be observed in other industries do not have the conditions necessary to evolve in the construction industry. The issues above depict some of the several inherent limitations in the modern construction industry and our contextual boundaries. Several researchers have tried to offer an explanation to such issues but there seems to be an inconsistency in how to actually overcome the structural weaknesses.

5. Discussion and implications

The preceding chapter has investigated supply strategies from the perspective of a Norwegian main contractor. In addition we have presented the rationale of the current supply strategies and why these prevail as the dominating practice in the construction industry today. Yet up until now we have not suggested any new methods or approaches to supply management in construction. In response to our remaining research question we offer a differentiated approach by combining theory and practice. The following sections aim to discuss the case findings and both their theoretical and practical implications. In accordance with the theoretical framework, we pay particular attention to how supply strategies influence the competitiveness of the firm. Emphasis will be put on subcontracting practices and implications for supplier relationships. Furthermore, the goal is to identify how a main contractor can strengthen its competitive position through supply strategy and supplier relationships. Information obtained from the case is applied in the discussion of alternative methods for the development of a supply management strategy. Our discussion revolves primarily around two alternative portfolio approaches, as presented in our theoretical framework. This approach might seem too simplistic, but is a necessary step in order to develop our line of thought. First we discuss these two approaches in isolation, and try to understand how these can contribute to the development of a differentiated approach. The objections towards these portfolio approaches will be given specific consideration in the next part, where we combine the two distinct approaches into an integrated solution. By considering the criticism that has been directed towards these approaches, we aim to nuance our discussion. These considerations also provide a solid foundation for our suggestion for a differentiated approach to supply management strategies in the construction industry. These final discussions are grouped in three distinguished parts as lessons from the theory, implications for uncertainty management and lessons from the case analysis. Finally, we evaluate the differentiated approach in relation to the implications for the competitiveness of the firm.

5.1 Supply management in the construction industry

As surfaced in the case, subcontractors supply a service to the main contractor. Often this service is bundled with the materials required to complete a specific part of a construction process. Thus, the subcontractor is both a service and a materials supplier. We can identify two apparent problems with this practice.

Firstly, with the subcontractors' profit margins on materials to one side, and their profit margins on man hours to the other side, it becomes difficult to evaluate their overall profits. One could argue that this information would not be vital as the main contractor simply evaluates the total cost of the various subcontractors' tenders. We would argue contrary to this notion. Efficiency does not simply arise from choosing the alternative posing the lowest cost when one does not have access to information regarding how the prices are set. More efficient solutions can be found and should be exploited.

Secondly, as the subcontractors' fee is fixed, they carry some risk regarding possible price fluctuations on their materials. Fluctuations in materials cost can arise from several sources. The most prominent factors are the availability of the product in the marketplace, fluctuations in currency, and the price of raw materials. Of course these factors can work for the benefit of the subcontractor, but it is more likely prices are adjusted so they can internalize the effect of negative changes and still provide the subcontractor with a fair margin. Furthermore, effects originating from these factors can be accounted for by adjusting the price on labor.

Hence, the conclusion is that important information about the subcontractors' pricing strategies is not available for the main contractor, leading to inefficient economics in construction projects. We believe that some of these inefficiencies can be removed through appropriate supply management. With basis in our theoretical framework and the presented case, we offer two alternative approaches to supply management.

5.1.1 Purchasing portfolio analysis

One possible route is to analyze the situation by applying Kraljic's purchasing portfolio approach (Kraljic 1983). We base our analysis specifically on technical subcontractors or technical special trade contractors, which refer to trades such as plumbing, ventilation and electrical contractors. These are prime examples of the problems discussed above.

The analysis is performed with a basis in the dimensions suggested by Kraljic (Ibid). We see these dimensions as being a continuum where degrees of risk and impact of the purchase are open for the possibility of boarder line suppliers. For example suppliers can be rated to lie between two or more categories. The figure below illustrates one possible rating scenario. The red squares represent different subcontractors rated with regard to the current

situation. Their location on the two continuums corresponds with a mix of partnership and competitive bidding strategies. Some are clearly suited for partnership strategies, whereas others have a more undefined position. This matches what we observe in the main contractor's supplier base. In the introduction as well as in section 3.2, the industry's inherent adversarialism and lack of long-term relationships was discussed in detail. The inferences drawn from these discussions, along with our observations, can lead us to conclude that some relationships should be managed as strategic partnerships. This point has been emphasized in countless research papers. However, it seems like this notion is not readily accepted by industry practitioners. Still, there clearly is a need for effective relationship handling. So, are there any alternative ways of handling the various relationships a main contractor has with suppliers and subcontractors?

The answer to this question is yes, most definitively. We now introduce the idea of unbundling service and materials. In this chapter we will discuss this idea from a purely theoretical perspective.

In the theoretical scenario, the subcontractors will no longer supply the materials needed to complete their part of the project. Following on from this concept the subcontractor now only delivers the service, whereas the main contractor bears the responsibility for acquiring and supplying the materials needed on the construction site. Where there previously was one supplier, we now have two. At first glance this might seem to contradict the notion of supply base rationalization and reduction. Lilliecreutz (1998) found that many companies have an apparent interest in reducing the number of suppliers in their supply base. Furthermore, this has become a trend in many industries. Contrasting to this, Cousins (1999: 153) states that firms appear to be adopting supplier reduction strategies without a thorough consideration of the market dynamics. Thus, one must carefully consider the market dynamics in order to ensure that supplier reduction strategies actually are appropriate. In line with this author, we would argue that the market dynamics of the construction industry might support the idea of unbundling materials and services even though it entails increasing the number of suppliers in the supply base. We now turn to the figure which presents such a possible scenario.

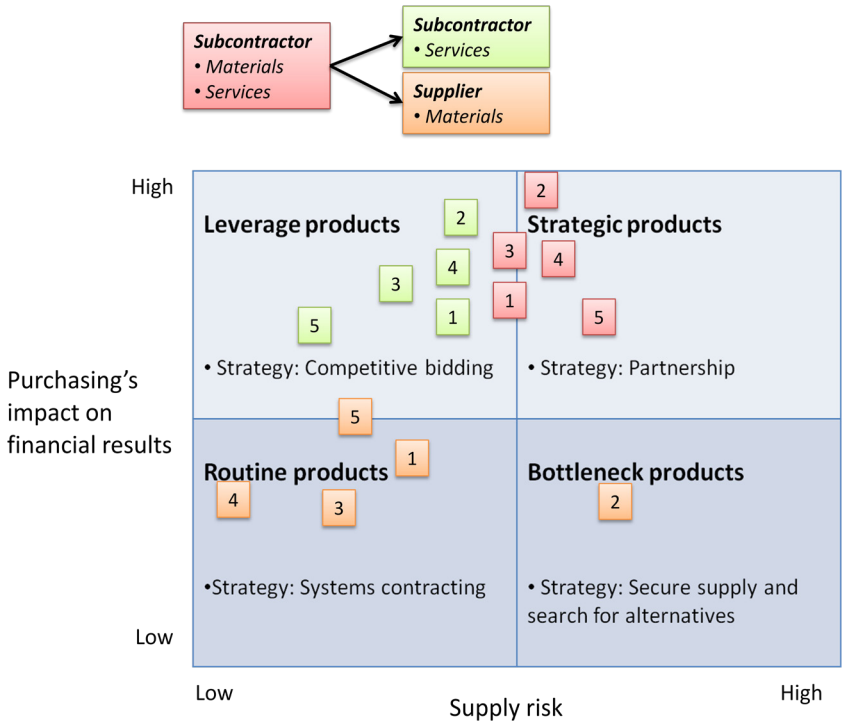

Figure 13 – Purchasing portfolio analysis

The red squares have now been split into materials (orange squares), and services (green squares). By doing this, we can argue that the supply risk related to services has been reduced by a given amount so that the subcontractor services move from the strategic products cell and into the leverage products square. Furthermore, we can argue that the characteristics of the goods, or building materials, can be categorized as having lower financial impact than the services, thus moving into the routine product and/or bottleneck products cells according to the specific products characteristics. For subcontractor services this entails that the competitive bidding strategy becomes viable in accordance with Kraljic's suggestions (1983). This would also fit into the behavioral pattern that we observe in the construction industry.

We can further look at this option in terms of the company's core competence in order to investigate its potential. Going back to Goddard (1997) and the identification of core competencies, subcontractors should focus on activities in the value chain that they execute better than others and those that are not tied into the existing ways of doing business. In other words, one has to consider if the two activities, providing materials and performing services, can be handled more effectively when divided between two separate companies, in contrast with the current practice.

We propose that a subcontractor has its core competence within the

services it performs, not in the purchasing of supplies. Undoubtedly, the subcontractor can have a professional approach towards its purchasing function as well, but the tacit and unique knowledge resides within the services it performs, and not in the uniqueness of the material. The service is at the core of the company, whereas the material is an addition to the service. In other words, the purchasing function here can be viewed as a support activity, whereas the service can be viewed as a primary activity. Even though both activities generate margins, a company should focus the efforts towards the primary activities to increase the organizational performance and efficiency (i.e. creating a competitive advantage). By having a conscious approach to the subcontractors' own core competence, new markets and possibilities can emerge in collaboration with the main contractor.

Also, in section 2.1 we argued that a main contractor's core competence resides in the capacity to generate value through the subcontracting activities. Alternatively, the core competence is the means to organize, coordinate and govern the system of suppliers and subcontractors to create value. A main contractor is likely to have a more professional purchasing function than a subcontractor, committed at acquiring competitive prices and conditions. Moreover, a main contractor is more favorably positioned to purchase materials than a subcontractor because of its size and outstretch. The main contractor can play the market and purchase large volumes than a singular subcontractor, thus obtaining scale benefits.

Therefore, from a theoretical point of view, we argue that the foremost disadvantage with today's practices is the division of roles and responsibilities in the value chain. Since subcontractors bundle their services with materials, the main contractor purchases the "package" at a higher price than necessary. But by unbundling the services and materials, the whole system will profit because the actors focus on their separate core competencies, instead of discrete and suboptimal solutions.

5.1.2 Analysis of contextual profiles

We can perform the same exercise applying Bensaou's (1999) contextual profiles as a basis for the analysis. This analysis would be contingent on the buyer's and the supplier's specific investments. As was clarified in section 2.3, investments can be both tangible and intangible. The intangible investments appear as the most interesting for our analysis. Intangible investments in this case can be time and money spent on learning the other party's business practices, routines, knowledge,

capabilities and skills. We continue by analyzing technical subcontractors, and investigate how these will fit into the contextual profiles matrix presented in section 2.3.

Firstly, we need to describe the product characteristics. We argue that the services rendered by most of the special trade contractors are of a technically complex nature, for example: special technical knowledge of that particular trade is needed in order to perform the service. Furthermore, the service rendered is characterized by customizations and adjustments as each delivery is unique in some way. This is reflected by the fact that no two construction projects are similar. Every project can be said to be unique in some way, and this entails customizations with regards to the specific technical solution needed.

Secondly, we need to describe the market characteristics. Here we argue that the subcontractor's core competence is close to the core competence of the main contractor, but yet different. The argumentation here is similar to the one presented in the previous section on the purchasing portfolio analysis. We argue that the subcontractor's core competence lies within the special trade of the company. This competence would be close to the main contractor's competence as this company in some ways functions as a coordinator and facilitator for the various construction activities. We also observe frequent design changes. This can be the result of uncertainties that materializes during the project phase. This is quite common in this industry. Conditions which were not present during the project planning phase, or which were not identified, might entail that changes are made as the project progresses. This also relates to the uniqueness of the construction projects, as already discussed. As a result, mutual adjustments in key process between the main contractor and the subcontractor are required. To exemplify this, changes or additions to technical solutions require adjustments with regard to the contractual arrangements. The NS contractual standards have mechanisms that handle these issues, so this is a prime example of process adjustments. Furthermore, there are two quite obvious characteristics. These are the fact that a subcontractor's service is a technically integrated part of the totality of the construction project. The electrical facilities for example can be considered a subsystem of the construction itself. Moreover, strong engineering expertise is generally required for all special trade contractor services. Special competence within the various fields is required.

Another factor, according to Bensaou (1999), is the competitiveness of the market. We cannot generalize for every type of special trade contractor, as in some areas there are multiple competing firms, and in other areas there are only a few existing suppliers. This is true for both types of service and the number of suppliers in a specific geographical area. This leads us to the third and final point: supplier characteristics.

The number of possible suppliers is an important factor of the supply characteristics as well. Furthermore, the bargaining power of the supplier emerges as an interesting point. This, of course, is related to the number of alternatives available. In different areas, both geographical and type of service, the relative number of alternatives is an indicator of the supplier's bargaining power.

Based on this analysis, we can try to identify the relevant positions in the matrix suggested by Bensaou (Ibid). The figure below contains our suggestions. Before we turn to this figure, our assumptions need to be clarified. As a main contractor employs a variety of subcontractors in a construction project, and these can have differing characteristics in relation to each other, one must differentiate among the various trades and locations. This is reflected in our proposition in the following manner: the optimal profile is marked by black text, the differentiated approach is marked by grey text. The optimal profile can be seen as the purely theoretical image, if all subcontractors shared similar characteristics. However, in practice, this is seldom the case. This is, thus, accounted for by marking alternative approaches with grey text. Thus, the appropriate contextual profile for a given company is dependent on individual characteristics as well as general characteristics.

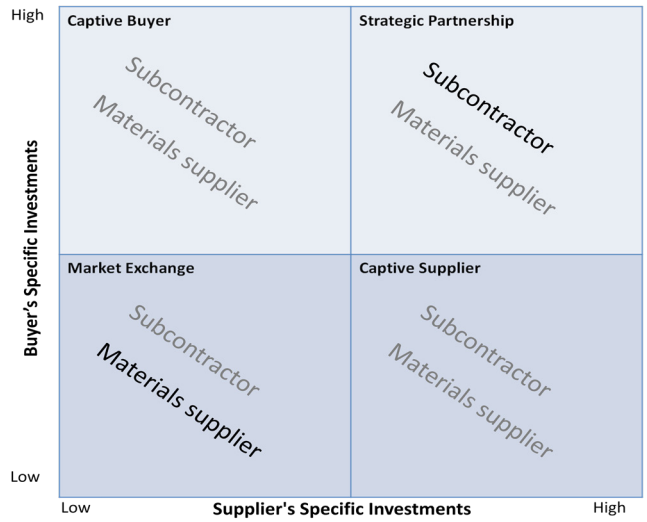

Figure 14 – Analysis of contextual profiles

What the figure then suggests is that generally speaking, subcontractor's characteristics indicate that the appropriate management profile is that of strategic partnerships. As a result, the relationship between main contractor and subcontractor should be close, trusting and collaborative, governed by the principles of long-term collaborative relationship management. This is in strong contrast to what we observe in the industry today. Further, the figure suggests that after individual analysis of the different trades, some subcontractors might have a close fit with alternative management profiles. This is also in line with what Araujo, Dubois, and Gadde (1999) suggest; a company can only handle a limited number of strategic alliances or collaborative relationships. Thus, there is a need for a differentiated strategy both in theory and practice.

Although an explicit analysis of material suppliers is not provided, we have placed these in the matrix in accordance with their various characteristics. The optimal solution would be to treat these in accordance with the management profile for market exchange. We believe that for most materials, this would be the optimal solution. But again, we experience the same issues as we had with subcontractors. Material characteristics and availability suggest that a differentiated approach is necessary to handle the supply effectively and to ensure adequate access to the products.

5.1.3 Summing up

Up to this point we have discussed two alternative approaches for segmenting suppliers and creating supply strategies. These two approaches are different with respect to the starting point of the analysis, and thus they present differing conclusions. The purpose of the purchasing portfolio analysis is to investigate how the purchasing process can be simplified with regards to supply costs and risk. Furthermore, the purpose of the contextual profiles analysis is to investigate some of the different kinds of relationships that exist between buyer and supplier in this context. In the next section we will continue to investigate how these alternative approaches can be combined in order to create a differentiated approach to supply strategies.

5.2 A differentiated approach to supply strategies

In this section we continue to formulate how a main contractor can approach the task of creating an efficient supply strategy. We start by comparing the two approaches and identify the areas where they complement each other, then move

on to nuance the discussion by taking into consideration the criticism of these models and investigate if the competing theoretical perspectives can add further value to our analysis.

5.2.1 Supply strategy – Lessons from the theory

As was briefly mentioned in section 5.1.3, the two approaches towards supply base segmentations are based on somewhat different sets of variables or dimensions. This results in different suggestions for how to manage the supply base. Both have their strengths and weaknesses. The analysis based on Kraljic's (1983) approach can be said to segment the suppliers while taking the industrial context into consideration. In other words, the situation we observe is characterized by adversarialism, opportunistic behavior and short-term thinking with regards to subcontractor relationships. In that respect, this analysis provides a result that might seem appealing to the main contractor. By implementing this strategy, the main contractor might be able to maximize short-term benefits. However, we believe that it lacks some elements of collaboration and long-term thinking in regards to supplier relationships. The analysis based on Bensaou's (1999) approach, on the other hand, is more focused on the relationship between the two parties, and the extent to which these have made some sort of mutual investments in the relationship. We argue that both the main contractor and the subcontractor in practice have made relatively high investments in learning each other's business practices, routines, capabilities and skills. For the main contractor, this is imperative in ensuring that a particular subcontractor is capable of performing the subcontracted part of the project. The same argument could be used if we see the situation from the subcontractor's point of view. They would need to understand the main contractor's approach to a set of different variables regarding project execution. However, we could claim that this approach is lacking some of the vital elements of the purchasing portfolio approach. Here we are thinking of elements such as, who is the most able to carry hand handle risk, what are the most optimal division of labor (e.g. who should be responsible for supplying materials), and what can be termed the cynical efficiency of the system. The cynicism originates from the discussion of the source of profits. In this case, we discussed the subcontractor's source of profits. As was made apparent, these companies obtain a respectable profit from supplying their own materials to the construction site. From a system performance and effectiveness perspective, this might not be an optimal solution. Thus, we introduced the idea of unbundling the

service provided by the subcontractor from the supply of materials. The argument is that a main contractor can be able to obtain better prices and terms for the same materials compared to the subcontractor. There are several reasons for this. We discussed the division of roles in terms of core competence. Through that discussion it became clear that the main contractor can take advantage of their purchasing power as a large organization with a professional purchasing department and the potential for purchasing volumes unmatched by the subcontractor organizations.

We argue that both analyses contribute with valuable insights, and illuminate the inherent problems with supply strategies in the construction industry. Furthermore, we believe that it should be possible to combine these two approaches to arrive at a differentiated supply strategy. This strategy would then be based on a consideration and trade-offs between short-term benefits and long-term thinking. In doing so, we argue that Bensaou (1999: 35) provides a valuable contribution when stating that "Effective supply management requires choosing a type of relationship appropriate to product characteristics and market conditions and adapting management practices to that relationship.". Matching of relationship requirements and actual relationship capabilities thus becomes the basis for combining the two approaches. In order to arrive at this point, several factors must be analyzed.

First and foremost, the different trades must be analyzed in accordance with our two approaches. Natural questions in this regard are:

- Where are the opportunities for improvement?
- Are the defined roles rational?
- Should the pattern of roles and responsibilities be changed? I.e. should the main contractor assume responsibility for supplying materials?
- The complexity of the service and material bundling. Is it rational to unbundle? Will this in fact lead to increased efficiency?
- What risks and opportunities are associated by choosing to change the behavioral pattern?

Secondly, what are the implications of the different available strategic options in terms of relationship consequences? I.e. will the subcontractors accept or agree to the changing conditions. If we return to the alternative relationship management choices as suggested by Cox and Ireland (2002), we are provided with a slightly unorthodox view of how supplier relationship management strategies should be

determined. These authors state that the choice between collaboration and adversarialism is actually a false dichotomy (Ibid: 413). As an alternative, they suggest that the level of inherent adversarialism in the existing relationships should be evaluated against how close the parties need to work together in order to achieve goal 'satisficing'. Stated differently, how much conflict over value appropriation is likely to occur, and how closely will the parties need to work in order to ensure that the individual goals are satisfied. The matrix presented in section 2.3 (figure 6) illustrates the different relationship management choices.

An important note regarding the criticism of the portfolio approaches

To further complicate matters, we believe that the criticism of these portfolio approaches can provide further insight to the nature of supply strategies. One of the main arguments against founding supply strategies on the portfolio approaches is the static nature of these. Furthermore, the dyadic approach is an unfortunate drawback. Cox and Ireland (2002: 417) suggest that the extended network of dyadic relations and the power balance in these relationships is an important factor in developing relationship management strategies. In line with Dubois and Pedersen (2002) we argue that relationships should be considered as organic entities that change and evolve over time. This is also true for the market dynamics. Conditions will change over time, demanding that supply strategies change accordingly in order to retain their effectiveness. Thus, the posture of relationships should not be locked and static.

5.2.2 Implications for risk and uncertainty management

The two models discussed in the previous section will affect the levels of risk and risk allocation in the relationship with subcontractors. If we consider the alternative of unbundling services and materials, we observe a reallocation in both buyer control and risk (see figure 1 for an overview). Since the subcontractor is no longer responsible for the materials the main contractor has more control and flexibility to organize the flow of materials out to the projects than before. But on the other hand, the main contractor also takes over the risk of materials (e.g. currency fluctuations, delays, quality deficiencies, and warranty issues). These risk elements was present before the process of unbundling, but they were accounted for by the subcontractor. The question then becomes to which party should these risk elements be allocated? Taking into consideration the fact that the main contractor will have a huge pool of suppliers, whereas the subcontractor in

comparison has just a few, we argue that the main contractor can achieve economies of scale by centralizing the risk in a more professional approach than it would be with the risks spread out around the supply chain and different subcontractors. The main contractor will have a better overview of the different categories of risk, and is in a favorable position to construct top-down risk policies. The traditional view to risk in this context is to avoid and/or transfer it downwards in the supply chain. But with the unbundling method the strategy is similar to Hillson's (2002) approach to uncertainty management, where risk can be viewed as an opportunity to reduce costs through an exploitation strategy.

When considering Bensaou's four contextual profiles, the allocation of risk will depend on the structure governing the relationship. Also, the levels of perceived risk will be affected by the degree of trust with the subcontractor. As was pointed out by Ring and van de Ven (1992), the history of successful transactions will reduce uncertainties and ultimately the risk premium in tenders. Following this logic we perceive that, from a theoretical perspective, subcontractors (i.e. strategic partnerships) should be governed through relational contracts where authority and control systems are evenly shared between the two parties. This is in line with the general consensus calling for more transparency and long term collaboration in the construction industry. Considering the material suppliers (i.e. market exchange), the reliance on trust and risk of the deal can be characterized as lower than that of subcontractors. This calls for a more simplified contract governing the relationship. Parallel to Bensaou (1999), Ring and van de Ven (1992) argue for markets as the optimal governing structure in this case.

5.2.3 Supply strategy formulation – Lessons from the case analysis

In our case presentation and analysis we discussed several topics related to the current supply and relationship handling strategies of a large main contractor. Several actions have already been implemented to reduce the adverse effects in the construction industry, such as an understandable supply strategy, extended partnership agreements, risk management on both project and portfolio levels, and the IT-tool Synergi. Also, the subcontractor survey presented in section 4.3.1 illustrates that the main contractor acknowledges the need to incorporate suppliers and subcontractors in the formulation of a supply strategy. These actions have been instigated to manage and professionalize the flow of goods and services. In this section we will attempt to combine the findings from our case analysis with the theoretical models previously discussed, and distinguish the benefits that can

be obtained through an alternative approach to supply strategies.

Fundamentally, the implications drawn from the analyses based on the approaches suggested by Kraljic (1983) and Bensaou (1999) signify that supplier relations should be handled differently according to their individual characteristics. For instance, when splitting materials and services the intention is to reduce the relational requirements and supply risk. However, such strategies might not be viable for every subcontractor. In some situations, AF does not have enough technical understanding and insight to control the supply of materials alone. Such trades are of high complexity and require specialized and customized solutions. Of course, the main contractor could confer with external professionals for optimal solutions, but it would then become a question of efficiency and price again. Thus, we argue that high technical complexity plays in favor of strategic partnership and against the unbundling strategy. Further, we argue that the unbundling strategy can be viable for bulk products, e.g. products where large quantities are supplied by the subcontractor.

Suppliers segmented in the direction of a market governing structure (i.e. suppliers of materials or services) can be handled differently than those of a more technical category. Standardized and conventional purchasing contracts with a selection of equal suppliers simplify the supply. This approach is similar to the previously formulated supply strategy in AF where the company leverages on purchasing power and increases the network of suppliers to play the market. However it is important to bear in mind that market-based governance structures do not necessarily entail an arm's length and short-term relationship with the supplier. Similar to Persson and Håkansson (2007), we believe that there exists degrees or levels of collaboration. Exploiting the availability of suppliers to achieve lower prices appears more a short-term than a long-term strategy. To reduce the effects of added risk premiums in the tendering process, subcontractors and suppliers alike should be included more into the planning phases of projects.

Continuous supplier and subcontractor development through the IT-tool Synergi appears to be a promising concept. As was uncovered in the subcontractor survey, the degree of specification in the project description was viewed as a decisive factor influencing the estimation of price. We believe that the prospects of Synergi have not yet fulfilled its potential. For instance it can be used as a common platform for sharing information and ideas with all relevant suppliers, and not just as an internal reference support for in-house procedures. Also, by

granting access to Synergi, AF functions as a mediator in a network of relations, thus enhancing the levels of transparency and intra-firm communication. Synergi as a management tool is relatively new and unexplored concept at AF, but the subcontractors who have received feedbacks and comments this far have responded in a positive nature. In fact, there are signs that the feedbacks have had a positive effect on the collaborative environment across projects. Subcontractors appear to accept the criticism and put extra efforts into adjusting the adverse issues in the following project. In this sense, Synergi promotes a sense of longevity because it reduces the feeling of one-shot project partnering initiatives. Thus, we believe that Synergi can support the main contractor in creating a more cooperative environment, and perhaps to facilitate a real advantage in the future.

5.2.4 Implications for the competitiveness of the firm

If we go back to our initial hypothesis, we suggested that a main contractor could obtain a competitive advantage by leveraging on subcontractor and supplier relations. However, during the course of our discussions, the prospect of a sustainable competitive advantage appears to be more a theoretical myth than a reality. Clearly there are many benefits presented from a supply chain management approach to subcontracting and purchasing in the construction industry, but how viable are such profits over time? Cousins (1999) commented that in the medium to long term firms are pushed into highly dependent relationships because the competitors are essentially doing the same thing. On the other hand, if Porter (1996) is in fact correct, that such methods are destined towards a state of hypercompetition, is unsure. The observations of supply practices in our case are believed to portray the activities in the industry in general. Following the logic of Porter (Ibid), this specific industry could already have reached a state of hypercompetition.

Performance can be measured in several ways. Strategists argue that financial indicators are not actually a good measure since numbers can easily be bent in any desired direction. An alternative measure would be to regard the survival rates. If a company is performing badly it will eventually fall behind competition and expire. But if it is performing well it will survive and continue to participate in the market. However such a dualistic view of company performance is too narrow since it does not consider different levels of performance. Consequently, it would be hard to distinguish those who actually have achieved a competitive advantage. Since our theoretical discussions of competitive advantage

covers ideas of supernormal profits jointly generated in an exchange relationship that cannot be generated standing alone, it is possible that key financial indicators (e.g. operating margins) can give an indication of a genuine advantage.

According to the AF's annual report of 2009, the company aims at achieving operating margins and returns on invested capital above the average of comparable, stock listed companies. With an operating margin at 6.2 % and return on invested capital at 35.7 % in 2009, AF has accomplished its goal of profitability. Is it then viable to assume that AF already has a competitive advantage vis-à-vis its comparable competitors? If it has, then we can no longer argue that AF's supply strategy is similar to the general industry, but different and more efficient. Our case analysis has shown that even though this industry has been heavily criticized for its slow acceptance of collaborative efforts and ability to implement new strategies, a more professional attitude to supply management is impending.

We believe that the prospect of achieving a competitive advantage in the construction industry is dependent on the way suppliers are handled and segmented. If the appropriate strategies are applied to the corresponding supplier/subcontractor in the supplier base, the process of estimating the true price is simplified and risk premiums are reduced. When such supply strategies become incorporated into the whole company, one can argue that it is actually a competitive advantage. On the other hand, this might not be a sustainable advantage since comparable competitors are expected to converge to similar strategies over time.

Another interesting discussion at this point is whether or not the efficiency efforts employed will in fact benefit the main contractor. Obviously, when realizing cost benefits in the value chain, the profits will be reallocated. A central question here is who will manage these benefits? Similar to the discussion on long term sustainability of competitive advantage, we would argue that the main contractor will enjoy the benefits until the point when the industry converges into similar practices. At this point, the tenders will approximate and the benefits will transfer to the client. On the other hand, one could also argue that the cost reductions would result in lowered prices on finished building, thus benefiting the common good.

6. Concluding remarks

The topic of this thesis has been supply strategies in the construction industry, from the viewpoint of a main contractor. Initially, we wanted to investigate which supply strategies are common in the construction industry and why the conventional practices remain dominant. Following on this, we wanted to investigate if there are any benefits to be obtained by pursuing an alternative approach to supply strategies. More specifically, how can main contractors approach supply strategies when considering both project and portfolio risk as well as the competitiveness of the firm. These two factors have contributed to differentiate our approach compared to the bulk of research on purchasing behavior in this industry, which mainly has been focusing on the benefits of long-term relationships and high collaboration between buyer and seller.

Our theoretical foundation has been based on four pillars. First, we discussed the notion of competitive advantage and the different approaches to this construct. The traditional view of competitive advantage has been confined to the resource based view of the firm and resources located in-house. However, as this view falls short to cover inter-firm and collaborative activities we extended the boundaries applying a relational view of the firm. Next, a solid understanding of outsourcing and subcontracting provides the basis for understanding the current practices observed in the empirical context. The rationale for subcontracting parts of a project to a third party resides in a make-or-buy analysis focusing on who can produce a good or perform a service with the highest efficiency. This is directly linked to the notion of core competence, and which party has the skills necessary to create highest value with the least amount of resources. Third, we have discussed supply risk management as an important factor frequently disregarded when evaluating collaborative efforts in the construction industry. Inter-firm alliances are inherently risky and encompass different types of risk. Fourth, the discussion of supply management was important in several respects as this provides the basis for strategic choices and operational handling. Furthermore, we claimed that supply management can be seen as a tool for developing competitive advantage.

The research questions provided in section 1.2 are investigated through an in-depth case analysis of a representative main contractor. Our analysis shows that the current approach to supply strategy is very much dependent on the structural limitations of the industry. Yet, even if the construction industry lags behind other

industries such as the IT and automotive industries when considering supply chain management, our findings suggest a shift from traditional, arm's length and adverse relations to more collaboration and cooperative buyer-supplier environments. The competitiveness of a firm is now more than ever contingent upon the firms' ability to exploit the external resources accessible through supplier networks.

The manner in which subcontractors bundles goods and services will in many instances be inefficient. If we evaluate the current situation based on the concept of core competence, it does not make sense that a subcontractor should supply materials when the service is at the core of their business. We apply two separate models for segmenting suppliers (i.e. portfolio analysis and contextual profiles), and propose an alternative approach to supply strategy based on these. Considering the technical complexity of the given trade or profession, we suggest that materials and services can be successfully unbundled to obtain efficiency across the supply chain. However, trades of high technical complexity require a higher degree of involvement and collaboration. Thus, we put forward a contingency model for segmenting suppliers and subcontractors that are dependent on a set of situational factors (e.g. supply risk, core competencies and capabilities). We believe that the suggested approach can help practitioners to make sense of the highly complex and diverse supplier base. Further, we believe that by doing a combined analysis in line with the suggested approach subcontractors and suppliers can be segmented in a more appropriate manner that provide a sound basis for identifying an appropriate relationship management strategy. At this point it is important to state that the dichotomy, close collaboration vs. arm's length, might be misguiding. We have argued that these two strategies are extremes on a continuum, and that appropriate relationship management strategy can contain either of them or be somewhere in between. On a final note, we strongly believe that main contractors need to renew their approach to supply strategies and relationship management in order to obtain a better fit between context and strategy.

We strongly believe that the main contractors need to renew their approach to supply strategies and relationship management in order to obtain a better fit between context and strategy.

6.1 Suggestions for future research

During the course of discussion in this thesis we have touched upon several inherent problems in the construction industry. To recap in some bullet points, without repeating ourselves too much, some of the most prominent problems are:

- A high level of adversarialism in buyer – supplier relationships due to the conflicting nature of supply and demand.
- Competitive nature of the relationships in the supply chain.
- Opportunistic behavior.
- Fragmentation and temporariness
- Lack of long-term thinking

We have addressed some of these questions and discussed alternative approaches to supply strategies. As became clear through the previous section, the current state of the industry is not easily changed. Thus, in order to see any improvements in the short- to medium-term, we are forced to accept these limitations and work within them. However, if the industry is to move forward, structural changes are indeed needed. With this in mind, we have identified several paths of future research that might provide new insights into how this can be achieved. Future research should focus on two different levels of the construction supply chain: 1) the client level; 2) the supplier / subcontractor level.

First and foremost, we believe that changes to counteract and mend the problems we have discussed must start on either side in the supply chain. Many researchers have investigated this industry form the same viewpoint as the current authors, and the majority suggest that main contractors must change their purchasing behavior and supply strategies to implement strategic, collaborative, long-term and close relationships with their suppliers. To some extent we believe that this proves to be difficult in practice. One major reason for this is the temporariness we observe. Projects are limited in time and scattered over geographical regions. We also argue that part of the problem arises from the method of competitive tendering. Main contractors are forced to play by the rules of the client in order to win contracts and work projects. In most instances, the main contractors are evaluated on the same criteria as they in turn evaluate the subcontractors. Thus, one can say that there is an infinite loop of competitive behavior. One possibility to counteract this would be for the client to change their behavior by focusing on softer selection criteria, and change the rules of the game. In the same manner as main contractors, the clients have a supply strategy. We

view this strategy as one of the major determinants for the behavior of both main contractors and subcontractors. Further, we argue that it is too easy to blame the main contractor for the problems we observe, as many researchers actually do. Research into client-led strategies for change in the supply chain might provide invaluable insights into how the rules of the game, and thus the structure of the industry can be changed. The argument is that the client has the power to change how the supply chain functions.

On the other hand, we have not seen many studies that take the viewpoint of the subcontractors. Further research into how these actors perceive their role in the supply chain will be of interest both for theoretical development and actual practice. The manner in which the subcontractors experience the supply strategies of the main contractors will undoubtedly provide valuable insights to how more effective strategies can be developed in the future. As Persson and Håkansson (2007) so appropriately stated, it takes two to tango. Thus, you should know your partner.

These are the two main strings of research that we believe would create a deeper and better understanding of the construction industry.

6.2 Limitations

The data collection methods and our discussion are subjected to limitations that need to be clarified. First and foremost, we have investigated supply strategies in the construction industry from one main contractor's perspective.

In addition, when considering the inherent complexities of this industry, which have been discussed in several section of this thesis, we have been operating with the assumption that the industrial structure and dynamics cannot be changed in the short-term. Clients, main-contractors and subcontractors have predefined roles. Furthermore, we acknowledge that construction projects are performed by temporary project organizations which are disintegrated when the project is finished. We observe that numerous research papers have dealt with issues regarding the macro structures, suggesting disruptive changes in how supply should be managed. We have taken the current state of the industry as non-changeable in the short to medium-term, assuming that we need to work within these limitations.

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Appendix 1 – Contractual arrangements

Design and build contracts

Design and build contracts term the contractual form where the main contractor assumes the responsibility for both the planning and the completion of a construction project. By applying this type of contract, the client has transferred all risk, both in time and finances, to the main contractor, and reduced the need for coordination and control. The main advantage of this contract is that it leaves room for the main contractor to utilize their knowledge and competence to design and build a construction adapted to their production process. This will often benefit the client in terms of reduced life cycle costs. Effective technical solutions can also result in a lower total cost for the contracted work.

General contracts

In general contracts, the client is usually responsible for the planning and design of the project. All the contracted work is usually centralized with one main contractor, who assumes responsibility for the construction process based on the specification provided by the client.

Separate trade contracts

Separate trade contracts are a variation of general contracts, but the construction work is separated into several distinguished packages. I.e. the client can contract a number different main contractors who then will be responsible for different parts and stages of the total project. The client will manage and coordinate the entire process. This type of contracting is often associated with government projects, and the level of risk resting on the client is often high. As a result, the need for competence and expertise within the client's organization is quite high.

Partnering

Partnering is a fairly new concept within the construction industry. Partnering usually regulated the relationship between client and main contractor. This type of contract is used in projects where the level of complexity is fairly high and time is needed to work out one-of-a-kind technical solutions. This type of contracting is based on cooperation and trust between the parties.

Combinations of contractual forms

Combinations of the various contractual forms are also seen in this industry. A combined solution in the form of a combination of general contracts and separate trade contracts is one possibility. The principle is the same as when a main contractor subcontract portions of the project to special trade contractors.

Characteristic for all the different contractual types is that the main contractor will engage special trade contractors, subcontractors, to carry out separate parts of the project work.

Appendix 2 – Game theory in negotiations

Practices of competitive tendering vary between the different business functions at AF. A good example is given by the head of purchasing in AF Building. When the company has won the tendering process and received the project contract from the client, a new round of negotiations is instigated with the subcontractors of interest. By utilizing the market mechanisms and availability of subcontractors within the specific trade or construction process, AF Building is able to obtain a fairer price on the subcontracted work. Principally, this process can be exemplified as a game, more precisely an ultimatum game were the goal is to reach an equilibrium price (see figure 15). First of all, AF Building split the subcontracted job into distinct parts or phases of work. Each part is evaluated by the various subcontractors who subsequently submit their own individual price for the part. Then, the next phase receives the same scrutiny as the preceding and so forth, eventually ending up with a full tender for the subcontracted work. AF Building then compares the prices of the different parts and chooses the lowest bid on each, thus ending up with the best full price for the subcontracted assignment. Afterwards, based on an assessment of the characteristics of the subcontractors (e.g. previous experiences, quality of services and materials, estimated risks, and so forth) AF Building performs a prioritization of the engaged subcontractors and initiates a new round of negotiations, starting with the subcontractor that was given the lowest priority. The new competitive bid is deliberately set below the best full price. This is to initiate the "game". As might have been expected, the subcontractor will reject the suggested price, but will also counteract the tender by calculating a new and fairer price than before. This bid is balanced with the initial best full price. The average price is subsequently submitted to the subcontractor with the second lowest priority. This process continues until a subcontractor agrees to the price. As a result, AF Building obtains the optimal (equilibrium) price based on the subcontractors of interest and availability of calculations.

This specific ultimatum game is applicable for all the parts of a construction project that has more than one possible subcontractor. The goal is basically to uncover the true price of the service by comparing tenders across different actors. Also, it is said that competitive tendering games will not pollute the relationships with subcontractors, seeing as AF is only utilizing the market mechanisms to its advantage. Conversely, subcontractors will utilize their own

position when viable (when economic conditions or availability of raw material necessitated it), thus defining the rules of the game. However, an interesting point is whether this strategy is sustainable over time. Competitors will attempt to imitate this activity when aware of the benefits, consequently ending up with a condition of hypercompetition, as depicted by Porter (1996). An importance notice here is that this is not a commonly employed strategy, but it is contingent upon different factors such as economic condition in the market or relation with subcontractor.

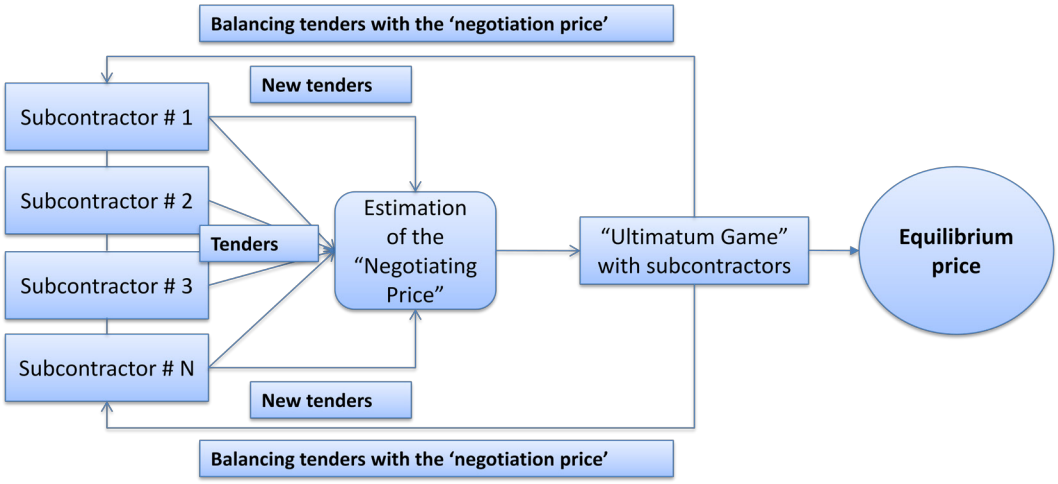

Figure 15 - Ultimatum game

Appendix 3 – Preliminary thesis proposal

BI Norwegian School of Management
Preliminary Thesis Report

"Procurement Strategies in the Construction Industry"

Students:
Matias Mäkiperä – 0805157
Per Marius R. Skarstad – 0821501

Study programmme:
MSc Business and Economics

Supervisor:
Lena Bygballe

Date of submission:
January 14, 2010

Summary

In this preliminary thesis report we begin by introducing core concepts such as supply chain management and purchasing as these are the antecedents to our theoretical foundation. Further, we touch upon the concept of competitive advantage, as this also is an important issue in our thesis work. The introduction provides a backdrop for this report.

In the second section we introduce our topic. We start by introducing our problem area. Next, we present our research question and make an argument for the choice of topic. As will become clear, we have chosen to research supply management strategies. Our empirical context will be the construction industry. One of the major reasons for the choice of context is that this particular industry seems to lag behind other industries when it comes to supply management, and thus becomes an interesting setting.

Next, we present our choice of methodology. We have chosen to perform a qualitative study, applying the case methodology. Interviews and company documents will become our primary data collection method. We also discuss issues regarding how to determine the quality of our study. Finally, we briefly present our empirical context, the construction industry, with focus on problematic issues regarding the tendering process.

In the fourth section, the theoretical framework is presented. The main issues in this section are the make or buy decision, competitive advantage, core competence and supplier relationships. These topics represent the four corner stones in our theoretical foundation. Central issues regarding each topic is presented and discussed. These discussions provide a platform for the further work on the theoretical framework.

Lastly, we have sketched out a schedule of our work on the master thesis. The schedule outlines the process we intend to go through in our work.

1. Introduction

Over the last decades there has been a steadily increasing focus on supply chain management (SCM) and the purchasing function (van Weele 2005; Holmen, Pedersen, and Jansen 2007; Håkansson and Persson 2004; Dubois and Pedersen 2002). As business becomes more and more competitive, the trend has been to reduce cost and rationalize operations. Managers have acknowledged that these two areas are crucial drivers in this respect. As a result, the supply side has become of high strategic importance for most companies (Dubois and Gadde 2000; Gadde and Snehota 2000).

The notion of supply chains has received much attention from researchers and managers alike. There is an abundance of definitions of SCM. However, the key principles are similar; the logic of SCM is that there exists cost benefits in adapting and coordination the activities carried out in sequence between the various actors in the supply chain (Håkansson and Persson 2004). One of the most commonly used definitions of SCM is provided by Lambert, Cooper, and Pagh (1998: 1); "*Supply chain management is the integartion of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders*". There has been a shift in the view of how competitiveness is created and managed. Previously, the focus was mainly internal. I.e. businesses were mostly concerned about what happened inside the boundaries of the firm. In the later years, this view has evolved to encompass the entire supply chain from raw materials to the end product in the hands of the customer. Håkansson and Persson (2004: 11) identify three trends in the development of logistics solutions; 1) increasing integration of logistics activities across firm boundaries, 2) increased specialization of individual companies, and 3) realization that flexibility and the organizations ability to respond to changing marked demands are critical capabilities. As will become apparent during this report, the second point here has several implications for our master thesis, and thus becomes especially interesting.

van Weele (2005: 12) further provides a broad definition of purchasing; "*The management of the company's external resources in such a way that the supply of all goods, services, capabilities and knowledge which are necessary for running, maintaining and managing the company's primary and support activities is secured at the most favorable conditions*". From the provided definitions we

now see that SCM and purchasing are related. SCM is concerned with all activities from supply of raw materials, through transformation activities, and to the end product. Thus, it encompasses the purchasing function which to a large extent is concerned with the supply of inputs.

Further, van Weele (2005) explains that most companies today spend over 50 % of their total turnover on purchased goods and services. One contributing factor here is as pointed out above, namely that we observe an increasing specialization of the individual companies. Thus, as companies are increasing their focus on what is considered as core activities and competencies, there is an ever increasing need to purchase certain goods and services from external actors as these are not available in-house. Thus, it becomes clear that the purchasing function is a key business driver. Purchasing and supply chain management offers a considerable potential for rationalization and cost reduction.

From the definitions above, supplier relationships emerges as an important issue in purchasing and SCM. There has been a realization of the benefits that can be gained from closer cooperation with suppliers (Gadde and Snehota 2000). I.e. supplier relationships have received an increasing strategic attention. Davis (1993) refers to this acknowledgement as a shift from purchasing to supply management. According to van Weele and Rozemeijer (1996) the tradtitional approach to supplier relationships, arm's length relationships, has slowly been abandoned for a more interactive approach. We now observe an emphasis on the benefits of collaborative and long-term supplier relationships (Araujo, Dubois, and Gadde 1999; Gadde and Snehota 2000; Holmen, Pedersen, and Jansen 2007; Dubois and Pedersen 2002). Further, Dyer and Singh (1998) argues that competitive advantage resides in the relationship between companies, not only withing the boundraries of the single company. Thus, the importance of supplier relationships become even more clear.

Through this introduction we have emphasized some of the general developments of SCM, purchasing and supplier relationships in the last decades. This sets the stage for our master thesis, and provides us with a backdrop for the following problem statement, research question, theoretical framwork, and choice of research methodology.

2. Topic

2.1 Problem statement

As will become clear through the following report, we have chosen the construction industry as our empirical area. There are several reasons for this choice. One of the main reasons is that this particular industry lags behind general industry, such as the automotive- and electronics industry, to a large extent when it comes to SCM and supply management issues. More specifically we want to investigate procurement strategies and supplier relationships in this industrial context. Further, we will link supply management to the 'competitiveness of the firm'. This provides us with a great opportunity to concetptualize how a firm can change its supply strategy, and for what reasons this might be a rational strategic move.

2.2 Research question

According to Berg (2007), research questions are influenced by the choice of theoretical framework, and the following literature review. The concepts and definitions originating from the theoretical framework can further develop and provide a more focused scope with regards to the research problems. Thus, our research questions at this stage can only be considered as preliminary, and will probably be subject to refinement as the research progresses.

Our preliminary research question is;
"*How does supply management in the construction industry function today, and what are the strengths and weaknesses of the current approach?*"

2.3 Relevance of the topic – an argument for the choice

Lê and Brønn (2007) pointed out that the construction industry has not shown any significant improvements over several years, compared to other more dynamic industries. According to the authors, this phenomenon can be explained by the fact that structural and construction failures often do not appear immediately, but are spread over time and are difficult to assess with a specific design or method. Thus, we perceive that the unwillingness to change in the industry is, to some extent, related to the problem of assessing the definite problems in the singular construction projects. The problems cannot be associated to one specific project, but to the sum of all engaged projects. We believe that the 'technical'

subcontractors hold the key to more efficient solutions in the construction projects, and thus can have a considerable impact on total cost.
Choosing the optimal method of procurement will thus be of crucial importance for the overall profit and success of the project. There is a strong reluctance in the industry to explore new methods for procurement. Business practices and culture have been formed of years of operating in more or less the same manner. There have been a few attempts to contribute to a modernization of procurement practices, such as the partnering method. However, even here the industry lags behind other industries in their strategic planning. There is a need to rethink strategies and approaches to purchasing and supplier relations. According to Yik et.al (2006) subcontracting has been a long-standing practice in the industry. However, this practice is not without its problems. For instance, the extensive use of subcontractors requires significant monitoring and measurement controlling systems that occurs transactional costs. Thus, the efficiency is said to be dependent on whether the transaction costs can be minimized or not. Further, the way the subcontractors are expected to complete the given assignment creates problems as well. To safeguard their interests, the client and main contractor often hold the subcontractor responsible for the completion of a particular task (e.g. the procurement of materials and equipment in addition to the actual assembly), thus transferring the risk downwards in the value chain. Such practice is said to highly influential on the total construction costs (Ibid). Consequently, greater attention should be paid to selection of procurement method.

In a study by Greenwood (2001), main contractors attitude to subcontracting was examined. He found that despite main contractors' apparent interest in closer buyer-seller relations, such relations remained traditional, arms-length and cost-driven, primarily because of the need to 'fit' with their task environment. According to the author, this conduct could be explained by traditional organizational behavior theory aimed at signaling legitimacy on how main contractors should look and behave in the industry, thus confirming our arguments on the reluctance to change. This in line with the findings by Dyer and Singh (1998), who would argue that the idiosyncratic rationale of relationships prevent any competitive advantages in the industry. Already at this stage we perceive that the unwillingness to rethink strategies in the industry is augmented by the main contractor's behavior and reluctance. Hence, the optimal approach to

study this particular area is from the perspective of a main contractor, as will be done in our thesis.

The issues depicted above, pooled with uncertain market conditions and the call for more dynamic capabilities in and between organizations and enhanced competitiveness in the focal industry, constructs an especially relevant and interesting field of study today. As we have already mentioned, there are both strengths and weaknesses with today's practice, but there is also latent potentials for improvements.

3. Methodology

In order to meaningfully answer our research question, we need to understand how subcontracting and procurement in the construction industry functions. According to Yin (2009), the case study methodology is relevant when trying to explain how some social phenomenon works. Further, when in-depth description of the phenomenon is required, the case study method becomes even more relevant (Ibid). We believe that both these conditions are present in our proposed research question. Thus, we choose a qualitative methodology – case study methods.

3.1 Case studies

We propose to apply a case study method as an approach to obtain the information and understanding needed to answer our research question. This method will enable us to investigate, describe and understand the empirical area. According to Berg (2007), case studies provide extremely rich, detailed, and in-depth information about the empirical setting of a study. Nuances, patterns, and latent elements that might be overlooked through applying other research methods can be captured through case studies. From our research question it follows that a broad investigation is in order. The research entails that the focal company's relation in a particular group must become part of the study, thus the group must also be examined. Moreover, the case method has been showed to be an appropriate method for investigating relationships and behavior. Following the arguments of Yin (2009), we can further justify why the case study method fits our research topic and question. A case study can be said to be an empirical in-depth examination of a phenomenon within its real-life context. Case studies are especially useful when the boundaries between phenomenon and context cannot

be clearly distinguished. Further, the case study method copes with situations where there are a variety of variables emerging from multiple sources of evidence, with data needing to converge in a triangulation fashion (Ibid: 18). Finally, the case study benefits from an a priori development of a theoretical framework, which guides the data collection and sub-sequent analysis.

In relation to our area of study, these are good arguments for the choice of method. Procurement in the construction industry is a complex task due to a range of factors such as; technical specifications and requirements of the goods and services purchased, interdependencies between goods and services in relation to the iron triangle (cost, time and quality), the risk such projects entails, human relations, and the amount of finances involved etc. A case study can help us account for factors such as these. Further, these are examples of elements that have a large impact on procurement strategies. The empirical research area will be further elaborated in section 3.4.

With regards to the design of the case study, Yin (2009: 27) propose five components for creating a formal design for case studies;

- Study questions
- Theoretical framework
- Identification of the units of analysis
- Logical linking of the data to the theory
- Criteria for interpreting the findings

These elements will guide our design process.

Berg (2007) distinguishes between several case study design types. The type fitting our purpose is the type termed 'descriptive case studies. "*This approach implies the formation and identification of a viable theoretical orientation before enunciating research questions*" (Ibid: 293). This has to some extent been considered before the formulation of our stated research question, and will be the point of departure for the following work on our master thesis.

3.2 Data collection methods

This section outlines the process of putting the case together. Case studies entail a variety of data gathering techniques. We distinguish between primary- and secondary source data. Primary data will be obtained mainly through two sources; 1) Interviews with key personnel both in the focal organization and in a selection of subcontractor organizations. 2) Company documents such as annual reports,

accounting reports, strategy statements, project reports, procurement reports etc. Secondary data, to the extent it is needed, can be obtained through news media articles and interviews, industrial surveys, and data collected in other studies. We now move on to consider the two main data collection methods.

3.2.1 Interviews

One can distinguish between three main types of interviews; 1) standardized interviews, 2) semi-standardized interviews, and 3) unstandardized interviews (Berg 2007). The main difference between these approaches is the rigidity with regard to structural formality. The main characteristics of the three types are presented in the following table;

Standardized interviews	**Semi-standardized interviews**	**Unstandardized interviews**
Formally structured	More or less structured	Completely unstructured
No deviation from question order	Questions may be reordered during the interview	No set order to any question
Wording of every question is asked exactly as written	Wording of questions is flexible	No set wording to any question
No clarifications	Interviewer may answer questions and make clarifications	Interviewer may answer questions and make clarifications
No additional questions may be added	Interviewer may add or delete probes to interview between subsequent subjects	Interviewer may add or delete probes to interview between subsequent subjects

Table 1 - Interview structure and formality – adapted from Berg (2007: 93)

We will primarily apply the semi-standardized approach as this allows us some flexibility in interaction with the interviewees. Flexibility will be important in several respects. One of the main benefits is that through remaining flexible, we will be able to capture and obtain information about crucial elements that was not considered during the preparation of the interview guide.

A short discussion of the advantages and disadvantages of the interview method will be in order.

The main benefits are;

- Interviews produce a more concentrated interviewee, thus allowing full attention to the questions at hand.

- Interviewer is able to spend more time with the respondent, allowing for collection of more data.
- Interviews facilitate for improvisation and adaption of the interviews to the respondent.

The main disadvantages are;

- Interviews are time consuming.
- It can be hard to create interest and commitment from the respondent.
- It can be harder to synthesize and analyze information due to the nature of the data collected.

(Askheim and Grennes 2000: 91-92)

3.2.2 Company documents

Through the entire thesis writing process we will have access to company documents as described above. Company records and documents will be important in putting the case togehter, providing us with factual information about a variety of factors and elements. Thus, written documentation will enable us to create a more complete picture of the empirical setting and context.

3.3 Determining the quality of the research design

There are several concepts that can be used to determine the quality of research; trustworthiness, credibility, confirmability, etc. (Yin 2009). Four tests are commonly used in social science to determine the quality of a study; 1) construct validity, 2) internal validity, 3) external validity, and 4) reliability. These tests can be challenging with regards to qualitative methodologies. Pedhazur and Schmelkin (1991) provide definitions of these tests that are directed towards quantitative research. Yin (2009) and Berg (2007) on the other hand, has to some extent adopted the definitions to fit qualitative research methodologies.

The following discussion will focus on two of these issues; 1) external validity, and 2) reliability.

A central question related to the choice of research methodology is to what extent our findings can be generalized to other similar settings. This is an important question in all types of research. External validity is a concern for all researchers. This term can be defined as; "*... the generalizability of findings to or across populations, settings, times and the like*" (Pedhazur and Schmelkin 1991: 229). There are conflicting views in the literature regarding the generalizability of the findings emerging from case studies (Berg 2007). One of the main arguments

against the generalizability of findings is that the study is performed in the object's natural context. The context is seen to be unique and specific for each and every object. Thus, one can argue that conclusion from one study cannot be generalized to be true for other objects.

However, Berg (2007) argues that case studies will provide valuable insight to the object of study, and that findings can to some extent be generalized to other, similar objects. Yin (2009) explains that generalization from case studies does not come automatically, but rather through replication of findings through multiple case studies. Thus, we cannot draw broad generalizations based on the findings of our research. We will however be able to draw some inferences from our findings in relation to similar objects in similar contexts.

Reliability in qualitative studies is about demonstrating the operations of a study, so that later investigators can replicate the study and arrive at the same findings and conclusions (Yin 2009). Thus, procedures related to the design of the study and data collection methods must be documented. Further, Pedhazur and Schmelkin (1991: 81) explain that reliability is a necessary but not a sufficient condition for validity.

Construct- and internal validity will be important concerns in many types of studies and research. However, these forms of validity will not be of major consequence in this case due to the nature of our research design.

3.4 Empirical context

This section provides a brief introduction to the empirical setting of our thesis. Our thesis will be based on a case related to AF Gruppen ASA. AF Gruppen ASA is one of Norway's largest construction companies and is a turnkey supplier of services in property development, building services, construction services, energy optimization, demolition/recycling and offshore services (AF Gruppen ASA 2009).

AF Gruppen as a construction and civil engineering company operates at a project by project basis. They obtain contracts for execution of projects through a tendering process. The client, who is the initiator of the specific projects, invites a limited number of construction companies to participate in this tendering process. The participating companies will further collect tenders from suppliers of goods and services like concrete frameworks, steel, wood, outfitters, electricians, plumbers et cetera. The construction company will then, based on tenders from

suppliers and subcontractors, offer a tender to the client for the entirety of the project. The company with the lowest tender usually wins the process and is awarded the project.

After the project is won, the construction company initiates a new tendering process with its sub-contractors. This is to finalize and minimize the full cost of the project target.

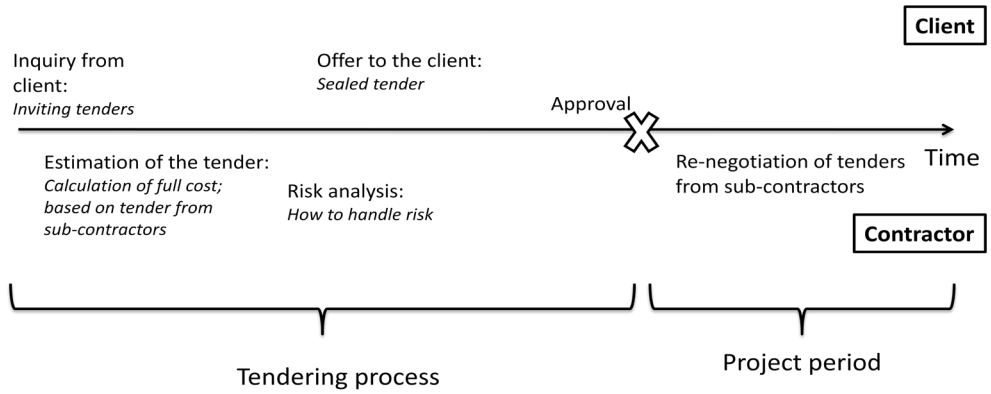

Figure 1 - The tendering process

To further complicate matters, the manner in which the tendering process works and plays out is dependent upon the form of contracts chosen by the client as well as the construction company itself. There is a variety of standard contracts that are applied to handle relationships among the various actors.

Procurement methods

The choice of procurement method depends on situational factors;

- General market conditions
- Risk
  - Distribution of risk on different actors
- Price and terms
- Contract form
- Type of project – construction and building specifications
- Type of supplier / subcontractor

The project manager usually decides what method of procurement suits the project best. The project manger is typically experienced with complex projects and will base the choices that are made upon previously obtained understanding and knowledge of complexity. Another factor to consider is that there is tradition for using local suppliers to a large extent in this industry.

AF Gruppen is to a large extent subject to the same characteristics as other contractors in this industry. Eriksson, Dickinson, and Khalfan (2007) describe the general characteristic as an extended use of subcontractors, with a relatively unsophisticated approach to these. Further, the relationships are mostly of a transactional nature (Ibid: 203). One of the major reasons for this is the extended use of standardized contracts. Another characteristic resulting from this is that risk tends to be trasfered from client, to main contractor, who in the next instance further transferes risk to the subcontractor. So in a sense, the party less able to carry risk is often the contractual part that is burdened with heavy liabilities. According to Lam et al. (2007) there is a certain cost related to impropper risk allocation. The subcontractir might; 1) adding a premium to the bid, or 2) delivering low quality work (Ibid: 485). Thus, risk allocation emerges as an important factor in construction procurement as impropper risk allocation affects the total cost of the project as well as overall efficiency and effectiveness.

Procurement of goods and services accounts for a major part of the total turnover for the construction company. In 2007, AF Gruppen ASA procured goods and services for 3.5 billion NOK (62 % of annual turnover), where materials accounted for approx. 35 % and subcontracting accounted for approx. 65 %. As a consequence, it is essential that main contractors such as AF Gruppen have strategies for handling these relations in place. Moreover, outsourcing of critical resources is not solely confined to the construction industry but to other industries as well. According to Dyer and (1998), the typical manufacturing firm in the United States purchases 55 % of the value of each product it produces, while the same number accounts for 69 % in a typical Japanese firm.

4. Previous work on the subject – theory and relevant literature in the area

From the introductory discussion and our following problem statement and research question, we have defined the scope of our theoretical framework. In the following sections we will briefly review some of the most interesting and important research that is found to be relevant for our area of research. The four main topics are; 1) competitive advantage, 2) core competence, 3) outsourcing / subcontracting, and 4) supplier relations.

4.1 Outsourcing and subcontracting– The make or buy decision

Subcontracting is common in the construction industry. As we shall see, there are good reasons for this practice. But before we turn to this, some definitions will be in order.

van Weele (2005) presents the following definition of outsourcing; "*Outsourcing means that the company divests itself of the resources to fulfill a particular activity to another company to focus more effectively on its own competence. The difference with subcontracting is the divestment of assets, infrastructure, people and competencies*". According to van Weele (2005) companies are increasingly turning to outsourcing in their attempts to enhance competitiveness. Outsourcing is related to the 'make or buy' decision. This author explains that the rationale behind this division can be different for different companies. There can be both tactical and strategic reasons for this decision. With regards to the strategic reasons, the most important are; 1) gain access to resources that are not available internally, and 2) increase flexibility and share risk (Ibid). Tactical reasons might be; 1) reduce control and operating costs, and 2) improve performance (Ibid). Other authors such as Simchi-Levi, Kaminsky, and Simchi-Levi (2004), classifies reasons for outsourcing on two major categories; 1) dependecy on capacity, and 2) dependency on knowledge. The latter category is the most interesting in our context, and provide us with a link to the subcontracting practice that we observe in the construction industry. Dependency on knowledge can easily be translated into subcontracting. The focal company is not in posession of the people, skills, and knowledge needed to produce a good or service, so the activity is outsourced in order to access this particular capability (Ibid). Further, the focal company must have the knowledge and skills to evaulate the needs of the customer and translate these into functional characteristics of the good or service. Thus, the focal company more or less functions as a coordinator.

If we now turn to the concept of subcontracting, a definition can be found in the Business & Management Dictionary; "*The delegation to a third party of some, or all, of the work that one has contracted to do. Subcontracting usually occurs where the contracted work (for example, the construction of a building) requires a variety of skills. Responsibility for the fulfillment of the original contract remains with the original contracting party. Where the fulfillment of a contract depends on the skills of the person who has entered into the contract (for example, in the painting of a portrait), then the work cannot be subcontracted to a*

third party. The term subcontracting is sometimes used to describe outsourcing arrangements".

Although subcontracting and outsourcing share some characteristics, there are also principal differences between them. Outsourcing usually the decision to buy a certain good or service where the buying company at some stage had the assets, knowledge and resources to perform the activity in question internally. Whereas in subcontracting, the buying company usually has not been in a position where it can produce the good or service internally. Leenders et al. (2002) describes subcontracting as a special class of the make or buy decision; the main contractor bid out part of the contract to other contractors, and in accordance with the discussion above, acts more like a coordinator of the project than a producer. Another characteristic of subcontracting is the frequent bundling of both product and service. E.g. electricians working on a construction project will in most cases supply their own materials as well as performing the installation service.

In this context, the four reasons listed above are believed to be the main driving factors in the decision to subcontract parts of construction projects to external actors. Further, a construction company will in most cases not be able to internalize all functions and competencies needed to complete complex construction projects. In this particular industry, one can argue that the main contractor has no choice but to subcontract parts of the project.

Dubois and Gadde (2000) explores purchasing behavior in the construction industry. These authors conclude that the role of various subcontractors vary to a great extent. The activities performed can range from including everything from design and production, to one of these. The main determinant of the activity scope is the contractual form (Ibid: 211). Several problems arise from this fact;

1) The actors can develop their own *objectives, goals and value system* without regards for the impact this can have on other actors involved in the project.

2) The contracts can be seen as nothing more than a way to transfer risk to other parties. Thus, they do not contribute to coordination of the various actors activities.

The result of this is that the current practice in the industry facilitates for a more competitive than collaborative behavior between actors involved in a project, thus constraining efficiency and performance.

One of the main findings of the study in question is that transactional exchange is the dominant form of business in this industry (Ibid: 213). Business relationships are contractual, not relational. Simchi-Levi, Kaminsky, and Simchi-Levi (2004) explain that business relations tend to be of a formal nature, relying on formal contracts to ensure adequate supply, prices, lead times, quality etc. These authors further explain that the actors tend to disregard how it's decisions affect the other parties in the supply chain. According to Thompson, Cox, and Anderson (1998), the standard contract applied in this industry is designed to transfer risk, thus leading to arm's length relations.

Dubois and Gadde (2000) explain that there exists temporary networks within the construction industry. This is related to the nature of the projects, which are restricted in the time dimension. This temporariness hampers long term thinking. Thus, the creation long term relationships and strategies that can be observed in other industries do not have the conditions necessary to evolve in the construction industry. Kamann et al. (2006) suggest that mutual expectations about future business will become an important asset in facilitating for long-term thinking in this industry. Further, the problem of opportunism among subcontractors can be reduced by such expectations. Moreover, these authors conclude that stable long term contracts might reduce transaction costs and enhance long term supplier performance (Ibid: 37). Thus, costly day to day problems can be reduced.

This section has provided a brief taste of the current procurement practices in the construction industry. It becomes clear that there are inherent weaknesses in the current approach to procurement strategies involving subcontracts. The aim of our thesis is to investigate these weaknesses further, and search for improvements that can lead to competitive advantage.

4.2 Competitive advantage

The concept of competitive advantage has a variety of definitions in the strategic literature. Intuitively, the concept encourages a perception of improved capacities to compete, and the utilization of such positions to ones advantage in relation to competitors. Peteraf (1993) stated that the competitive advantage primarily resides in the organizational competences and resources. When these are superior relative to those of rivals, the competitive advantage emerges as they are matched appropriately to environmental opportunities (Ibid). This idea is founded in the

resource-based view of the firm, where resources are applied and combined to create sustainable interfaces. The crux of obtaining competitive advantage is said to reside in the way that a firm extracts 'rents' and how these are defended over time (i.e. Ricardian or monopoly rents). Such an approach includes both ex post limits (before), as well as the ex ante limits (after) to competition. In other words, the rents have to be extracted in a way that the competitors are not able to copy the activity. A final condition to competitive advantage is the mobility of the resource. If the resource is easily accessible (e.g. there is a boundless supply), then the position is not justifiable over time.

The resource-based perspective of a competitive advantage has received support from other others authors as well. An alternative definition is given by Barney (1991), stating that "*a firm has a competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors*". Building on the assumption of resource heterogeneity, he proposes that, in order to embody a competitive advantage, a resource must have four distinct attributes: 1) it must be valuable, 2) it must be rare, 3) it must be imperfect immobile, and lastly 4) it cannot be substituted with others. These four attributes gives rise to the framework known as the VRIO. If a resource entails all of the attributes, it is said that it will help generate sustainable competitive advantage.

While further exploring the resource-based view of the firm, Dyer and Singh (1998) found that the perspective in fact overlooked one imperative aspect. According to the authors, the (dis)advantages of an individual firm are often related to the (dis)advantages of the network of relationships in which the firm is embedded. This means that the search for competitive advantage has traditionally been confined to the resources located within the firm, and not accessible through business relationships. In such a fashion, the authors suggest a 'relational view' of competitive advantage. By the introduction of relational rents, that is a supernormal profit jointly generated in an exchange relationship that cannot be generated standing alone, a dyad or a network of firms can develop relationships that result in sustainable competitive advantage (Ibid). For instance, firms are said to generate relational rents when the volume of exchange episodes increases. Additionally, synergy-sensitive resource interfaces (i.e. resource combinations that increase in value when they are connected) that entail the attributes projected by Barney (1991), will also generate relational rents. These are both relevant

sources of relational rents in business relationships.

One interesting point at this juncture is that the resource-based view and the relational view are in fact contradictory views. Following on the notion of Peteraf (1993), critical resources that represent opportunities for competitive advantage should be protected against other firms rather than being shared in a dyad or network. On the other hand, the relational view of competitive advantage can also be seen as an extension of the resource-based view since it expands the boundaries of a firm. A dyad generating sustainable competitive advantage through a particular resource interface should adapt both the ex-post and ex-ante limits to competition and the attributes of the VRIO. This way, the perspectives are in fact complementary as well. Because of this, we argue that the existing theories on competitive advantage are highly context dependent and subject to change in dynamic environments.

Nevertheless, the scheme of sustainable competitive advantage predominantly exists in the way that the advantage is valid over time. Porter (1996) argues that rivals can quickly copy any market position, thus any competitive advantage is temporary. This approach is conceptualized through the activity based view of the firm. As competitors continuously benchmark and adapt each other's positioning in the market, they reach a state of 'hypercompetition', which is said to be the path predestined for a mutually destructive state. The key then becomes to outperform competitors, either by focusing on operational effectiveness, strategic positioning in the market, or both. The latter suggests establishing different activities from the rivals, or performing the same activity differently or, otherwise, better. In the construction industry, subcontracting is the dominating activity, thus we suggested an approach of combining operational effectiveness and strategic positioning through leveraging on subcontractor alliances. This way, a company can outperform rivals by establishing a difference in activities that it can preserve (Ibid).

Alliances between organizations have recently received momentum in the construction industry. The term 'alliance' in this context is used interchangeable with another well known expression within construction, which is the concept of 'partnering'. Alliances provide opportunities for transferring skills and resources, which helps reduce uncertainties and accelerate learning (Ingirige and Sexton 2006). The alliance participants engage in a continuous process of trust building supported by 'openness' and 'mutual alignment', thus facilitating for sustainable

competitive advantage. This way, the benefit can be operationalized through the combination of both the resource-based and the activity-based views of the firm, which we adopt in our thesis. However, in project-based organizations such as those found in the construction industry, the potential long-term learning benefits have been substituted with notions of short-term productivity and cost savings (Ibid). This is primarily because the projects postulate 'one-off' characteristics which promote barriers to learning from earlier experiences. Thus, we observe a crucial differentiation between the concepts of 'long term partnering' and 'one-off project partnering', based on the anticipated longevity of collaboration. Because of the very nature of project-based organizations, the rationality of partnering is bounded to discontinuous learning and feedback loops among the different project teams, thus obstructing the potentials for creating competitive advantages (Ibid).

According to March (1991) cited in Ingirige and Sexton (2006: 524), the strategy of seeking short term benefits (e.g. discontinuous collaboration between the different construction project teams) reduces the opportunities for alliance project teams to add value in the future. Relating this to Peteraf's notion of competitive advantage (1993), there should be a natural trajectory embedded in a firm's knowledge base (e.g. continuous learning), to facilitate for competitive advantage. Consequently, we observe an inconsistency between the way alliances are utilized and how to actually achieve a competitive advantage in the industry. Also, with respect to Porter's approach (1996), competing solely on the basis of operational efficiency (e.g. achieving excellence in individual activities) is not really a viable strategy, because the competitive advantage would not be sustainable over time. Strategy is about combining activities better than the rivals. In such a fashion, there is a significant gap between the strategic theory and frequent business practices, thus a concept that needs further assessment in our master thesis.

4.3 Core competence

Another interesting topic at this juncture is the concept of core competence. According to Pralahad and Hamel (1990), core competence can be defined as the "*collective learning in organizations, and the coordination of diverse productions skills and integration of multiple streams of technologies*". Further, the authors suggest that a company's competitiveness is principally determined by the price/performance attributes of contemporary products. However, such

competitiveness would only be versatile in the short run, as markets are believed converge into similar standards over time. The crux of sustained competiveness then exists in the company's ability to generate, at lower costs and with superior pace relative to competitors, the core competencies that spawn unforeseen products (Ibid). An important distinction is made at this point. Unlike physical assets (e.g. products), competences do not deteriorate as they are applied and shared. In fact, they grow. This entails that an organization should endeavor to fully exploit competences in order to make the most of its untapped potential.

Hindle (2008), along the lines of Pralahad and Hamel's propositions (1990), raises an important question, asking: "*why should non-essential activities be allowed to consume valuable resources?"* Here, he makes out a central issue for all strategizing managers, more specifically, identifying those activities that are not "at the core". According to Goddard (1997), core competences can be identified based on seven critical characteristics. We consider the most relevant. As a starting point, a core competence is tacit and consequently impossible to imitate. Secondly, it is something the company does better or differently from competitors. Thirdly, they are rare, meaning that they limited to two or three activities in the value chain based on the future success of the company. And lastly, they are said to be flexible, in the sense that they are able to straddle a variety of functions and are not tied into existing ways of doing business. These characteristics materialize the concept of core competence and can help managers identify critical and central activities in the organizations.

An interesting observation is made at this point when uniting the concepts of core competence and competitive advantage. Considering the critical characteristics for identifying core competencies (Hindle 2008), we perceive that they are actually in line with the characteristics of competitive advantages. For instance, relating to the transferability of competence (i.e. tacit knowledge), this is similar to ex-post and ex-ante limits to competition (Peteraf 1993), imperfect mobility (Barney 1991) and the alliance partner's absorptive capacity in a business relationship (Dyer and Singh 1998). Further, Hindle (2008) suggests "doing" something better or differently than competitors. Here, we see that the process of balancing operational effectiveness and strategic positioning emerges as an auxiliary view (Porter 1996). The rarity of activities is also similar to the attribute of rareness (Barney 1991), whereas the notion of flexibility can be contrasted to the interface formation in the resource based view of the firm

(Peteraf 1993). Overall, we observe that the two concepts are actually very similar in both its definitions and characteristics. On the other hand, Mooney (2007) elaborated on this point, noting that even though sharing common attributes, they are in fact distinctive. For instance, a competitive advantage does not necessarily emerge from a competence embedded in an organization; rather it can be derived from a unique asset or resource, such as a favorable geographical location or a strong brand name (Ibid). However, we would argue that resources do not only involve physical assets or facilities, but also organizational and intangible ones, thus including competence as an organizational resource. We will not pursue the comparison of the two concepts any further; our purpose at this time is to stress the closeness and relatedness we observe.

Our conceptualization of competitive advantage and core competence sets the stage for the pending discussion on subcontracting in the construction area. Going back to Hindle (2008), and the topic of non-critical activities, the drive of identifying core competences has led to an increased popularity in outsourcing. As companies become more and more aware of core activities, outsourcing of those that are not perceived as critical also increases. Consequently, the value is to understand the reasons for outsourcing and how outsourcing relations should be dealt with.

4.4 Supplier relationships

'Business relationships' is an extensively researched area. Several schools of thought offer a large variety of recommended approaches to relationships with customers and suppliers. We chose to adopt the 'Industrial Networks' perspective in our thesis. There is a lot of literature available on supplier relationships in this school of thought. However, we will also draw upon other sources adopting different perspectives.

Due to the increasing specialization of actors, as was discussed in the introduction, buyer-seller relationships are becoming of increasing strategic importance. According to Gadde and Snehota (2000), making good use of suppliers is a complex task. They argue that there are at least two reasons for this. First, the economic consequences are difficult to assess, and second, a company can only exercise limited control over a supplier. Buyer-seller relationships are interactive and continuously changing, and thus there exists inherent uncertainties (Ibid).

Every relationship comes at a 'price'. Communication, coordination, adaption and sometimes commitment all have their costs. Moreover, there are also benefits arising from relationships. Gadde and Snehota (2000) distinguish between relationship costs and relationship benefits. These can further be split into sub-categories;

Relationship costs	**Relationship benefits**
Direct procurement costs	Cost benefits
Direct transaction costs	Revenue benefits
Relationship handling costs	
Supply handling costs	

Table 2 (Gadde and Snehota 2000, 308)

This classification is made from the buying company's point of view. Further, we believe that these costs and benefits, in many instances, are not explicitly evaluated by the buying company, thus, leading to sub-optimal configurations of supplier relationships. The various relationship costs and benefits provide valuable insights to the economic consequences of supplier relationships. These are factors that need to be taken into account when a procurement strategy is created. Thus, this classification of relationship costs and benefits will have implications for the propositions we make in our master thesis regarding how to handle supplier relationships in light of obtaining competitive advantage.

There is a variety of factors that influence how successful supplier relationships form and evolve. According to Ford (1980) the development of buyer – seller relationships is a five stage process characterized by various degrees of; 1) social distance, 2) cultural distance, 3) technological distance, 4) time distance, and 5) geographical distance. Experience with the other party, and uncertainty is also crucial factors in the development of a business relationship. Ford (1980) further goes on to explain that the first contact with potential suppliers is characterized by high distance and uncertainty. As the exchange process is repeated, these factors are likely to decrease, introducing a sense of commitment between the parties. When the relationship evolves further, into the long-term stage, the parties will even make extensive mutual adaptations and investments.

Again, this is a complicated process with many factors operating at different levels. Do all relationships have to evolve to a high commitment relation

with extensive adaptations? The literature provides a balanced view of how to approach this problem. Araujo, Dubois, and Gadde (1999) conclude that a buying company is in need of a variety of supplier interfaces, meaning that relationships with high involvement are complex to handle and that substantial investments are required. Thus, it would entail that a company can only handle a smaller number of these relationships. Then, the decsion of how to handle different relationships becomes a strategic task. Gadde and Snehota (2000) contribute to this discussion with a systematic review of the decisive factors in choosing how to handle supplier relationships. The framework presented by these authors distinguish between three key dimensions of the supplier involvement concept; 1) coordination of activities, 2) adaptation of resources and 3) interaction among individuals (Ibid: 309). Thus, they argue that the existence of activity links, resource ties, and actor bonds describe the degree of involvement in a relationship. High involvement would then entail close coordination, a high degree of adaption of resources and intense interaction between companies, which we then can see is similar to the long-term stage as presented by Ford (1980). We see that there has been a development in the literature, from the recommendation of arm's length relationships, via the partnering perspective, to a more balanced view of how companies should approach their supplier base. Gadde and Snehota (2000: 314) conclude that there is no such thing as a generally best type of relationship, which is in line with the conclusion by Araujo, Dubois, and Gadde (1999).

Furthermore, a study by Bensaou (1999) found that there is no significant difference in performance between the various types of relationships. No relationship is inherently more effective than another, be it a strategic partnership or a market exchange based relationship. This would then suggest that the performance of a relationship is dependent on how well it is managed. Bensaou (1999, 37) propose that: "*Successful supply-chain management therefore requires the effective and efficient management of a portfolio of relationships; first the firms must match the optimal type of relationship to the various product, market and supplier conditions; second, they must adopt the appropriate management approach for each type of relationship.*"

Effective management in relationships would, as previously stated, require assessment of economical consequences. But in addition, the current posture of the relationship as well as possible changes in degree of involvement should also

be assessed. Gadde and Snehota (2000) point out that effective management within relationships would also entail that modifying the posture of that relationship in light of changing conditions, and that this is a critical issue in supply management. Thus, the posture of a relation should not be locked and static until the relationship dissolves, but should rather be dynamic and organic.

According to Bensaou (1999) there are two kinds of successful relationships. The following figure can help explain this notion.

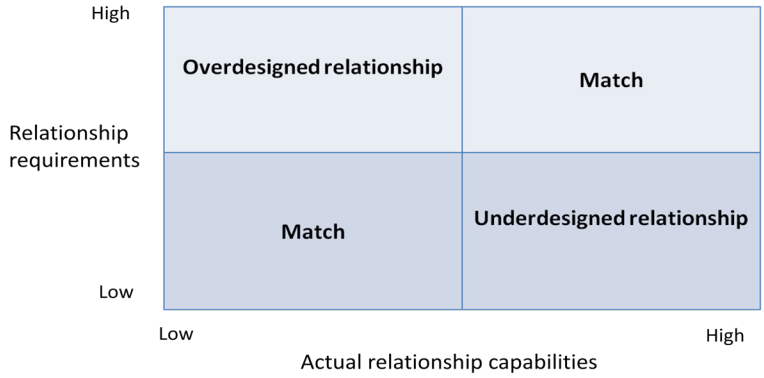

Figure 2 - Managing a portfolio of relationships (Bensaou 1999, 43)

Design or redesign of a relationship would consist of three steps;

1) Strategic selection of relational type to match the conditions given by the product, technology and the market,

2) Identification of an appropriate management profile for each type of relationship design.

3) Matching the design of the relationship. This last step will help a company find the desired management profile so that over- or underdesigned relationships can be avoided.

The key to an effective approach is to match the actual relationship capabilities to the relationship requirements. E.g. investing to heavily or putting more resources than necessary into a relationship would not only be costly, but also potentially very risky.

Dubois and Pedersen (2002) disucsses supplier relationships with regards to purchasing portfolio models, such as the framework presented by Bensaou (1999). They argue that the portfolio models do not account for interdependencies between relationships, and further that this is a major weakness with this approach. The main point being that the portfolio models

Moreover, they argue that the ‘industrial networks’ perspective regards relationships between buyer and seller as being embedded in a larger network of

actors. Thus, the interdependencies between various relationships becomes of interest due to the focal unit of analysis being inter-firm relations, not companies. We could say that the 'industrial networks' perspective on relationships is more extroverted than the purchasing portfolio models in the sense that the perspective is expanded from a dyadic level, to a network view.

However, we believe that the two perspectives are not mutually exclusive, but rather can complement each other in the sense that you need to keep your mind at two levels to make the most of supplier relationships; 1) management within relationships, and 2) management in business networks – among relationships.

The discussion above presents some important considerations when dealing with suppliers. Furthermore, in our empirical context, construction companies working with a variety of suppliers and subcontractors are presented with a huge challenge. We will further explore this notion in our master thesis.

4.5 Relevance for implications of the thesis

The preceding discussion of theoretical areas such as competitive advantage and subcontracting constitutes the basis for the discussion of how supplier relationships can be handled effectively. The implications of our study will be derived from a joint consideration of these topics. As will be made apparent, the different perspectives alone only capture parts of the problem. It is the successful combining of the different perspectives that gives our discussion its value.

As we pointed out in section 2.3, the unwillingness to adapt theoretical implications in the industry is principally a structural problem and not because there is a lack of knowledge amongst the practitioners. However, we argue that our thesis can shed light on how to actually overcome such structural problems by the application of theoretical perspectives. Concerning the inferences descending from competitive advantage and core competence, we witness a shift in the boundaries of firms when connecting resources and activities. Subcontractors can be viewed as an extension of the main contractor, thus competitive advantage can be ascertained by connecting the competences together into sustainable and valuable interfaces. It is then indicated that firm's who combine resources in unique ways may realize an advantage over competing firms who are unable or unwilling to do so (Dyer and Singh 1998). Further, our theoretical conceptualization is positioned away from the traditional cost-driven practice in

the industry when arguing for a balance between operational effectiveness and strategic positioning. Based on our synthesis on this area, we identify three key issues:

1. *Is it possible to obtain a sustainable competitive advantage in the construction industry by moving away from the traditional transactional exchange and towards a more relational exchange? I.e. changing procurement strategies.*
2. *How can traditional subcontracting activities be performed differently or, conversely, better, compared to today's practices?*
3. *What is the common 'longevity' in partnerships with subcontractors in the construction industry today?*

We believe that these questions are essential to consider in our thesis if we are to discover any potential competitive advantages in the procurement of subcontractors in the construction industry. On the other hand, these are only our thoughts so far on the matter, and are of that reason subject to change when we further outline our theoretical framework. We also stress that these questions are not 'new' research questions, but rather elements that will guide our work on the subject.

5. Schedule

We use the framework presented by Berg (2007: 287) as a basis for our schedule. We distinguish between five main stages, with related activities.

Research design – December 2009 to primo February 2010

Literature review

Establish access plan for data

Data collection strategies

Consider analytic methods

Data collection – February to mid March 2010

Use data collection plan

Consider literature – begin comparison and analysis

Analysis – Mid March to mid April 2010

Organize data

Comparison of data and literature

Link between data and theoretical framework

Reflection – February to May 2010

Consider findings and meanings of these

Compare findings to literature

Assess implications – theoretical framework and practical application

Finalization

First draft of thesis ready for review and evaluation primo June 2010

Second draft of thesis ready for review and evaluation late July 2010

Finalization and submission of thesis by mid August 2010

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