When do firms use different types of supplier evaluation techniques?

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Abstract:

The aim of this paper is to investigate what supplier evaluation techniques that are used in different types of supplier relationships. In the study we have found eight supplier evaluation techniques that are used either before establishing a supplier relationship, during the relationship or after. We conclude that different supplier evaluation techniques are used differently dependent on whether the relationships are transactional, facilitative, integrative or connective. Although, there are differences in the use of supplier evaluation techniques among the four relationship types, the empirical data shows that there are variances also within them. Factors as the purchased items' features and its strategic importance, the internal and external power relationships, the acknowledgment and assigned resources to the purchasing department, preferred sourcing strategy, supplier's heritage, track-record and structural embeddedness and especially technical and organizational resource interface towards them, all impact the features of the relationship. In an attempt to explain the variances within the supplier relationships we introduce a model that reveals 16 different archetypes of buyer-supplier relationships that proves successful in explaining the discovered variances also within each relationship type.

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1. INTRODUCTION

The types of supplier evaluation techniques used in a buyer-supplier relationship are not merely dependent on the volume and complexity of the transaction (Kraljic, 1983), the power relationship of the involved (Bensaou, 1999), the heritage and the structural embeddedness of the suppliers (Choi and Kim, 2008), or the technical and organizational resource interfaces towards the supplier (Lind and Strömsten, 2006). Nevertheless the type of supplier evaluation technique used is dependent to a large extent on all these previously presented parameters. These are not mutually exclusive, some are implicit, and some parameters are elusive to quantify. As a result, making a clear cut definition of what characteristic in a buyer-supplier relationship carries the strongest explanatory value as to what supplier evaluation technique is used is hardly viable. The supplier evaluation techniques used in practice are to a moderately high degree explained by the buyer-supplier relationship based on the modification of the Lind and Strömsten framework. However other connections between the supplier evaluation techniques and the supplier relationships are identified in the study. Thus we believe that our central contribution to the field merges and fortifies existing theory while also contributing with a detailed and interesting case study.

Supply chain management and network theory are two highly topical areas. Current research points to the importance for organizations to consider not the competition between companies but rather as competition between networks. This more holistic view makes the inter-organizational element of the value chain all the more strategically important for its success. In a value chain, or rather a network, there are a multitude of relationships between buyers and suppliers. For the network to be able to successfully compete, relationships need to be attended and monitored in the best possible manner. As a part of this, there is a necessity that both buyer and supplier look upon each other in the most accurate way feasible. Different supplier evaluation techniques contribute to this by working as inter-organizational control mechanisms. Therefore, it must be underscored the importance of using the most proper supplier evaluation technique in different supplier relationships.

The aim of this paper is to investigate what supplier evaluation techniques are used in different supplier relationships and to collect empirical data. Also, based on the collected data from a case study of two companies and by using the theoretical background we will hypothesize about the explanation of supplier evaluation techniques in different relationships. Authors in the field of purchasing have identified different portfolio models which differentiate types of suppliers depending on different parameters. However, literature regarding supplier evaluation techniques associated with the different portfolio models is scarce. Thus using the Lind and Strömsten framework (but shifting the focus upstream) and current research on supplier evaluation techniques we will approach the research question: *What supplier evaluation techniques are used when evaluating different types of supplier relationships?*

Furthermore results are elevated to a general level and analyzed, this in accordance with our intention to shed some light on the quite unexplored territory of supplier evaluation in different buyer-supplier relationships. Additionally, we believe that ideas for further research themes and other unexplored topics in the field of purchasing will be brought to the surface from this study.

2. THEORETICAL BACKGROUND

2.1 Different perspectives on purchasing

The scientific research on purchasing dates back to the 1960's, early focusing on consumer buyer behavior and soon also on the industrial procurement practices (Kulmala, 2004, p.66). The traditional role of procurement was to secure a steady flow of materials for production and to acquire them at cheapest price possible. Companies spread their purchases among several suppliers in order to receive the best prices (Skjött-Larsen, Schary, Mikkola and Kotzab, 2007, p.225). It was not until the 1980's that this view began to be challenged. Porter 1980 (referred to in Kulmala, 2004, p.66) argues that competitive strategy and organizational relationships came of special interest in the business literature and the power relationship between buyers and suppliers received increased attention. Kraljic

(1983) urged managers to adapt purchasing to the new environment. Larger volumes, intensified competition, raw material scarcity and political turbulence brought larger uncertainty. He argued that instead of only monitoring the current situation management had to be proactive and to make things happen in their own advantage. This required a change in perspective. Purchasing had to go from being an operating function to become supply management - a strategic function (Kraljic, 1983).

The Kraljic model marked the beginning of a change in the area of industrial purchasing (Appendix A). While previous purchasing literature argued that competitive advantage stemmed from internal capabilities Kraljic (1983) aimed at matching external resources with the buyer's needs. Purchases are classified based on the volume and complexity of each procured *item*, and depending on this classification a certain strategy is recommended (Dubois and Pedersen, 2002). It is one of the purchasing models most used in practice. Dubois and Pedersen (2002) explain the popularity partly because the model is fairly easy to communicate and understand partly because it gives practical guidelines for how to manage different purchasing situations, suppliers and/or supplier relationships. Kraljic (1983) is the first of several scholars (van Stekelenborg and Kornelius, 1994; Olsen and Ellram, 1997a), representing a transactional-oriented perspective on purchasing behavior. The transactional-oriented focuses on transactions in isolation and on firms buying *items*. There is a strong price focus, where firms are recommended to exploit their possibilities of short-term based competition. Every transaction is a new business deal, hence no supplier should benefit from past performance. Short term business partners should be kept at arm's length distance, enhance flexibility, and effectiveness should stem from choosing the most efficient trading partner at each point in time (Axelsson, Laage-Hellman and Nilsson, 2002, p.54).

In the late 1990's a new line of scholars appeared representing a relationship-oriented perspective on purchasing. They criticized the transactional-oriented perspective in various ways (Olsen and Ellram, 1997b; Bensaou, 1999; Dubois and Pedersen, 2002; Gadde and Snehota, 2000). Dubois and Pedersen (2002) argued that it was too narrow. Gadde and Snehota (2000) found the transactional-oriented perspective of differentiating based on product variables rather than on relationship features to be insufficient. In order to determine what level of involvement needed in a relationship it is relationship specific attributes that must be investigated. Bensaou (1999) found that companies balance a portfolio of different types of relationships rather than relying on one type.

The Bensaou (1999) model is a relationship-oriented model classifying buyer-supplier relationship dependent on specific tangible and intangible investments made by the buyer and supplier in the relationship (Appendix A). Bensaou (1999) argues that the crucial variable in classifying different types of buyer-supplier relationships is the power-dependence. Gadde and Snehota (2000) state that the praxis at that time of encouraging strategic partnering in favor of arm's length relationships as a superior strategy not only oversimplifies the issues involved but also is directly bad for practice. Since developing partnerships with suppliers is resource-intensive they can only be justified when the costs of extended involvement are exceeded by benefits of the relationship. Due to resource scarcity in all companies, a firm can only be highly involved with a limited number of suppliers. Hence, firms are in need of a variety of relationships each with their own requirements and benefits, and with the capacity to deal with different types of relationships in the appropriate way. Then, the performance could be dramatically enhanced. Firms can analyze their degree of involvement in a relationship by distinguishing three dimensions; coordination of activities (e.g. integrated delivery systems), adaptations of resources (e.g. joint development of customer specific products), and interaction among individuals (Gadde and Snehota, 2000). Axelsson et al. (2002, p. 41) state that the most significant aspect of the relationship-oriented perspective on purchasing is that it stems from the interaction between the buyer and the supplier. Firms are buying capabilities rather than products, thus cost- and value orientation rather than price is what is most important in obtaining low total cost and creating new value. Renewal and effectiveness should be reached through co-operation and by combined resources and knowledge. Buyers should approach long-term relationships, where appropriate, with tough demands and joint developments. Transactions are parts of relationships, and the relationship is in turn part of a network context (Axelsson et al., 2002, p.41).

Dubois and Pedersen (2002, p.41) argue in conjunction with above that when classifying it is counterproductive to use given products combined with a dyadic perspective on purchasing. A buyer-supplier relationship represents a dyad in network terms, when consisting of two nodes and one link, where each node represents an actor performing value creating activities (Choi and Kim, 2008, p.6). Firstly, it is counterproductive since the item of exchange is not given when firms interact but may instead be subject of an ongoing joint development. Secondly, a dyadic perspective may cloak opportunities of enhanced productivity and innovativeness since both parties are part of networks and have other relationships that affect them (Dubois and Pedersen, 2002). The industrial network approach has inter-firm relationships as focal units rather than individual firms or products. These relationships are embedded in networks and receive their content based on links between the activities of the companies, the connections of their resources and the bonds between them as actors. When relationships are not regarded in isolation as dyads, their impact is always related to other connected relationships. This enforces the importance of time since industrial purchases often are repetitive and relationships evolve with time. Thus, individual purchases cannot be analyzed in isolation from previous or anticipated future ones (Dubois and Pedersen, 2002). The network perspective takes connected relationships and evolvement over time into consideration.

Håkansson and Lind (2004) showed how the interaction between two large trading partners involved a complex network of business units, relationship units (e.g. key account managers), and time units (e.g. product development teams). The units were intertwined in a complex web of relationships internally, between the two corporations as well as with other organizational actors such as competitors, clients and suppliers. Choi and Kim (2008) explain that a dyadic perspective of suppliers in isolation may have been appropriate when large highly vertically integrated buying companies were the norm. But since firms now are more specialized on their core competence and operate with integrated suppliers and contract manufacturers that assemble parts from an extensive network of second-tier suppliers, firms must bring structural embeddedness into the equation. Structure refers to the characteristics of a supply networks, in terms of number of suppliers and customers and also how tightly or loosely coupled these relationships are. Embeddedness refers to the state of dependence of a firm on its suppliers and customers in a particular supply network structure. A firm's quality performance is embedded in its own supplier's performance and in turn in the second-tier supplier's performance. The behavior of a supplier depends on how it is embedded with its relationships with other suppliers and customers. Supplier's operational and financial success is embedded in the success of its major customers, and if the supplier is classified as strategic by the buyer and is too dependent of other customers it might pose a threat to the buying firm. Supply management departments should therefore measure their supplier's structural embeddedness and efficiently scan the networks of its key suppliers beyond its direct relationships with them (Choi and Kim, 2008).

Lind and Strömsten (2006) evolved a resource-based framework on buyer-supplier *relationships* existing in a network context, classifying relationships based on levels of technical and organizational interface towards the counterpart. Similar to Bensaou (1999), they classify relationships based on resource interface. What is new is that they identify two basic types of resource interfaces, technical and organizational, and place the relationship into a network context, where they acknowledge that firms' behavior is affected by its connections to other firms in the network. This is the classification method we will use, and it is further explained in chapter 3 Theoretical framework.

2.2 Supplier evaluation techniques

Management accounting is defined as *"…the process of identification, measurement, accumulation, analysis, preparation, interpretation and communication of information used by management to plan, evaluate and control within an entity and to assure appropriate use of and accountability for its resources."*(CIMA, 2009, p.8) Axelsson et al (2002) state that developments in the field of management accounting have resulted in new methods and in turn in features such as; increased interest in non-financial measurements, inclusion of both historical and future events, process-orientation and an inter-organizational perspective. In line with these findings we claim supplier evaluation techniques to be an important part of modern management accounting practice.

Supplier evaluation helps the business organization to control the costs of supply. Carr and Ng (1995, p.351) found that only 19% of Nissan Motors' manufacturing costs consisted of overhead and labor costs. Thus, due to the relatively large size of material and component cost, managing supply chain costs has consequently become the most critical element in overall cost control. From the point that sourcing was viewed as a strategic function numerous tools have been developed to be used in and for supplier evaluation. As a consequence from studies of strategic purchasing and the movement from a transactional- to a relational perspective on purchasing supplier evaluation techniques have evolved. Axelsson et al (2002, p.54) divide supplier evaluation into two approaches and state that these are complementary and not mutually exclusive. Transaction-oriented techniques are not optimal for integrated relationships and relationship-oriented techniques are not effective in evaluation of an arm's length supplier. Hence, the strategic purchasing literature identifies the existence of different relationships which supports the use of different types of supplier evaluation techniques.

2.2.1 Transaction-oriented techniques

Literature sheds little light on supplier evaluation before purchasing was viewed as a strategic function. However, Axelsson and Laage-Hellman (1991) identify a set of bulk measures that could be classified into five areas and that they consider to be transaction-oriented techniques:

1. Key measures for development of prices for separate purchased products.
2. Key measures for sum of purchased products.
3. Various indicators of the suppliers' performance such as quality claims, on-time delivery versus too late or too early.
4. Key measures for the individual purchaser, e.g. number of transactions per purchaser, or cost per individual.
5. Key measures of the purchasing department, e.g. operative costs versus performance.

In the transactional purchasing philosophy the measurement of supplier performance consisted of rudimentary methods, e.g. purchase price was seen as one factor that could be influenced, and was by itself enough to judge whether a supplier was good or not. Axelsson et al (2002) couple the transaction-oriented purchasing behavior with this traditional view of purchasing and conclude that these methods are not sufficient to incorporate the costs of a more integrative relationship which is captured by the relationship-oriented techniques.

2.2.2 Relationship-oriented techniques

Some of the techniques described in the following section have a strong inter-organizational focus, while some are more internally oriented. However they are used to deal with inter-organizational aspects as well. The techniques do not have clearly defined boundaries since some of them overlap or have characteristics in common (Axelsson et al, 2002, p.55).

2.2.2.1 Open Book Accounting/Disclosed cost data/Cost tables

Congruent with the movement from a transaction-oriented purchasing behavior to a relationship-oriented one is closer communication between buyer and supplier. This may involve supplier cost data disclosure. Disclosed cost data is a name for different kinds of more specified and detailed cost data and refers to cost data and related process information that the supplier shares with the buyer (Munday, 1992, pp.247-248). Open Book Accounting (OBA) requires the supplier to render the buyer access to internal accounting data and is something that almost is exclusive to close collaborations (Ellram, 1996b). Munday (1992) demonstrates that Japanese firms at the time required more disclosed cost information than did British firms. He also showed that the majority of the suppliers investigated were content with disclosing cost information. Also, if cost data were used in a constructive manner and not to squeeze margins from the supplier, then effective cooperation in the generation of efficiencies was possible. In line with this, Axelsson et al (2002, p.56) mean that these techniques should be highly relevant for purchasing and supply management practices, specifically to more integrated relationships. Although a major problem with these techniques is to establish trust. Ellram

and Blancero (1997) highlight the importance of mutual perceived fairness for success in a strategic supplier partnership. The information provided can include; direct costs, overhead costs, depreciations, major cost drivers and conventional allocation bases. This information can also act as an instrument for supplier evaluation on its own, or as a vehicle for other supplier evaluation techniques.

2.2.2.2 Total Cost of Ownership

Ellram (1993) presents the concept of Total Cost of Ownership (TCO) as a purchasing tool as well as a philosophy, which aims at understanding the total cost of a purchase from a particular supplier. TCO involves identifying the major cost elements associated with a key purchase. Ellram (1993, p.49) divides the purchasing process into three stages, which are associated with different cost drivers. The stages presented are; pre-transactional, transactional, and post-transactional. Contrary to the traditional view of purchasing, where mainly the transactional stage was included in the analysis, she states that there are activities in other stages of the purchase that also drive the cost. The costs in the different stages constitute the total cost. It is important for firms to not only implement the method, but also to embrace the philosophy of trying to understand the total cost of a purchase. In later contributions to the field, TCO is divided into two approaches; the dollar-based approach and the value-based approach. These two differ as to whether one strictly looks at actual cost information, or incorporate cost data that is hard to "*dollarize*". (Ellram, 1996a, p.12) The distinction between a standard or unique model is also explained. The standard TCO-model can be used where the issues of concern are the same across all purchases, when there is a desire to analyze repetitive purchases, and the model is relatively easy to use. The unique model on the other hand could be used when purchases vary greatly and where no set of factors captures critical issues across all purchases. This model is good for adapting to different needs.

2.2.2.3 Target Costing

Target costing has become feasible through inter-organizational cost management and is sometimes used. One way to apply target costing is to take an actor somewhere in the supply chain as departure, e.g. the buyer. First the buyer must consider what the future holds in terms of product features and costs. Then research has to be made in order to establish what the supplier must perform in order to be attractive to the buyer. Finally, thought has to be put into the consequences that the actors involved might face, e.g. pressuring for a too low price might in the long run hurt the supplying actor (Axelsson et al, 2002, p.55). When balance is found, all actors in the supply system face a joint challenge. Target costing involves two main processes: First, "*…deciding on features of the product and then establishing the target cost based on the estimated value for the customer. This gives the basis for setting the price calculating the profit.*". (Axelsson et al, 2002, p.55) Second, the supply system has to achieve the previously established target cost. Target Costing is a strenuous activity when broken down to component level. The Target Costing process in a multi-firm integrated supply chain conveys competitive pressure, normally faced downstream, upstream (Axelsson et al, 2002, p.55). It provides pressure and increased transparency to the entire system thereby involving purchasing and supply management.

2.2.2.4 Activity Based Costing

Allocation of indirect costs is normally the most critical issue for the costing system. Basically, *''Activity Based costing (ABC) is developed to provide more accurate ways of assigning the costs of indirect resources to activities, business processes, products, services and customers.''* (Kaplan and Atkinson, 1998, p.97) Since the overhead costs are more accurately assigned to the product, the risks with open profit margins should decrease. *''Activity Based cost systems provide a mechanism for establishing causal relationships between expenses.''* (Kaplan and Atkinson, 1998, p.99) The strong cause-and-effect focus should be a valuable source of information in a number of inter-organizational decision situations, since the financial consequences of different actions become more explicit. The ABC-technique has the ability to separate the costs caused by the purchased product, and by the supplier. Axelsson et al (2002, p.56) mean that ABC is closely related to target costing but even more to the open book techniques and that the cost shared in the open books could preferably be reached by

applying ABC. They mean that it could be a very useful opportunity to get stricter cost control by not only tracing and estimating activities related to products but also to suppliers. Dekker and Goor (2000) present a case study that demonstrates a specific application of an ABC-model in a supply chain that sheds light on how it could be implemented.

2.2.2.5 Supplier rating

Supplier rating is a technique that measures different dimensions of a supplier's performance that result in a success rate. Bossert (2004) argues that there are three elements for any supplier rating system; quality, delivery and cost. Quality refers to quality improvements and defect-free products and *"…the absence of reported deficiencies equates with desirable quality performance…"*. (Bossert, 2004, p.58) The common measurement of quality relates the number of products with defects to the total number of products supplied. Delivery has become more important due to the movement towards smaller inventories and Just-in-Time. The percentage of on-time delivery is one common example. Cost refers to the actual cost of doing business and some examples of what this category could include is amount of scrap, inspection, rework, how well the supplier complies with product specifications, service, technical support etc. Supplier rating frequently involves a lot of data, and a database is often useful. Bossert (2004, p.59) however states that *"…rating is only as good as the way it is used."*.

2.2.2.6 Balanced Scorecard

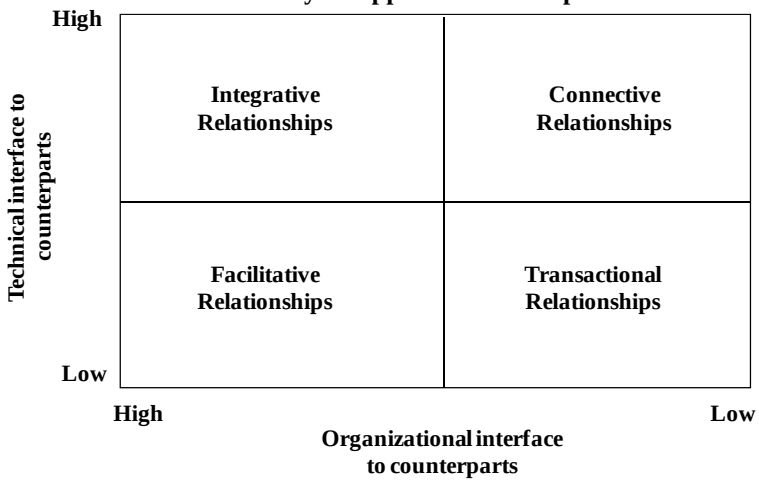
The balanced scorecard, originally developed for using within a firm, is proposed to be used also in supplier evaluation and incorporates chosen aspects that should be considered (Axelsson et al, 2002). The idea is to identify and balance the key drivers that help sustain long-term profitability. The method of the balanced scorecard is firstly to identify factors that influence the long-term profitability and secondly to balance the measurement of these factors. The different perspectives of the balanced scorecard (financial, customer, internal business process and learning and growth) include both financial and non-financial measures and together act as a tool to foster corporate strategy (Kaplan and Norton, 1996, p.9). Axelsson et al (2002, p.57) write that *"Although the relationship with suppliers most likely influences all four perspectives, purchasing and suppliers are not explicit parts of the concept."*. They argue that purchasing is inherent in internal business processes but they think that there should be something more explicit covering this area, bearing in mind the relative importance of purchasing and supply management. Some possible measures in this area could be: number of suppliers in the supply base, amount of business transactions performed in accordance with well-developed long-term agreements or the number of ongoing product development projects involving the purchasing unit and suppliers (Axelsson et al, 2002, p.57).

3. THEORETICAL FRAMEWORK - THE LIND AND STRÖMSTEN (2006) RESOURCE INTERFACE FRAMEWORK ON BUYER-SUPPLIER RELATIONSHIPS

Lind and Strömsten (2006) introduce a relationship-based framework in a network context, which they apply when classifying *customer* relationships from the supplier's perspective. They argue that firms in a business-to-business market take part in a heterogeneous set of customer relationships, from integrative ones to more transaction-based ones. There are two different types of resource interfaces – technical and organizational – and the relationships to customers and resource interfaces towards them evolve over time (Lind and Strömsten, 2006). A relationship between a customer and a supplier exist in both directions - from the customer towards the supplier, and from the supplier towards the customer. Although, the counterparts may perceive each other differently and classify the relationship in different ways, they will still recognize the relationship in any way as long as there are at least one link and two nodes (Choi and Wu, 2009). We argue that in a corresponding way to the original use of the Lind and Strömsten (2006) matrix, it can also be applied from the opposite perspective, i.e. from the customer towards the supplier. In the same way as the supplier has a resource interface towards its customer, the customer will have a resource interface towards its supplier. The interfaces have different features towards different counterparts, and correspondingly give rise to different types of relationships. The model is useful in the way that it acknowledges the relationships between buyers

and suppliers as embedded in larger networks, although it focuses on dyadic relationships. The model measures on one axis technical interface to the counterpart and on the other axis organizational interface to the counterpart (Figure 1), (Lind and Strömsten, 2006, p.1260). The level of each type of resource interface give rise to four types of relationships; transactional (low technical and low organizational), facilitative (low technical and high organizational), integrative (high technical and high organizational), and connective (high technical and low organizational)

Fig. 1 - A resource-based interface framework on buyer-supplier relationships



3.1 The technical interface to suppliers

The technical interface contains technical types of resources, such as products and production facilities. Products are fundamental parts of the supplier's and customer's operations, and their features are shaped through interactions between the two parties. A product can be adapted to the demands of the buying firm and/or the end user and/or to fit the requirements of the supplier. The production facilities are used for producing the products and to give them the desired features. Lind and Strömsten (2006, p.1259) state that: *"In business markets, production facilities are often designed in relation specific counterparts in order to fit a certain input, but more often the aim is to satisfy a certain user or group of users. Several empirical studies show that products developed and produced by a firm are combined with other products and components that are used and processed further in the customer's production facilities, which makes the use and production of products systemic."*. Bensaou (1999, p.36) denotes technical resources as tangible specific investments, which made by the buyer can include*" tangible investments in buildings, tooling and equipment dedicated to the supplier or in products and processes customized to the components procured from the supplier"* and from the supplier tangible investments might include *"warehouse location or layout and specialized facilities and dies."*. Hence, we will define the level of technical interface to supplier as the level of deviation from the standard technical interface to suppliers. As a consequence the buyer's technical interface to a supplier will be marked as zero on the axis when the buyer has no adaptation, in terms of product, input and production facility, to meet the needs or requirements of the supplier deviating from the buyer's standard technical interface. The more the technical resources are adapted to a supplier's requirements, the more the technical interface will deviate from standard and as a consequence be higher on the axis.

3.2 The organizational interface to suppliers

The organizational interface contains organizational resources such as dedicated business units and business relationships (Lind and Strömsten, 2006, p.1259). Business units depend on its capability and ability to interact with other organizational units, hence a prerequisite for interaction is that it has the sufficient capacity and opportunity. This means whether there are enough organizational resources in terms of time and personnel at the buying unit and the supplying unit to support a relationship with the

counterpart, as well as if the interaction is possible in terms of for example cultural, lingual or geographical boundaries. Lind and Strömsten (2006, p.1259) state that *"…as a unit grows it becomes more important financially for suppliers and customers, which encourages the growth of long term relationships. Business relationships are connected and they form network structures to help attain the goals of each firm by, for example a relationship can be used to mobilize resources that would not otherwise be available."*. They conclude that *"…acquiring a network of connected relationships is not easy…because it demands the investment of considerable time and effort."* and *"Some customer* [and supplier] *relationships are more important than others financially or for innovation. Thus, companies adapt their organizational interfaces to a small number of their most important customers* [and suppliers].". Bensaou (1999, p.36) presents organizational resources denoted as intangible specific investments, which from the buyer can include "*investments in people or in time and effort spent learning the supplier's business practices and routines or spent exchange information, best practices and knowledge to further develop and nurture the relationship"* and from the supplier *"guest engineers and developing information systems compatible with the buyer's proprietary databases or electronic data interchange protocols.*". We define the level of organizational interface to supplier as the level of organizational resources spent on a relationship with a supplier and level of organizational adaptation to the supplier. If the business unit neither has capacity nor ability to interact with the supplier and/or puts no organizational resources into the relationship the organizational interface to the supplier will be marked zero on the axis. The more organizational resources spent on the relationship and the higher the degree of organizational adaptation to the supplier, the higher the organizational interface to the supplier will be.

3.3 Transactional relationships

The level of technical and organizational interfaces results in four categories of relationships. When the technical and organizational interfaces to the supplier both are low, the relationship to the supplier is transactional. There are no technical adaptations in products, inputs and/or production facilities to meet the supplier's requirements. These types of relationships have standardized interfaces and where commodities most often are of low financial or strategic importance and are procured through standard outlets. The interaction is kept at arm's length and most often the contact between the parties is infrequent and superficial. The transactional supplier relationship is of minor importance for the buyer, and no dedicated organizational units are assigned to work with the suppliers, and the organizational resources spent on the relationship are kept at a minimum (Lind and Strömsten, 2006 p.1260).

3.4 Facilitative relationships

Facilitative relationships appear when the organizational interface to the supplier is high and the technical interface is low. This means that there are no or marginal technical adaptations to the supplier's requirements (Lind and Strömsten, 2006 p.1260). Facilitative relationships are often of great financial importance for the buyer. The items ordered might answer to a large business volume, increasing the business unit's importance for the firm and as a consequence make low costs high priority. However, there might be cases where the items are customized, i.e. designed by the buyer to fit its product, demanding organizational resources spent on the relationship to help the supplier achieve its task. Hence, there might be technical adaptation from the supplier's side towards the buyer, all the while there is no technical adaptation from the buyer towards the supplier. The contacts between the companies are frequent and as such the buyer will dedicate organizational units to interact with such suppliers. Whatever reasons, the acquiring firm motivates assigning organizational resources and/or to adapt organizationally to the relationship, although no technical adaptation on their part is required.

3.5 Integrative relationships

Integrative relationships are associated with both high organizational and high technical interface. The products or inputs are often dedicated to a certain need, and is developed in close cooperation with the supplier (Lind and Strömsten, 2006 p.1260). Product interfaces are adapted to meet certain

requirements, explicit or implicit, from the supplier and integrated production facilities will fortify long-term relationships. Often the products and production facilities at the buyer as well as the supplier will be characterized by a high level of integration towards the counterpart. This adaptation often takes time and requires large specific investments to be made increasing the required benefit to be achieved to motivate the relationship. The involved business units will often be strategically important and the firms will then dedicate organizational resources to support the relationship. Integrative relationships are often critical to the buyer's profitability, but can be even more important to the future innovativeness and competitiveness of the firm. Integrative relationships often involve cross-functional teams, joint product development or dedicated relationships units such as general account managers or strategic purchasers.

3.6 Connective relationships

Connective relationships occur when the buyer has a high technical but low organizational interface to the supplier. The products and production facilities involved are customized to the needs of the counterpart (Lind and Strömsten, 2006, p.1260). The buyer has either been forced in making these technical adaptations or has implemented them on purpose. Concurrently, the buyer has either chosen or been forced not to spend organizational resources and/or to make organizational adaptations to the supplier. The buyer might be forced since it lacks the sufficient organizational resources to support the relationship or due to lack of ability, because the supplier either lacks the sufficient capacity or there are other boundaries making it impossible to implement a high organizational interface. It might be the case that the buyer has chosen to have a low organizational interface, although it makes high technical adaptations. The relationship might be beneficial to the buyer, motivating the high technical investments, although it does not require a high organizational interface. The motive behind a connective relationship is not always as clear-cut as the other three types of relationships. Choi and Kim (2008) argue that all relationships are structurally embedded in larger connected networks. Hence, it might be possible that a buyer with good network awareness might choose not to dismiss a supplier because it has shown poor performance or requires a technical adaptation if this supplier is connected to other promising companies or gives other indirect benefits (Choi and Kim, 2008, p.9).

It is also possible that the supplier acts as a lead supplier of a certain product or technology demanded by the market, as such requiring the buying firm to technically adapt to the supplier, while there is no need to invest large organizational resources. The buyer can also be forced into a connective relationship if the supplier's bargaining power is very large. The buyer might be dependent on the supplier's product, but since the buyer lacks any possibility to influence the supplier, they choose not to have a high organizational interface to the supplier. Another possible scenario could be if the supplier is a new firm with an innovation or a product that might prove beneficial in the future, motivating technical adaptations to the supplier, although there might be impossible or unnecessary to dedicate organizational units at this point in time. Further, a relationship to a supplier might be temporary connective for a period of time. It might be the case that the technical adaptations only has to be made once, and when the changes are in place the relationship might transform into a facilitative or transactional one. It might also be the case that if organizational resources are made available or assigned with purpose, at the same time as the high technical interface is to sustain, that the connective relationship develops into an integrative one.

4. METHODOLOGY

4.1 Choice of method

"Case studies have become quite common in accounting research, especially in management accounting, although they are relatively rare in finance. In accounting research case studies are gaining acceptance as an appropriate research method, and increasing numbers are appearing in the research literature". (Yin 1984, p. 26) The aim of this paper is to investigate what supplier evaluation techniques are used in different supplier relationships and to collect empirical data. Based on this intent our research question was: *What supplier evaluation techniques are used when evaluating*

different types of supplier relationships? A case-study was appropriate when trying to answer a question that is likely to provide many ambiguities. In order to provide an answer to the main problem, we found that a case study containing descriptive as well as explanatory characteristics would best accomplish this aim. Descriptive case studies *"are case studies that describe accounting systems, techniques and procedures used in practice."*. (Ryan et al 2002, p.143) Hence, to determine what supplier evaluation techniques that are used in different buyer-supplier relationships, we found it necessary to observe and describe two well-established corporations with thousands of supplier relationships and vast experience in this area. The field of relationship-based purchasing theory within a network context is new and no studies using the chosen framework has previous been made. Thus, the case study is also explanatory. Explanatory case studies *"attempt to explain the reasons for observed accounting practices. The focus of the research is on the specific case."*.(Ryan et al 2002, p.144)

4.2 Design and selection

Upon having established a case based approach to address the research problem one has to consider whether to use a single case or multiple ones. Yin (1994) writes that this particular question is one to which much attention has been given. Dyer and Wilkins (1991, p.613) take a stand to defend *classical case studies* i.e. the single case studies. The authors mean that the strengths of the emergent approach of multiple case studies, presented by Eisenhardt (1989), mask important weaknesses. In the classical case study researchers tend to focus on comparison within the same organizational setting, this to communicate the fullest contextual insight (Dyer and Wilkins 1991, p.614). The emerging approach introduced by Eisenhardt (1989) is however by the author claimed to be powerful in the sense that it allows for reconciliation of evidence across cases, types of data, different investigators, and between cases and literature. Thereby, researchers can *"…increase the likelihood of creative reframing into a new theoretical vision."*. (Eisenhardt 1989, p.546) The two different views offer explanations of why the number of cases is irrelevant. *"The concern is not whether two cases are better than one of four are better than three. Rather, the appropriate number of cases depends upon how much is known and how much new information likely to be learned from incremental cases"*. (Eisenhardt 1991, p.622) Further the length of the case studies is irrelevant since it is the content and explanatory value that matters. *"However, the key issue is not page length of the number of cases…. The central issue is whether the researcher is able to understand and describe the context of the social dynamics of the scene in question to such a degree as to make the context intelligible and generate theory in relationship to that context"*. (Dyer and Wilkins 1991, p.616)

Our approach has been to use a multiple case study. We believed that considering the above mentioned trade-off and the nature of the theoretical generalization, this type of approach presented the most advantages. Our paper consists of two case-companies. Given this and the time-frame of the study, we believe that little depth will be lost and that we are capable of understanding the context to a sufficient degree. Furthermore using two cases will generate insights that a single case study would not have. Selection of cases is an important aspect of building theory from case studies (Eisenhardt 1989, p.536). Atlas Copco and ABB, listed on the Nasdaq OMX Large Cap, were chosen as objects for the case study as they are large organizations and would be more likely to allocate substantial resources to their respective purchasing organization. Further, interest in the field was expected as companies are highly dependent on purchasing function's performance. Furthermore, we searched for companies that would have a diversified supplier base with high probability of having diversified relations and companies that produced physical products as the collection of data and analysis would become more tangible. In addition to this, feasibility in terms of time and willingness from companies were not limiting factors.

Our process of gaining entry was similar in both cases. In the Atlas Copco case we were introduced to the Strategic Purchasing Manager at Underground Rock Excavation by a third party who had connections to the company. At ABB we were firstly introduced to a third party via a personal connection and then the third party introduced us to the Supply Manager of the Swedish Automation Products Division. Upon getting contact with respective managers we wanted to legitimate our

proposal. This was partly done through e-mail and partly by a telephone interview. In our contact we explicitly described the context of our study, our ambitions, motivation behind the study, and which interviewees would be suitable for both parties. To avoid misunderstandings and increase precision in our observations we expressed that we sought multiple interviewees. As a response to our request, the respective managers at Atlas Copco and ABB replied with a preliminary schedule for the interviews with the different interviewees. At Atlas Copco the proposed interviewees were strategic purchasers while at ABB supply managers. At first glance we were concerned that this might have consequences for the specificity of the answers we were going to get. After consideration we came to the conclusion that it implied little disadvantage interviewing personnel at different organizational layers due to the fact that the underlying object of study was their supplier relationships. Further, the purchasing organizations of the two firms are different and at ABB the supply managers of all local business units answer to one of the supply managers, who has a double-role. Hence, although the LBU:s are separate business units there is a collaboration on the purchasing side. Moreover, having explained in detail what we were looking for, we trusted the judgment of respective manager to set us up with the most appropriate interviewees. The manager at Atlas Copco proposed four strategic purchasers and one quality engineer and the manager at ABB proposed himself with an additional three supply managers.

4.3 Data collection

Inherited in a case study the data collection procedures are not fully routinized (Bogdan and Taylor, 1998). Hence, the challenges for the researcher's emotions and intellect are greater than for many other research strategies. Being aware of this during the data collection process has hopefully enhanced the quality of the study in terms of validity and reliability. Using several sources in conjunction allow cross-checking of findings and to gain deeper and clearer understanding of the studied relationship which in turn increases the probability of an accurate description (Yin, 1994). To be able to triangulate and cross-check data sources we have aimed at using several types of data sources with the strategy of theoretical sampling; interviews, internal documents as well as physical artifacts, such as annual reports and information pamphlets (Glaser and Strauss, 1967). Although interviews are an essential part of case studies, no source has an absolute advantage over another, but they are complementary (Yin, 1994). Due to the large number of supplier relationships and the probable low marginal contribution of to the conclusions direct observations has not been conducted. Hartley (1994) argues that unless one is a full participant observer, continual presence in the organization is unlikely to be beneficial. Furthermore, being two researchers with different perspectives as well as qualities and shortages that complement each other have hopefully enhanced the set of characteristics desirable for conducting a successful case study.

4.3.1 Theory

In explanatory case studies *"Theory is used in order to understand and explain the specific, rather than to produce generalizations. The theory is useful if it enables the researcher to provide convincing explanations of the observed practices."*. (Ryan et al, 2002, p.144) The necessity of a thorough theoretical background is twofold. Firstly, to get the appropriate background for the interviews and the study we need to dig into the field of purchasing and management accounting, in particular supplier evaluation techniques. Secondly, in order to explain the empirical phenomena, a deeper understanding of perspectives on purchasing, several classification tools and supplier evaluation techniques is required. Due to the fact that the companies studied actively work with portfolio models and supplier evaluation, it was key that we as interviewers had sufficient knowledge in the field to make a legitimate impression. Also, we figured, that the impression we would make on the interviewees would affect the quality of the interviews itself. When, the interviews were scarce in terms of time, we had to be very well prepared to secure that we managed to obtain all relevant data at one point. To get the relevant theoretical background we used different databases. Through our mentor and previous course literature we found out about Kraljic's (1983) importance in the field. Via a recent publication by Skjött-Larsen et al. (2007) we encountered various other references relevant in the field. When reading the different publications it became apparent who among the scholars were important since

many of the publications referred to one another. To make the central twenty publications more manageable we made the decision to abstract the essence by constructing a literature overview.

The most modern perspective on purchasing is the relationship-oriented perspective in a network context. Hence, we wanted to use a classification tool within this perspective. We decided to use a framework developed by Lind and Strömsten (2004). Although, this resource interface based model had only been applied from the supplier's perspective towards the buyer, it had strong qualities which made it an attractive choice. After consulting our mentor and co-founder of the framework we found the model to be possible to use from the buyer's perspective as well. *"In interpretive research, theory plays a central role in case study research. It is both the input and output of the research process. In the case study itself there is an ongoing relationship between theory and observation. Existing theory is used to make sense of case study observations, but through these observations it may be found that the theory needs to be refined, modified or even rejected."*. (Ryan et al, 2002, p.150) The framework proved to describe the empirical findings well. However, we found variances of supplier evaluation techniques also within the relationship archetypes in the framework. This required further analysis of the factors behind these variances, which resulted in a new model, which is based on the framework of Lind and Strömsten (2004) and Bensaou (1999). *"If available theories do not provide such* [convincing] *explanations, it will be necessary to modify existing or develop new theory, which can be used in other case studies. The objective of the research is to generate theories which provide good explanations of the case."*. (Ryan et al, 2002, p.144)

4.3.3 Interviews

Initially, two preparatory interviews of about 30 minutes were conducted by phone with the supply managers of each company in order to more in-depth explain our purpose and method of study and also to discuss with them whom at each company would be most suitable to interview to reach the aim. Since, the supply managers are in better position than us to decide whom is most suitable, the interviewees at Atlas Copco were four strategic purchasers and one quality engineer and at ABB four supply managers of different LBU:s but within the same division and country. We strived for identifying a broad range of perspectives among the interviews, but also wanted them to be experienced. Most of the interviewees have worked within the organizations for many years and have witnessed changes in perspectives and methods. The studied business units jointly have more than 2000 active supplier relationships, of where the interviewees have the executive responsibility of the vast majority and know them well. Based on this and the data collected from the interviews and internal documents we found the interviews conducted sufficient and that the selected interviewees were the most relevant to talk to at each company to draw conclusions in a valid and reliable manner. We decided to solely take the perspective of the buyer, thus not interviewing any suppliers. Additional to the difficulties in doing the opposite logistically, we limited the scope since due to the large amount of suppliers the risk for bias in the sample providing invalid information was too large to be motivated.

In total nine in-depth interviews were made lasting from 60-100 minutes, with an average of around 75 minutes. Both researchers were present at each interview and were conducted two-on-one. The interviews were made in Swedish hence all terms and quotes are translated. The interviews were semi-structured, in a way where a standardized set of key questions were formulated beforehand, but at the same time open enough to permit varying answers (Kvale, 1997).Together with the set of key questions, a short explanation of the purpose and classification framework was also sent. We believe that by helping each interviewee to be prepared and to have reflected over their supplier relationships the quality of the answers were enhanced. We used the same base questions for all interviews but modified and adapted the themes dependent on what emerged during the interview sessions. We wanted to keep a certain degree of flexibility, in order for the interviewees to tell their own story as long as we found it relevant. Although, all questions where not formulated in the same order they were all asked in all interviews. During the course of data collection we have despite some inherited unpredictability of case studies aimed at collecting data in a systematic way (Hartley, 1994). The first interviews at each firm were longer where the first half was a presentation of the studied divisions operations and purchasing organizations. The second half of these two interviews and all of the rest

were conducted in the same way. After a short introduction by the interviewee, we presented our research project, purpose and framework once more in order to make sure the interviewees fully understood it. All interviewees were asked, based on their view, to allocate their supplier portfolio into our described classification framework.

Moreover we guaranteed them personal anonymity, asked for permission to record the interview and to publish the name of each company and local business unit. We also took notes during the interviews to capture material such as drawings made by the interviewees. The recorded material lasting for more than twelve hours was fully transcribed. This was a time-consuming but necessary task. In order to analyze such a large amount of recorded data in a structured way, there were no alternatives. King (1994, p.20) points out that *"…to analyze such a* [from recorded] *transcript in any depth two or three working days will often be needed. To these figures must be added the time to develop the interview guide and recruit participants, to carry out the interviews and to travel to and from them, and to feedback findings to participants…"*. Although these time-consuming activities gave opportunity in thoroughly processing the collected data in a structured way that provided the opportunity for a good overview and reflection.

4.3.4 Internal documents

As a vital part of the theoretical sampling strategy, the internal documents played a great part, but Yin (1994) warns for potential pitfalls if the documents are seen as the unmitigated truth. The internal documents consisted of written descriptions of organization structure, task descriptions, sourcing strategy as well as the formal supplier evaluation techniques used. The main purpose was to confirm data and analyze the formal and written version. This data collection was made after the interviews were conducted, out of three reasons. Firstly, we only then knew what internal documents would be relevant for the study. Secondly, a large amount of internal documentation received before the interviews might have corrupted our minds in a way that we would already have created a picture before conducting the interviews. Thirdly, the information received is confidential and it might have been sensitive to ask for this before we had established more trust at the case firms.

4.4 Analysis and presentation

It is proposed that the most difficult aspect of a case study is to analyze data evidence, since there are no fixed formulas to follow (Yin, 1994). The analytical process has evolved concurrently with the theoretical and empirical work. The first analytical steps were made when writing the transcript of the recordings. This task was very valuable since it gave opportunity to reflect over and get new perspectives of the collected data. In order to enhance the validity of the findings and to not draw any premature conclusions, we decided to study the transcripts and internal documents individually. By using tables we sorted the information regarding certain key themes derived from the literature involving relationship classifications and supplier evaluation techniques used. Then we compared our findings, discussed them and created a common picture.

When having done this we analyzed each company individually to give a stand-alone picture, which is the foundation for how the empirical chapter is presented. Once we had sorted the information and created two stand-alone pictures we were ready to conduct a general analysis of what supplier evaluation techniques that is used in each relationship type, which we did both vertically, relationship category for relationship category, and horizontally, supplier evaluation technique for supplier evaluation technique. This was conducted through a cross-case comparison where we used illustrative examples to support our findings. Then we had created a clear picture of distinct differences among the relationships. However, we had also discovered variations within each relationship type which required to be further investigated. By further analyzing the data and cross-checking the variances with purchasing literature we found variables that seemed to explain these variations very well, which we presented through the new model described above. Yin (1994) states that satisfactory explanatory evidence is reached when the observations in the case act in accordance with the proposed linkages between the variables and ultimately make sense of the data. Hence, we then considered the data analysis complete, since no additional patterns could be identified from the

observations. Yin (1994) further argues that there are several alternatives to how the empirical findings in a multiple case study should be presented. It is argued that the data and procedures should be presented in detail, enabling the reader to make his or her own analysis (Eisenhardt, 1989, p.544). We chose to present the empirical findings bearing this in mind, and use illustrative examples to both bring the text alive and to give support to the conclusions made as evidence.

4.5 Quality

In research researchers must consider the accuracy and applicability of the study. In literature there are two concepts that depict this – validity and reliability (Yin, 1994). Validity can be divided into three sub-categories: construct validity, internal validity, and external validity. Generally validity concerns if we in our study measure what we intended to measure. Reliability is dependent on whether someone conducting the same research again would reach the same results.

4.5.1 Validity

4.5.1.1 Construct validity

Construct validity is a measurement of the incorporated subjectivity in the study (Yin, 1994). A researcher's goal is to maximize the construct validity in order not to cloud the results with subjectivity. Some actions that we undertook to maximize construct validity were; Firstly, as mentioned earlier we sent out a document explaining the concepts that were to be discussed during the interview. Also in that document we attached questions that later were asked during the interview. This allowed us to follow our intended interview process as regards to covering the questions that we intended. From the interviewees perspective getting the questions explicitly stated gave them time to process potential answers. This also added to the minimization of misinterpretation of questions asked during the interview, thus reducing subjectivity. Secondly we interviewed a number of people with the similar expertise. When conducting multiple interviews we as researchers can sort whether something is misunderstood or if it in fact is a difference. Nonetheless, the multiple sources of data decreased the subjectivity which is somewhat synonymous with interview-based case studies. Finally our data was sent to respective companies to ensure that details were correctly understood and that no confidentiality boundaries were over-stepped. We received some minor corrections, which in itself imply that facts and nuances were correctly interpreted. Also the data was verified by managers at respective companies which guarantee accuracy.

4.5.1.2 Internal validity

The internal validity refers to the accuracy of the conclusion's interpretation of reality (Yin, 1994). High internal validity implies that results have been caused by the variables proposed in the study and not others. Some factors that contribute to the internal validity are; Firstly, we conducted multiple interviews where we on beforehand told interviewees that their names would remain confidential. This added to the internal validity as answers likely were more detailed and thorough when the interviewees could feel more relaxed with answering open-heartedly. Secondly the handling of the corrected and verified data was careful and rigorous. By using the methodology of elicitation and analysis presented in section 4.4, Analysis and Presentation, we believe that we increased the likelihood of our conclusions to portray reality. Finally using the same questions with two case-companies increases the likeliness of accuracy of our conclusions.

4.5.1.3 External validity

External validity determines whether the findings of the study are generalizable in other situations (Yin, 1994). Considering the underlying objects of study in this research, the supplier relationships and the companies' respective evaluation techniques, it is no drawback that we interviewed one company within Atlas Copco and four within ABB. The suppliers were numerous at each place which increased the possibility of generalization. Variables that might affect our final result are discussed throughout our analysis and in fact contribute to our final conclusion. However, a common complaint about case studies is that general conclusions cannot be drawn from empirical findings in few observations (Hägg and Hedlund, 1979; Cooper and Slagmulder, 2004). We believe that the scope within our observations

is wide enough to provide conclusions that could be generalizable to similar situations. Also, we believe that observations made can offer a basis for a more generally applicable theory (Cooper and Slagmulder, 2004).

4.5.2 Reliability

If achieved results can be found by another researcher using the same procedures then the study has reliability (Yin, 1994). To achieve high reliability in this study we have done the following; we have disclosed detailed information about the research process, both via this methodology section but also in the data section. The empirical data provides reliability indirectly by being comprehensive and unbiased. Thus, researchers can extract explicit details of what information was attained throughout the interview process. The fact that Atlas Copco and ABB agreed upon having their names published adds transparency to the data and in turn would help a researcher to conduct the same study and arrive at the same results. Finally we believe that reduction of inaccuracies and partialities has been accomplished.

5. DATA

5.1 ATLAS COPCO

Atlas Copco is a world leading provider of industrial productivity solutions. The products and services range from compressed air and gas equipment, generators, construction and mining equipment, industrial tools and assembly systems, to related aftermarket and rental.[1] The Atlas Copco Group, founded already in 1873, is a global industrial group of companies headquartered in Stockholm, Sweden. Revenues for 2008 amounted BSEK 74 (BEUR 7.7) with 34 000 employees at year-end. The Atlas Copco Group manufactures products in more than 20 countries. The Group operates through a number of divisions within three business areas; Compressor Technique, Construction and Mining Technique and Industrial Technique. [2]

One of the divisions within Construction and Mining Technique is Underground Rock Excavation (URE). The division produces and sells mining- and construction machines. The core competence is the design and assembly of their products. The products are complex and are built on platforms but are to a high degree customized to the customer's requirements. One example of a product that URE produces is the Boomer which is a high capacity drill rig. Approximately 70 % of the division's total cost can be attributed to purchasing, and the function is regarded as important by top management (Strategic Purchaser C, *interview*, 2009-03-27). Inputs are almost entirely sourced externally, with one exception being the drilling machine which is one of the group's core competencies. URE is furthest down-stream in their value chain and supplies customers with products via their sales companies. The main users of the products are mining- and construction companies around the globe (Strategic Purchaser A, *interview*, 2009-03-27).

5.1.1 The purchasing function

On a group level, the strategic purchasing function has mandate to organize itself as it pleases. There is no purchasing collaboration on a group level as products are unlike. This ensures flexibility and speed to the purchasing function in each division. At URE the strategic purchasing function is divided into four commodity groups, one handling purchasing of indirect material and services, two handling purchases of inputs for production (raw material/welding and hydraulics/electronics) and one handling aftermarket. Currently there are fourteen strategic purchasers that handle two hundred active suppliers, suppliers whose input constitute parts of products, and over two thousand in total. Due to the relatively low volume of the business the intention is to build relations (Strategic Purchaser A). The purchasers have the following responsibilities: supplier contracts, agreements and negotiations, development according to market demands, participation in product development, evaluation and selection, audits according to ISO 9000/14000, and following up on targets for lead time, number of suppliers, and total

[1] http://www.atlascopco.com/us/AtlasCopcogroup/ACinsummary/ [2009-04-29]
[2] http://www.atlascopco.com/us/AtlasCopcogroup/ACinsummary/briefdescription/ [2009-04-29]

cost (Atlas Copco, *Internal Documents*. 2009). The quality function is a resource to the purchasers and assists in the audits and notifies when there are issues of poor quality. The resources of the quality function are allocated to suppliers with the most incidents of poor quality. This function is not formally evaluated on performance (Quality Engineer, *interview*, 2009-03-27). The strategic purchasers classify their suppliers according to Kraljic's (1983) framework. The allocation of their time depends on commodity group and many purchasers have suppliers that supply products that are placed in different corners of the matrix. The division is independent of type of product according to Kraljic's (1983) framework. Every purchaser has transactional, facilitative and integrative suppliers in their portfolio and perhaps one connective. Evaluation of purchasers is based on cost-savings, negotiation results, lead-time, delivery performance, and payment terms. This is communicated through an annual discussion. No bonus system is in place. The purchasing function is evaluated internally and by the controller function that monitors cost and costs in relation to exchange rates (Strategic Purchaser C).

5.1.2 Supplier evaluation at ATLAS COPCO

Supplier evaluation studied at URE varies among different types of supplier relationships. There are formal and informal evaluation methods, some basic methods are the same across all supplier relationships but where adjustments both in structure and in use depend on relationship (Strategic Purchaser A). Supplier evaluation at URE can be divided into three categories; when choosing a new supplier, ongoing evaluation or when the supplier has quality problems (Quality Engineer). Within these categories there are a few standardized tools that are used, which are presented below.

5.1.2.1 The Supplier Qualification Process (SQP)

The supplier qualification process (SQP) is initiated by a need. After the need is defined, the purchaser starts scanning for suppliers. Having found potential suppliers, a self-assessment questionnaire is sent to the prospects. The questionnaire covers various basic areas that are vital for the purchaser. After this, a Request for Quotation (RFQ) is sent out to a small number of potential suppliers where they specify, e.g. price, weight, minimum-order-quantity, and payment terms. In all relationship types except transactional the supplier questionnaire is followed by a supplier visit coupled to an audit. This activity involves three to five people from URE, representing different functions, visiting and evaluating the supplier from five perspectives (Performance and Stability, Quality, Environmental, Core Competencies, and Important Processes). The quality function is responsible for three out of the five perspectives. In the different perspectives there are four to nine different areas, which include a variety of questions. Some questions act as thresholds and others as enablers. All questions do not provide the ability to be answered *"yes"* or *"no"* which provides nuances to the evaluation. As a starting point in the final evaluation the answers are weighed against expectations from that specific supplier e.g. a close collaboration demands English proficiency. After the supplier visit and audit is completed, purchasers move on to make a decision. The SQP is standardized but the decision is made upon a case-by-case basis and the final decision is in the hands of the strategic purchaser. When the decision has been made a test sample is examined, and if it reaches the intended standard it is verified and validated and the supplier is finally approved (Strategic Purchaser A).

5.1.2.2 The Supplier Analysis

All suppliers are evaluated on an ongoing basis via the supplier analysis. The supplier analysis is referred to as the *scorecard*. In this scorecard all suppliers are monitored according to the following parameters; delivery performance, lead-time, order acknowledgment, quality (both in relative and absolute numbers), number of orders, and value of orders (Strategic Purchaser A). The scorecard helps the purchasers to monitor the suppliers' performance, informs the suppliers where performance can be improved, acts as a basis for discussion during supplier meetings, and lays the foundation for the supplier rating. Suppliers can easily access the scorecard through the internet (Strategic Purchaser C).

5.1.2.3 The Supplier Rating

The supplier rating system is built on figures from the scorecard. This tool is constructed to give suppliers a grade, rating, dependent on their performance. The different grades in the rating system

bring different consequences. The scale used is A to D. Suppliers with an A-rating are considered to be good and are offered to use the Atlas Copco brand in their marketing. The D-rating on the other hand implicates consequences such as a six month deadline to fix the problem or a fine sent out to get attention (Strategic Purchaser A). The fine is set in relation to the portion of supply disturbances. The parameters that constitute the rating are amount and portion of claims, and delivery performance. Every rating class has a certain criteria and it is the lowest performance of the three parameters that sets the rating. In some cases when a supplier shows a weak quality performance a supplier audit is conducted. The supplier rating system does not work in relationships where the supplier has a strong bargaining power (Strategic Purchaser B and C, *interviews*, 2009-03-27).

5.1.3 Relationship specific evaluation

In the following section specific relationship types will be described by characteristics and supplier evaluation techniques used in different relationships.

5.1.3.1 Transactional Relationships

The majority of the supplier relationships are transactional. These are the suppliers that purchasers dedicate least of their time to, as there is low organizational and technical interface (Strategic Purchaser B, C and D, *interviews*, 2009-03-27). Normally these are suppliers to which purchasers just send out an order when there is a need. Typical for the transactional suppliers are that their input constitutes little purchased volume and therefore do not require any organizational adaptation, and they provide inputs that does not require any technical adaptation, e.g. labels, screws and nuts. Another example of a transactional supplier at URE is a supplier of standard components. From the beginning the supplier was connective, and supplied mechanics for the development of a CPU-module. After standards were established the relationship to the supplier of mechanics for the CPU-module changed and became transactional (Strategic Purchaser D). When initiating the SQP with a transactional supplier two steps are excluded; the supplier visit and the audit (Quality Engineer). Since these typically are suppliers of input that could be found elsewhere, focus in the SQP is price (Strategic Purchaser C). To evaluate price, different potential suppliers are exposed to competition and where the cheapest price gets the order, given that they fulfill the threshold criteria in the supplier self assessment (Strategic Purchaser A). When it comes to the ongoing evaluation of transactional suppliers, purchasers follow the supplier analysis and the supplier rating, although less actively. However, the tools are the same. As long as suppliers reach an acceptable level nothing is done but if they do not then they are easily replaced. URE does not want to treat a supplier that has become a large volume supplier as transactional (Strategic Purchaser C). Hence, volume is however a parameter that is followed in the supplier analysis in transactional relationships (Strategic Purchaser A). Although, time spent on these relationships is tried to be kept at a minimum. Every half-a-year to a year, there is a meeting between the supplier and the purchaser where the results from the supplier analysis are discussed. If transactional suppliers want to develop, they have to push for it themselves (Strategic Purchaser B). The quality function allocates very little time to these suppliers as they never become large contributors to poor quality (Quality Engineer). Normally, at URE, transactional suppliers do not cause many disruptions.

Other methods of supplier evaluation such as, Open Book Accounting, and Target Costing are not used. This is explained as being a consequence of exposing suppliers to competition and the little payoff of these methods in this type of relationship. Last year the purchasers tried to define components of total cost but this was unsuccessful (Strategic Purchaser C). Since, the purchasers are looking for different characteristics in different suppliers there is no possibility to standardize this tool. Hence, there is a subjective and unique TCO philosophy that is manifested in the SQP, the supplier analysis and the rating system. The TCO aspect is also formally specified in the purchaser's job description. Purchasers are aware that e.g. poor quality affects the TCO. In general as higher the organizational and technical interface gets to the suppliers the wider the definition of inclusion gets (Strategic Purchaser A and Quality Engineer). Parameters that purchasers look after in transactional

relationships are e.g. value of allocation of time, price, payment terms, and delivery-related costs (Strategic Purchaser C).

5.1.3.2 Facilitative Relationships

The second largest group of supplier relationships is facilitative. These are suppliers that purchasers dedicate much of their time to. There is high organizational and low technical interface. Normally this is a supplier that supplies input of high volume (scale or scope) or importance (standard or complex). When this is the case the purchasing function needs to allocate organizational resources to maximize the value of the relationship. Issues of importance with these suppliers are e.g. delivery performance, quality and payment terms. One example of a facilitative relationship is a supplier that supplies high volume, both in terms of scale and scope, of standard components and that has been a supplier to URE for many years. This specific supplier supplies a wide variety of components for the construction of the operator's cab (Strategic Purchaser C). Another example found was a supplier that supplied a customized input that is vital to the assembly of the final product. This specific supplier constructs the frame for URE's final products and has to technically adapt to URE's requirements. The common denominator in these relationships is that they require a high organizational interface. In many cases, the input from facilitative relationships has been technically adapted to URE. Due to the fact that URE buys relatively down-stream (modules like a touch panel), technical products become facilitative as the development has been outsourced upstream (Strategic Purchaser D). Facilitative suppliers are encouraged to collaborate with other facilitative suppliers and from time to time URE arranges *"Supplier Days"*. Exposure to competition for facilitative suppliers is not always the case (Strategic Purchaser C).

With a facilitative relationship all steps in the SQP are included. Since these typically are suppliers of input that constitutes a large volume or importance the focus in the SQP is not only on price but also on other formal parameters and also informal. The evaluation of price is similar as in transactional relationships. However, exposure to competition is not always possible (Strategic Purchaser B, C and D). In addition to the price parameter, the other parameters such as Performance and Stability, Quality, Environmental, Core Competence, and Important processes are evaluated through the SQP (Strategic Purchaser A). If problems are discovered during the supplier visit and audit the purchasers develop an action plan for the supplier to correct these (Quality Engineer). When it comes to the ongoing evaluation of facilitative suppliers, purchasers follow the supplier analysis and the supplier rating actively. The result from the supplier analysis is one important issue during the monthly meeting. A formal evaluation of the largest suppliers is conducted on a yearly basis (Strategic Purchaser B and C). The purchasers are trying to work with business plans, with three to four goals, together with the suppliers. The goals are often related to logistics improvement or prices (Strategic Purchaser A). Quality enhancement is something that is initiated by a problem of poor quality. As it is the suppliers with the largest volume supplied that normally are found in the facilitative relationship, the quality function dedicates the majority of their time here. In general, if a facilitative supplier deviates in terms of quality an additional supplier audit can be issued (Quality Engineer). Other methods of supplier evaluation that can be found in facilitative relationships at URE are Open Book Accounting, and a subjective and unique TCO. Open Book Accounting is more an exception than a rule at URE. The supplier that was found willing to share cost information and develop a joint calculation of costs, supplies standard components of both scope and scale and has been a supplier to URE for almost a decade (Strategic Purchaser C). The subjective and unique TCO is broadened in relation to what is included in transactional relationships and informal parameters such as e.g. collaboration and experience become important (Strategic Purchaser C and D).

5.1.3.3 Integrative Relationships

The second smallest group of supplier relationships is the integrative. In this type of relationship the purchasing function allocates organizational and technical resources to maximize the value of the relationship. The interaction with the integrative supplier is frequent, and with some even daily contact is needed. Due to the frequency of the meetings, interaction is usually informal and consists mainly of technical discussions e.g. how the input will affect URE's end product or compatibility issues

(Strategic Purchaser B). Characteristics of importance with these suppliers stretch beyond measurable parameters and things like ability to collaborate, innovativeness and supply chain quality become important. One example of an integrative supplier is a motor supplier which supplies a unique component which is partly demanded by the market. A further complication is that the motor supplier acts in an oligopolistic supply market giving them high bargaining power. Both resource interfaces are high. URE needs to have frequent contact with the motor-supplier due to the importance of the input. Meanwhile URE is a very small customer hence it is impossible for them to affect the supplier to customize the motor design, consequently URE needs to adapt its end product to the motor (Strategic Purchaser B). Another example of an integrative supplier is a supplier of CPU-software. In this integrative relationship there is very close collaboration due to the fact that the product adds much value and that it is essential that compatibility issues are sorted out. Integrative suppliers are not encouraged to collaborate with other suppliers. Either URE opposes supplier collaboration when they are afraid that sensitive technology will leave the relationship and in other cases when the suppliers simply are not interested (Strategic Purchaser D). In integrative relationships suppliers are almost never exposed to competition (Strategic Purchaser A).

With an integrative supplier all steps in the SQP are included. Since the relationship to the supplier needs to have a high organizational and technical interface the focus in the SQP is not only price but other formal and informal parameters such as service ability and geographical location (Strategic Purchaser C and D). The evaluation of price has little relevance in general and in relationships where the supplier cannot be influenced no relevance at all (Strategic Purchaser B). Depending on what URE is looking for in the supplier relationship they will subjectively make the supplier decision based on the SQP, e.g. in some integrative relationships innovation is more important while in other like the CPU-software developer transparency is. In general evaluation of the answers in the SQP is stringent and the supplier needs to reach higher levels in the different parameters to qualify (Strategic Purchaser D). If problems are discovered during the supplier visit and audit the purchasers develop an action plan for the supplier to correct them (Strategic Purchaser A and Quality Engineer). In the ongoing evaluation of suppliers in integrative relationships, purchasers follow the supplier analysis and the supplier rating actively. It is very important that the delivery performance of these suppliers works well since most items are critical to the production (Strategic Purchaser B). However, the supplier rating does not work as an evaluation tool in networks as information is only received from the first tier supplier. Instead networks are solely evaluated by a project evaluation at the end of the project (Strategic Purchaser D). The result from the supplier analysis is one important issue during the monthly meeting. Moreover, more informal topics are discussed such as project activities, economic climate, general performance of the collaboration, and second-tier suppliers in cases where they can be affected. Due to frequent interaction the dialogue is colored by informality and often involves technical discussions. A formal evaluation of the largest suppliers is conducted on a yearly basis (Strategic Purchaser B). As in facilitative relationships quality improvement is something that is initiated by a problem of poor quality. The quality function allocates all its quality development resources to the 15 largest contributors to poor quality, in absolute terms. As a consequence, many of these are integrative. In general, if a facilitative supplier deviates in terms of quality an additional supplier audit is issued. In some cases, where URE has low bargaining power, little resources from the quality function are allocated, simply because the ability to influence is limited (Quality Engineer).

Open Book Accounting is commonly used in integrative relationships. When the supplier does not want to engage in this, purchasers try to estimate costs of input by calculating material costs, labor cost etc. However, some level of cost disclosure is normal in integrative relationships (Strategic Purchaser B). The subjective and unique TCO is here, as in facilitative relationships, broadened with additional informal factors that affect the total cost. This can be costs connected to the ability to collaborate, innovativeness, aftermarket, and supply chain quality. Where the transparency is high a primitive ABC calculation is conducted where purchasers investigate cost drivers on component level to see what components drive the cost. Target Costing is conducted and is normally used in the product development phase and in the discussion with suppliers about new purchases. It is however

dependent on the suppliers bargaining power and the product features. If it is impossible to influence the supplier or to change the input design, target costing is not applicable (Strategic Purchaser D).

5.1.3.4 Connective Relationships

The smallest group of supplier relationships is the connective. In one case at URE a network exists where the suppliers initially all were connective. The network was a constellation of suppliers designing a CPU-module to be used in URE's products. As the project moved from being in the planning stages to the execution the relationship premises changed and the connective relationships transformed into other relationship types. The relationship with the contracted producer became facilitative, and the relationship to the innovative developer changed to a more integrative relationship. The relationship to the platform producer however stayed connective. According to the purchaser, connective relationships are often temporary conditions. The platform supplier stayed as a connective relationship because URE had to technically adapt the CPU-module to the platform, but little interaction was needed in the relationship (Strategic Purchaser D). Another example of a connective relationship is with a lead supplier of a GPS device that is demanded by the market. Although URE answers to a small fraction of the supplier's revenue and is not able to influence the component features and price. Hence they need to technically adapt the product after the standard interface of the GPS device but there is no reason for allocating any particular organizational resources (Strategic Purchaser D).

In a connective relationship all steps in the SQP are included. As in facilitative and integrative relationships, the evaluation in the SQP in connective relationships is not only concerned about price and formal parameters described above, but also informal parameters, such as whether they have a good track record, if they will be able to supply spare parts for a number of years ahead, closeness to technology clusters, and the compatibility with other suppliers in that project. These aspects are considered when making the decision of which suppliers that are to be included in e.g. a project to develop a new CPU-module for a product (Strategic Purchaser D). When it comes to the ongoing evaluation of connective suppliers, purchasers do not use the supplier analysis or the supplier rating. As in some of the integrative relationships neither one works as an evaluation tool for networks as information is only received from the first-tier supplier. Networks are evaluated by a project evaluation, which also lays the foundation for future network constellations e.g. if one supplier is dissatisfactory it will not be included the next time. Further, purchasers see what constellations of suppliers that achieve the best results. The project evaluation is done in an ongoing manner through project group meetings but is finalized when project is done (Strategic Purchaser B and D). In connective relationships at URE a subjective and unique TCO is manifested in the SQP and the project evaluation. Due to tricky variables of constellation alternatives, innovation and time frames it is very hard for purchasers to quantify or even grasp the total cost of a connective relationship. However, the philosophy of TCO is still active but not at all formalized. "*When evaluating this type of relationship one does it more by experience than by some scientific method*". (Strategic Purchaser D) Open Book Accounting is not present in the connective relationship but may be used when suppliers move into other relationship categories. Target costing is conducted in the CPU network and the evaluation is used ongoing during the project (Strategic Purchaser D).

5.2 ASEA BROWN BOVERI

The ABB Group is one of the world's leading suppliers of power and automation technologies to utility and industry customers. It operates in around 100 countries and employs 120.000 people. Its annual turnover for 2008 was 34.9 Billion USD (ABB Annual Report, 2008, p.8). ABB is structured in five separate divisions globally which are reflected in every country; Power Products, Power Systems, Process Automation, Robotics and Automation Products. The Automation Products Division serves customers with products like drives, motors, generators, low voltage products, instrumentation and power electronics.[1] It has ten separate business units (BU) containing several local business units

[1] http://www.abb.com/cawp/abbzh252/a92797a76354298bc1256aea00487bdb.aspx [2009-04-29]

(LBU) scattered globally. We are studying four such local business units within the Automation Products Division located in Västerås in Sweden; LV Motors, LV Systems, Machines and CEWE Control.

5.2.0.1 LV Motors:

The Swedish LV Motors LBU is one of seven motor factories in the LV Motors BU and is described as a typical LBU within the ABB Group employing about 200 people. LV Motors makes electrical low voltage motors for the industrial sector. The motor is a standardized push product with a specific ABB industrial design. Purchased materials answer to about 50% of the total cost. The LBU has 110 suppliers divided among four strategic purchasers (Supply Manager A, *interview*, 2009-04-03).

5.2.0.2 LV Systems:

The Swedish LV Systems Division is one of 31 LBU:s in the LV Systems BU. The LV Systems BU has 4500 employees worldwide and 150 people located in Sweden. LV Systems is the market leader in low voltage power distribution and motor control systems and has its largest customers in the manufacturing industry. The systems are complex pull products with an expected lifetime of about 40 years, mainly consisting of switchgears, sheet-metal and copper. The systems are fully customized and engineered-to-order, but is constructed by combining different standardized modules. Purchased materials answer to 50% of the total cost. They have 285 suppliers, of which 15 are internal that account for 45% of the purchased volume, divided over two strategic purchasers (Supply Manager B, *interview*, 2009-04-03).

5.2.0.3 Machines:

The Swedish Machines Division has 400 employees and is structured in three separate sub-units; direct current (dc) motors, traction motors and alternating current (ac) machines, which is the sub-unit we are focusing on at this LBU. AC machines are large complex pull products which are fully customized to the customer's needs. Machines sold 250 ac machines last year to industrial customers. Purchased materials account for 40-50% of the products total cost. They have 550 suppliers out of which 50 are classified according to Kraljic as strategic (a-supplier), 150 as important (b-supplier) and 350 as non-critical (c-supplier) divided over nine strategic purchasers (Supply Manager C, *interview*, 2009-04-03).

5.2.0.4 CEWE Control:

The Swedish CEWE Control Division has 550 employees. The LBU develops and supplies products and solutions that control and distribute electrical energy up to 1000 V, e.g. switchgears and contactors. These are supplied to customers operating in all industries, the largest in wind power, train manufacturing and internal system providers. The products are push products that should always be available and are produced to inventory and to direct order. Important components are contactors containing copper and silver, magnets and sheet-metal. The supplier base exists of 204 suppliers, whereof the largest 39 account for 95% of the volume, and are divided among eight strategic purchasers (Supply Manager D, *interview*, 2009-04-03).

5.2.1 The purchasing organization

The purchasing organization for the Swedish AP Division is structured in a way that each LBU has its own supply manager responsible for strategic purchasing. On top, the supply manager for one of the LBU:s has an overall responsibility for the strategic purchasing in all LBU:s in the Swedish AP Division. The supply managers have meetings every month, where they present cost savings results, cost savings activities and measures of e.g. development of on-time delivery, split between low-cost and high cost country sourcing and payment conditions, e.g. days of purchase outstanding). In general the supply managers have great superiority and the main duty of the overall division supply manager is to secure that all strategic purchasing departments work with supply management, is implementing designated strategies and make sure they have aggressive budget targets that are properly measured and evaluated. Every LBU has a two-legged purchasing department, operating and strategic, with its own manager that are both represented in the LBU:s executive board (Supply Manager A).

The operating purchasing department spends about 70-90% of their time as production planners and the rest in running the daily operations e.g. placing orders, tracking delayed orders and having daily communication with suppliers. The strategic purchasing departments have between two and nine strategic purchasers and are structured roughly in the same way. Their supplier portfolios are divided based on material groups, but with a mixture of different supplier relationships amounting to approximately the same volume in total. They have a few challenging integrative and facilitative relationships where they allocate about 70-90% of their time, a large group of non-critical transactional relationships and some have maybe one connective relationship. Typically the number of suppliers in each portfolio varies between 20 and 50, but where some handle only three when there are very integrated suppliers and some more than 100 when having many small transactional relationships. The main duties of the strategic purchasers are to find new suppliers, run the Strategic Qualification Process (SQP) to approve or disapprove the supplier, sign contracts, negotiating prices and conditions, and to evaluate and develop suppliers. There is an intense focus on minimizing the total costs and they are described as project managers of cost-cutting projects. Each LBU has its own quality department that runs the operating dialogue with the supplier if there are quality issues (Supply Manager A).

ABB started to gradually change sourcing strategy around ten years ago from being very focused on single-sourcing and deep integration to a multiple sourcing strategy where competition, arm's length and pressure on total cost is in focus. The result of the single-sourcing strategy had been very poor. The intention was to achieve what the Asian car manufacturers had achieved but there was a lack of central understanding for the purchasing function within the ABB Group. The large number of integrative relationships was too demanding and the available time and resources in the purchasing function were too scarce. The suppliers took advantage of this and started to exploit the relationships. ABB got stuck in a number of integrated relationships were the supplier had large bargaining power and could dictate the conditions. Today ABB is careful to outsource only what they cannot make in-house and buy the rest on as detailed level as possible. Important targets are to control its own cost structure and to gain bargaining power in the supplier relationships. The keywords are competition and a strong technical department. The technical competence enables buying large volumes of standard items from low cost countries in Asia and Eastern Europe. By exposing the suppliers to competition created naturally by the market lowest total cost and flexibility can be reached (Supply Manager A). ABB wants between 5-20% of the supplier's business volume. They limit the scale since they believe that if ABB is too small it does not get enough priority and if too large the supplier risks losing ability to remain competitive (Supply Manager C).

5.2.2 Supplier evaluation at ABB

Supplier evaluation at the studied LBU:s at ABB varies among different types of supplier relationships. There are formal and informal evaluation methods, some basic methods are the same across all supplier relationships but where adjustments both in structure and in use depend on relationship. ABB applies a transactional perspective on purchase. Purchased *items* are classified through the Kraljic (1983) Matrix. Level of integration with the supplier depends on where in the matrix the material is. Since ABB is a large and complex organization it often happens when using the Kraljic (1983) Matrix that some suppliers deliver material residing in 2-4 areas of the Matrix. If several LBU:s procure materials from the same supplier, the rule is that the one with largest purchased volume owns the contract (Supply Manager D).

5.2.2.1 The Supplier Qualification Process (SQP)

The work in finding a new supplier begins with the identification of a strategic need, e.g. to lower total costs, come out of a single-source situation or market demands. Based on this need a screening for potential suppliers is conducted. All new suppliers have to undergo the Supplier Qualification Process (SQP). The content and scope of the SQP differ between different types of suppliers. The suppliers found in the screening are roughly evaluated based on annual reports, presentations, brief check of the supplier's largest customers and a brief questionnaire. The routine depends on material type. Five suppliers advance to the next step and receive a quest of quotation, where materials, scale and scope of

the purchase are specified, quotation and a self-assessment is requested. This is followed by a new discussion covering technical aspects and a new quotation. Based on this one or two suppliers are selected and a detailed supplier audit is conducted (Supply Manager C). The audit contains three parts, the quality process made by the quality department, one of the delivery capability and one of the financial situation carried out by the strategic purchaser (Supply Manager B). In the delivery capability audit the supplier's capability to deliver requested products and volumes, innovation, cooperation and product development ability is evaluated. In the financial audit credit checks are run and financial key measures are controlled (Supply Manager C). From six categories in the audit the supplier receives a percentage score and in order to pass the average score has to be above 50% and approved on certain parts, e.g. human rights (Supply Manager B).

5.2.2.2 The Supplier Scorecard:

All suppliers of items classified by the LBU as critical or bottleneck according to the Kraljic Matrix are denoted a-suppliers and are frequently evaluated through a Supplier Scorecard (SSC). This differs from one LBU to another. Some evaluate the largest strictly in terms of volume, while others also include suppliers that deliver smaller volumes but critical items (Supply Manager A,B, C and D). The SSC measures the supplier's performance on quality, on-time delivery and co-operation. How the areas are weighted in relative importance varies from one LBU to another and in one LBU even among different suppliers. In general on-time delivery is considered as most important and where the supplier can receive between 40-60% of the points, quality as second most important (20-40%) and co-operation as the least important (10-20%)(Supply Manager A, B, C and D). The quality and on-time delivery scores are exponentially distributed. The goals are held high in order to put pressure on the most important suppliers and to make them feel the competition and continue to improve. The points are allocated by the discretion of a cross-functional group inside the LBU with representatives from purchasing-, goods receiving-, production-, quality- and technical departments. The SSC:s are then sent out once each month to the a-suppliers (Supply Manager C). In all LBU:s but one this happens in full disclosure where the suppliers can not see each others scores. This LBU is producing standardized products where comparison is more fair and fruitful than for the other LBU:s producing more customized products (Supply Manager D). Based on the SSC:s, action plans are constructed and followed up on later meetings. The reward for performing well on the SSC is gaining more volume. The only contracted punishments are late delivery fines, and informally bad performance leads to lower received volume or replacement (Supply Manager A).

5.2.3 Relationship specific evaluation

5.2.3.1 Transactional Relationships

The large majority of all supplier relationships are of the transactional type. All strategic purchasers have in their portfolios a long tail of suppliers with low technical interface on which they aim to minimize time spent on the relationships. Items bought through transactional relationships are numerous small different items ranging from labels, cable ties, paint, bolts and much more. The strategy is to buy standard items and to minimize the transaction costs. Every three years a check is made on this supplier group, where they try to consolidate purchases from three suppliers into one. The strategy is to source items with low volume and low degree of complexity from countries in Eastern Europe. As the volume goes up it is more profitable to source from Asia, and increasing the sourced percentage from these countries is desired and a measure that is monitored in the monthly meetings. It is common that as the purchased volumes increase in combination with greater geographical distance, the supplier relationships require higher organizational interface, hence most of the Asian supplier relationships are facilitative and the Eastern European transactional (Supply Manager A).

The evaluation of these suppliers is made much less frequent and simpler than for the other relationship types. The SQP is much more simplified. After the initial screening a quest of quotation and a self assessment is sent to the supplier, containing a condensed investigation of the quality system, delivery capability and financial situation. Different from more important supplier

relationships this is enough for making a decision of which supplier to choose (Supply Manager C). However, in one of the studied LBU:s the SQP is more thorough also for transactional relationships. This is due to their low number of supplier relationships to the number of strategic purchasers and the fact that they add new suppliers quite seldom which give them more time to spend on the SQP and adapt it more case by case (Supply Manager A). TCO has high priority within the organization and even in non-important supplier relationship costs are evaluated much more thoroughly than only on price. What formally has to be included in all relationship types are costs associated with; quality system, product quality, financial stability, on-time delivery, lead time, sustainability, price, transport and logistics (ABB, *Internal Documents,* 2009). Informally some strategic purchasers include costs of conducting the SQP, sample tests, costs associated with the start-up phase, geographical distances and communication. For transactional relationships only the formal areas are found in total cost calculations (Supply Manager A). No formal on-going evaluation of these relationships is made. The work is more to resist the annual increase in prices, which is easy due to ABB:s large bargaining power (Supply Manager C). The contact is more problem based where the rule of thumb is that if frequent disturbances occur it is most often not worth spending resources on solving the problems but rather more effective to replace the supplier. The keyword is to keep these suppliers at arm's length, expose them to tough natural competition created by the market and to minimize resources spent on the relationship, which is achieved by a multiple sourcing strategy (Supply Manager A, B, C and D).

5.2.3.2 Facilitative Relationships

All strategic purchasers have some facilitative supplier relationships in their portfolios. The reason that no one has many is simply because they require large organizational resources and time in particular. Facilitative relationships at the studied LBU:s are of different types and require large organizational resources for different reasons. In some relationships they purchase large volumes of standard items in either scale or scope or sometimes both. The cost of these purchases add up to a large relative volume percentage of the strategic purchaser's portfolio and thus small cost changes on the individual item have large effect on the total cost. Hence, they are followed more closely by the responsible purchaser. For items of low complexity and high volumes the aim is to source from Asia. The geographical and cultural distance is thus a strong driver for the need of a high organizational interface, concurrently as larger volumes better motivate spending more organizational resources (Supply Manager A).

Some materials that are demanded in high volumes by several LBU:s and BU:s purchases are handled jointly. These materials which often are simple and purchased in large volumes e.g. copper, sheet-metal and ball-bearings are negotiated on a central level on either business unit-, division-, country- or group level to reach economies-of-scale (Supply Manager B). There are certain organizational units called group commodity teams (GCT) where each LBU that purchases the material in question participate. The responsible strategic purchaser at the LBU for the material meets with the other members of the GCT a few times per year to set tactics and strategies and to decide how to allocate ABB's volume among the approved suppliers. Normally a certain member of the GCT has the main responsibility for the supplier relationship with these large volume suppliers, thus saving organizational resources for other members of the GCT (Supply Manager A and B). Some facilitative relationships are large in scope, i.e. the supplier delivers hundreds of different items. The strategy then is to divide the purchases on several sub-contracts with the supplier. This is to avoid a single-sourcing situation where ABB gets stuck with a supplier. By splitting the contracts it is easier to expose the supplier for competition, thus making it possible to lift off volumes when the supplier is performing dissatisfactory (Supply Manager A and C).

Another type of facilitative relationships are supplier's that often have a high technical interface towards ABB, but where ABB has a low technical interface towards them. The LBU designs drawings which they allocate to a contractor that is producing the item or component. One example is the supplier of the outer casing to a motor. Here ABB even paid the supplier's development costs of the necessary tools needed for producing the customized component. ABB owns the developed tools placed in the supplier's production facility, so that they fast and easy can move the production (Supply Manager A). When choosing a new supplier of this type a full SQP is conducted. It might be the case

though that the supplier starts as transactional and over time develops to a more facilitative one. The responsible purchaser always follows the development in volume both in absolute and relative terms, and it is said that if the supplier accounts for about 5-10% of the portfolios volume a more thorough SQP should be made. Every 2-3 years a check is run whether there have been large disturbances related to quality or lead time. If this is the case a new SQP will be made. Dependent on the result from this SQP either an action plan for improvement will be outlined or the supplier will be replaced (Supply Manager C). As the delivered materials can have a larger impact on the operations the total cost definition is made more stringent for facilitative relationships. Additional to the areas included in transactional relationships, costs associated with continuous improvement, co-operation, flexibility, and in particular processes and routines are formally considered in the total cost calculations in facilitative relationships (ABB, *Internal Documents,* 2009). Informally the costs associated with geographical distance and lead time gets a higher focus, since there often is a positive correlation between longer lead time and a higher level of capital tied up (Supply Manager A). Many facilitative relationships, those classified as a-suppliers, are evaluated monthly through the SSC's as described above, while others are not evaluated by the scorecards. On the other facilitative relationships classified by the LBU as b-suppliers, quarterly meetings are held where performance on quality, delivery accuracy and total cost are disclosed from both parties and discussed. Further, the suppliers are informally evaluated through the high organizational interface and the frequent contact. In facilitative relationships the management strives of receiving some sort of cost break downs, although they do not want to go all the way and apply Open Book Accounting in facilitative relationships.

5.2.3.3 Integrative Relationships

The number of integrative relationships has been minimized at ABB since the single-sourcing strategy was abandoned. Today the integrative supplier relationships are almost exclusively either encouraged relationships with internal suppliers or with suppliers possessing a unique core competence. They strive to keep R&D internally and anything that can be competitively produced in-house is done so (Supply Manager C). The LBU:s have between three and 50 integrative relationships, where the more customized products produced the more integrative relationships there are. In two of the LBU:s the integrative relationships also accounts for more than 85% of the total volume and naturally it is on these relationships where most organizational resources are spent (Supply Manager B and C). Due to the complexity integrative relationships is sought in the geographical and cultural vicinity. Effective communication, time zones and similar traditions make an integrative relationship easier (Supply Manager A). The motives behind the high technical interface towards the supplier are ranging from products adapted to a supplier's standard to some pure R&D projects. Since, these relationships are more complex than the previous two types the ways they are handled, developed and evaluated are more heterogeneous as well. One integrative relationship to a supplier of radiators stems from the suppliers core competence. In this relationship ABB is a small customer and has to adapt their product to the standard of the supplier. A highlighted problem with these relationships is that at the same time as ABB seeks a co-operation the supplier does not prioritize ABB as high and does not feel exposed to competition. The situation demands a high organizational interface to the supplier, and a high technical interface as the LBU has to adapt its product after the procured item (Supply Manager C). One of the LBU:s has a more R&D-intensive integrative relationship to a contactor supplier. The strategic relationship has developed over many years and both organizations are well adapted to each other and have developed several successful patents together. The relationship is described as symbiotic and they drive each others innovation. After an evaluation a couple of years ago it was concluded that the two partners had grown too comfortable in their relationship, and that some competition would be healthy for both parties. In an attempt to expose the supplier to competition the LBU decided to engage in a relationship with a second contactor supplier. They have chosen a dual-sourcing strategy since natural competition does not exist in this supply market. The suppliers possess very unique competencies and as such the competition needs to be artificially created and maintained by one strategic purchaser. This requires large organizational resources thus the responsible strategic purchaser only works with three suppliers, something that is very rare at ABB (Supply Manager D).

Suppliers in integrative relationships are evaluated rigorously in the SQP. In contrast to other relationship types a thorough check is run once a year, where quality and delivery performance is evaluated and if there is a large frequency of disturbances a new SQP will be run and an action plan will be established and closely followed (Supply Manager C). Due to the high level of integration between several departments of both organizations and high degree of adaptation, changing supplier is often very expensive. Often these suppliers' components are heavily integrated in the product interface where an entire product platform might have to be redesigned. At the end of a project which can involve the production of a subcomponent, a product or even an entire product family a thorough evaluation of the partnerships is conducted internally (Supply Manager D). For integrative relationships the total cost concept formally includes the same as for transactional and facilitative relationships but also measures contribution to R&D (ABB, *Internal Documents,* 2009). Informally, what is also considered are track-record from participation in earlier projects and supplier's other customers to protect technology. Further a time aspect is added and is very important if the supplier is delivering a very unique component. The aftermarket needs to be served with these critical components for the product's lifetime and as such a steady supply needs to be secured and the costs for this need to be accounted for (Supply Manager A and D).

The aim in these relationships is to have broad contact surface, involving many departments and as such a frequent informal evaluation is conducted every day. A more formal evaluation is run every month where the SSC is updated for all integrative relationships and sent to respective supplier. If curves are pointing down, immediate action is taken to turn the development around. Action plans are made and follow-up meetings are conducted (Supply Manager C). If there is no market for the item provided, a test is conducted to determine the ability to compete. The component is broken down into pieces as is feasible. The sub-components are then benchmarked to the market (Supply Manager D). Target Costing is a technique that is avoided as much as possible, but for some very integrated suppliers it is used, as they are nearly an extension of the own organization (Supply Manager C). The use of target costing is often connected to the use of Open Book Accounting. In the earlier single sourcing strategy Open Book Accounting was a prerequisite for conducting business with ABB, but now even for more integrative relationships the technique is used more restrictively (Supply Manager A). The studied LBU:s only use open books in relationships where the power distribution is balanced and a great level of trust is obtained and trust is something that takes time to establish. Although open-books are not always used, ABB demands detailed specifications of costs to be disclosed by suppliers in all integrative relationships. When they do not manage to get all items disclosed they work hard to figure out the blank numbers (Supply Manager D). Although they do not formally use Activity Based Costing (ABC) they appreciate when the cost information is disclosed in ABC-format. A primitive form of ABC is used in some of the integrative relationships where the strategic purchasers work hard in identifying relevant cost drivers and activities (Supply Manager C). One LBU has several integrative relationships with internal suppliers. This relationship involves very close technique contact and product development. The LBU is assigned by central ABB level to co-operate with this other ABB BU. The prices are market-based pressured by external customers and where the LBU is not allowed to expose the internal supplier to competition. This has large effects on the supplier evaluation and no SQP:s, audits or price negotiations are conducted. SSC:s are run on the supplier but they are not revealed to external suppliers. The same LBU are using Open Book Accounting in external integrative relationships, but not in the internal (Supply Manager B).

5.2.3.4 Connective Relationships:

Connective relationships are harder to find in the organization. Two LBU:s has no connective relationships at all. They try to minimize single sourcing situations and when they have a high technical interface they usually support this relationship by large organizational resources as well (Supply Manager C). However, there are two connective relationships. The first one is with a supplier that has a strong core competence in circuit boards which it develops for the end product. In this relationship a network of first-tier and second-tier suppliers are involved. The LBU has assigned the developer with a number of dual-sourcing alternatives in the second-tier. It is organized this way since

although the LBU is stuck in a single source situation with the circuit board supplier they want to give the supplier an ability and flexibility to choose between different alternatives. In this way competition is introduced further upstream which pressures total costs as well as making the LBU more protected if one sub-component to the circuit board stops to be produced. The technical design and the operating work with the second-tier suppliers are left to the circuit-board provider and thus there is no need for a high organizational interface (Supply Manager D).

The other connective relationship is with an external supplier of a unique type of switchgear demanded by the market, where the end product is adapted to the supplier's standard. Although this relationship is not desirable, the switchgear is necessary to satisfy the end customers. The logistics flow and the component itself are not that complicated, hence a high organizational interface is not required (Supply Manager B). In these two connective relationships a thorough SQP was conducted. In the circuit board relationship, different from a normal SQP, the entire supplier network was evaluated in order to investigate compatibility between different components used in the circuit board system. The total cost concept for these relationships are similar to the integrative relationships, but further emphasize compatibility, closeness to technology clusters and a broadened perspective where the scope is on the entire supplier network involved. The time aspect in securing availability of sub-components are something that needs to be secured in the entire network and costs for this are taken into account (Supply Manager D). The SSC is conducted, but on the external switchgear supplier the meetings are less frequent. Open book accounting is used with the external switchgear supplier but not with the circuit board supplier. Although, this increases the organizational interface to the external switchgear supplier the overall contact is made only quarterly and the organizational resources spent on are low.

6. ANALYSIS

6.1 Transactional relationships

Both companies use a condensed version of the SQP as extra time allocated cannot be justified. This can also be seen by the policy that as little time as possible will be allocated to this category of suppliers. The rationale for this is that value extracted from increased time allocation cannot be compensated by cost savings. The more time available and the less frequent new suppliers are, the more rigorous SQP:s are conducted e.g. in one of the LBU:s the supply manager has relatively few supplier relationships compared to other LBU:s hence they can afford conducting a thorough SQP even for their transactional relationships. This rationale also explains the way the quality functions at respective company deals with this type of supplier; they allocate no time unless there is a problem. Changing supplier is always the action taken when quality is unacceptable, and therefore there is never a second supplier audit. Due to the fact that both companies expose suppliers to competition in combination with the limited resources, no other techniques for evaluating the suppliers are feasible. There is almost no transparency, which is essential for open books, ABC, and Target Costing.

Both Atlas Copco and ABB are well-aware about the term total cost, and the context in which they are using it has a strong resemblance to TCO (Ellram, 1993). The difference in the two companies is that ABB has formally defined the parameters to be included in the term total cost. Nonetheless, both companies do use a TCO philosophy in practice. This is illustrated in the transactional relationship when purchasers do not allocate any time to the specific supplier, this as an action to minimize pre-transactional costs. Transactional costs are measured mainly by price. Post-transactional costs are minimized as well. In Atlas Copco but not ABB, the parameters in the scorecard are considered, and in both companies little negotiation, hardly any quality improvements are made and suppliers are changed if they disappoint. A characteristic in common for total cost at the two companies is that as organizational and technical interfaces increase the broader the term total cost becomes. This proves why there are so few parameters in the term total cost taken into consideration with transactional relationships. The approach to total cost is very alike when it comes to transactional relationships. Although the approach might be the same, there are still some fundamental differences in the strategic approach to purchasing from transactional relationships. While Atlas Copco purchases

mainly from local suppliers, ABB has its bulk of transactional relationships in Eastern Europe. This difference in strategy is most likely explained by the difference in business. In general, Atlas Copco purchases on a higher level and in less volume. They need to know that their suppliers reach a certain quality level and by having them close they can assure that if something were to go wrong alternatives could be supplied shortly. In contrast, ABB purchases downstream in larger volumes which grants the possibility of outweighing the increased lead times by cheaper purchase prices. This is particularly true for the two LBU:s at ABB producing push products, while it is more difficult for the LBU:s producing more pull products.

A difference that is noteworthy between the two case companies is their usage of scorecards on transactional suppliers. The reason for ABB not using a scorecard on transactional suppliers could be that they have a larger market of suppliers that could supply identical products. One implication of having a large supply market is that there is less necessity to follow up on parameters – one supplier is always interchangeable with an identical one. One could make the assumption that the more specificity an input carries, the smaller the market for it is. In ABB's case, their input from transactional suppliers is relatively generic and there, in most cases, is a market for it. If the assumption above holds that would imply that since Atlas Copco's input is more specified, their market for input is more limited. This also increases the importance of the parameters in the scorecard. Even if URE does not actively use it themselves, the information might be enough to influence the behavior of the supplier to the better. Following the assumption above, the following can be assumed: the more input specificity, the less interchangeable suppliers become which in turn affects relative bargaining power. This has some explanatory value as to why Atlas Copco is using a rating system with a fine connected to delays in supply. It likely also has explanatory value as to why the rating system seems to not be working – suppliers have relatively high bargaining power against URE. It might also be the explanation to why Atlas Copco has higher frequency in their meetings than ABB. While ABB systematically says no to increases in input prices and keep contracts under one year, Atlas meets with suppliers every half-a-year to year.

6.2 Facilitative relationships

The facilitative relationships identified can be described as four broad types. The first type is relationships with suppliers delivering large scale often of a standard product, e.g. copper or ball bearings. The large volumes give rise to cost items with a big impact on the profitability. As such the organizational resources allocated are high, where ABB even has a certain global organizational unit dedicated solely on procurement of these materials. The second type is suppliers large in scope, often delivering hundreds of different items. ABB focuses on multiple sourcing and is exposing the suppliers to competition by splitting contracts, while Atlas Copco aims at building closer relationships and working jointly to pressure costs. In all these relationships geography plays an important part in both companies when considering total costs. In order to support sourcing from a more distant destination and longer lead times, the volumes have to be considerably larger. If lead times are to be shortened and the distance closer to production the prices are often higher. ABB has chosen a solution where all facilitative relationships of these types are in low cost countries, and the majority in Asia. Atlas Copco, with considerably smaller volumes in absolute terms, wants shorter lead times and closer relationships, hence they source mainly from Sweden. The third type is relationships where suppliers produce a customized item designed by the purchasing firm and often involve frequent contact with the technique department. At Atlas Copco these relationships have evolved over many years, where the suppliers have strong expertise in the production and long-term single sourcing has facilitated the bonds between the firms, with the idea that this will bring lower total costs and higher quality. In ABB the shift in sourcing strategy ten years ago has brought that they want to be flexible and to pressure total costs also in these relationships by exposing them to natural competition. One strategy has even been to pay for the development of and to own the tools that the supplier needs for producing the item. The fourth type is relationships with suppliers of a standard item often critical for the production, thus requiring close organizational supervision to secure the deliveries. These suppliers might possess strong bargaining power which requires very close attention from the strategic purchasers. Due, to the

strategic importance of these items it is preferred to shorten lead times and to source from the cultural and geographical vicinity.

When evaluating a new supplier in a facilitative relationship, regardless of type a detailed SQP is required and action plans are created to amend the weaknesses. The consequences of choosing the wrong supplier could be costly to the firm, when procuring either large volumes in scale or scope or smaller volumes of customized or critical items. In ABB the formal total cost concept is widened to also include factors such as co-operation, continuous improvements and process quality, while both companies also adapt what costs that are included uniquely for each relationship and at the discretion of the responsible strategic purchaser. The ongoing evaluation is characterized by more frequent meetings, monthly or quarterly, and more attentive monitoring. In general Atlas Copco has a closer contact with this relationship type than ABB, and sequentially supplier conferences and events are organized. Atlas Copco wants to encourage these suppliers in co-operating more together and creating networks. Reasons to the closer contact might be differences in sourcing strategy where Atlas Copco is keener on single sourcing and has its relationships geographically closer. The more customized end products, components purchased on a higher detail level and lower absolute volumes at Atlas Copco might also increase the scrutiny to secure sufficient quality.

However, in both companies most facilitative relationships are included in the scorecard system, at Atlas Copco also in the rating system, since volume and strategic importance are the qualifiers for closer supervision. Important parameters are developments of quality, on-time delivery and volumes. At Atlas Copco the quality department is solely dedicated at improving the quality and lowering the defect percentage on the 15 largest suppliers in volume, of where most are facilitative. The largest impact on lowering total costs can be made by improving the quality at these suppliers. At ABB the majority and at Atlas Copco every facilitative relationship is closely evaluated every year in terms of performance of quality and delivery. If there are large disturbances a new SQP is made and the supplier are either initiated in a development program or replaced. The companies aim for higher transparency in facilitative relationships than in transactional ones. However, Open Book Accounting is used very rarely at Atlas Copco and not at all at ABB. This since it requires a balanced power relationship, high trust, mutual gain and a pressure on both parties to commit in order to be effective. Both companies have bad experiences where open books with suppliers have been used. Either due to lack of resources or complex cost structures the suppliers have exploited the situations by either closing the books after a while or by referring to complex cost items impossible for the purchaser to verify. It has lead to situations where with high supplier bargaining power and low ability for the purchaser to affect the costs. Hence, both firms are very careful before initiating Open Book Accounting and a high level of trust and transparency is required. Further, ABB believes they are more flexible and can easier expose the facilitative relationships to competition if they keep the suppliers more at arm’s length. However both companies do require detailed cost-break downs where they aim to identify the relevant cost drivers and to lower the total costs. Neither ABC nor are Target Costing used in these relationships. A probable reason for the first is that it almost requires open books. For the latter the risk is that the price suggested to the supplier is either too high, increasing the suppliers margin, or to low often because of insufficient statistical material.

6.3 Integrative relationships

In general, the two companies have two different archetypes of integrative suppliers; suppliers that supply standards of large quantity that forces technical adaptation, and suppliers that are closely integrated via development projects. With integrative suppliers the SQP is done to its full extent. The formal tool looks the same as it does when evaluating facilitative suppliers. However, informally both companies have higher demands for these suppliers and the criteria for acceptance are broadened. This is a consequence of the continuum of allocation of resources in respect to maximization of value. In these particular relations ABB and Atlas Copco know that time cannot be a limiting resource. With integrative suppliers the SQP is followed up every year, and if there are many disturbances a new SQP is issued. As with the informal evaluation in the SQP, the scope of the total cost term is broadened when evaluating integrative suppliers. As explained earlier the total cost is defined at ABB whilst not

at Atlas Copco. ABB has added a parameter that they formally call *"contribution to R&D"*, but as in the SQP there are various parameters that are not formalized. These parameters are very similar in both ABB and Atlas Copco e.g. supplier track-record, supplier's customers and insurance that suppliers will be able to supply spare parts for a certain time-period. The philosophy of total cost can be found in these companies' decisions, and to some extent summarize the way they go about evaluating their suppliers. It is more formalized at ABB but in essence they both apply the same logics. Yet the logics might be the same, but their respective industry looks inherently different from one another. There are different sets of suppliers that require adaptation to. As previously explained there is a difference in the mean bargaining power between the industries which should reflect the way that the logic of total cost is applied. To some extent there are such adaptations to the sourcing behavior at respective company, although it is not formalized.

In integrative relationships the scorecard is used by both companies. A notable difference is that at ABB the grading in the scorecard is set in a cross-functional team. This is necessary as one of the parameters is qualitative. At Atlas Copco the scorecard is standardized across all types of suppliers. During the monthly meetings, the scorecard is discussed together with the supplier. Both companies have frequent contact with integrative suppliers and many of them between different functions. This amount of contact implies informal evaluation of the suppliers. Regardless of formal models or objectivity, tight contact results in informal evaluation. Supplier fines are contracted at ABB and are working. At Atlas on the other hand, fines attached to the rating system are not working. The rationale of differing bargaining powers in different industries should apply to this occurrence as well. In integrative relationships where suppliers are extremely close, such as joint development projects, the rating system does not work either. In this case it is more likely that once in a development project, the suppliers are not interchangeable and the rating system serves little purpose. It does however serve purpose when a project is finalized and evaluated, being a reference for future selection of suppliers in this type of development. Instead these integrative relationships are evaluated project-based. The project evaluation is a formalized process that is undertaken at both companies after the project is finalized. In this, evaluation parameters like the ones present in the scorecard and informal parameters included in total cost are evaluated. Hence, the supplier evaluation techniques can have a purpose although, the integration level prohibits them to be used during a project.

Other methods of evaluation that are used in integrative relationships at both companies are Target Costing, Open Book Accounting, and primitive ABC. What these three have in common is e.g. the dependability on relative power, the aim for a win-win situation, perceived fairness, and trust. ABB tries to stay away from target costing, but uses it from time to time mainly in relations where there is no competition. Atlas Copco uses it when possible, but it depends on power in the relationship and the product's characteristics. The same inclination towards showing more information with highly integrated buyers (from the supplier's perspective) is present regarding Open Book Accounting. ABB requires that integrative suppliers show disclosed costs, but only with a few relationships full Open Book Accounting is accepted. Atlas Copco also acknowledges that there is a correlation between *"integrativeness"* and full disclosure. We have not found any case of integrative relationships where the *"integrativeness"* takes us so far as to a true ABC-model in the supply chain. However, activities and cost drivers are scrutinized in the integrative relationship. This signals that they indeed use some type of primitive ABC method although it is not formalized. Thus the technique is not dependent on the buyer's perspective on the supplier, but rather the relation the buyer has to the supplier and vice versa. There are signs of adaptation to this two-way relation in the practice at companies e.g. at ABB purchasers conduct an assessment of competitiveness on integrative suppliers that are not willing to oblige to the disclosure of costs.

6.4 Connective relationships

Connective relationships are not many at the studied firms and are often more difficult to identify. While most connective relationships are permanent conditions, some are also temporary ones that transforms to one of the other relationship types with time. It could be a relationship where the purchaser has outsourced the development of a new hardware and that, as time passes and trust is

enhanced, develops into an integrative relationship with mutual product development and co-operation. Another example could be a supplier of a component used in a larger system to which a technical adaptation, but when the technical adaptations finally are made more develops into a transactional or even a facilitative relationship. At the studied firms we have identified different types of connective relationships.

One type is relationships with suppliers delivering standard items initiated by demands of the market. The items have a demanded function but represents only a small part of the end product e.g. a GPS-device or a certain type of switchgear. In these relationships the purchasers have adapted their product to the purchased item. In one of the relationships the firm is a small customer and the item is purchased at a low volume. The total cost of the purchased item is not that big in relative terms and it is not possible to influence the supplier, hence only a low organizational interface is directed. In the other case the firm is a larger customer and the item answer to a greater part of the cost, but here the end product is engineered to order and the purchased component is purchased as standard by choice so there is no need for more frequent contact. These relationships have in common that they are evaluated more like facilitative ones. A full SQP is run, they are included in the scorecards and in Atlas Copco's case also in the rating system. In the relationship where the firm is a larger customer, Open Book Accounting is in use since several years. The market demand has brought a single sourcing situation, where the strategy has been to enhance the transparency. The relationship is described as a win-win situation where both firms are interested in working with cost drivers, which can explain the success behind the open book collaboration. Despite the transparency, meetings are only held quarterly and contact is not frequent, which might be due to either lack of resources in the purchasing department or simply no need for more frequent contact. It might also be the case that the purchaser is such an important customer and has big bargaining power that they can demand open books all the while they do not need to dedicate large organizational resources to the relationship.

Another type is relationships with networks of suppliers that together create or develops an integrated system of components, e.g. a computer processing unit or a circuit board. These relationships are very different from all the other in the way that all suppliers are dependent of functions produced by other members in the supplier network. Both firms have this type and in both cases they outsource the development of a component to one main contractor. They assign preferred second- and third-tier suppliers that the first-tier supplier has to work with. Sometimes they give the supplier two choices sometimes only one. The SQP is very rigorous and involves not only the first-tier supplier but also the other members of the network. From both a total cost perspective and a functionality perspective it is important to consider factors as compatibility of different supplier constellations, their closeness to technology clusters and innovation ability. Furthermore, the time aspect gets even more important since it is very important that all subcomponents used in e.g. the circuit board continues to be produced for the entire aftermarket period. If one subcomponent stops to be produced and replaced the compatibility with other subcomponents might be affected. Then the circuit board and maybe the entire product have to be redesigned. Hence, costs for this are very important to take into consideration. Although it is not formally stated in any of the firms, the term TCO in these relationships does not only include all possible factors driving cost in one supplier relationship, but costs in the entire connected network.

Both firms use their scorecards only on the first-tier suppliers in these networks. It is explained that they leave the responsibility for on-time delivery and quality further upstream to the first-tier supplier. Another possible explanation could be that these relationships does not fit the dyadic and transactional Kraljic model on which the scorecard's are based. Open books are not used in these relationships. A possible explanation could be that these networks often appear in project forms or that the cost structure is too complex for open books to be effective. The ongoing evaluation of these relationships are to a large extent informal, where the scorecards and rating systems only function as a benchmark of the current development, but where the result does not matter since it is very complex to change supplier constellation during the project. After the project is conducted the networks are

evaluated internally in the company. Here, the scorecards play a great part when deciding whether to continue with the network members also in future projects or not.

6.5 Further analysis

As presented above we have found that there are clear differences on how the relationship type is influencing the choice of supplier accounting techniques, formal as well as informal. However, we have discovered that there are actual differences also within each relationship type. For example we have seen how one integrative relationship differs from another, and the used supplier accounting techniques vary in the same way. There is a large difference if you find yourself being a small customer in an integrative relationship purchasing a critical component as a motor from a strong supplier with strong bargaining power or if you have an equal in a supplier part-taking in your R&D. In the motor case the firm is very dependent on the quality and the delivery performance of this motor, but to the provider it might only answer for 0.1 % of their annual turnover, although the relationship demands a high organizational and technical interface from the purchaser's side. Here the transparency will be limited and there is no use of either Open Book Accounting or ABC-calculations or even disclosed costs. Although the SQP is conducted in a rigorous way and the scorecard and rating system keep track of quality, on-time delivery and co-operation aspects, the tools do not have the same authority in an integrative relationship where the purchaser is fiercely dominated and the supplier often are initiated by a market demand. The lack of ability to affect the supplier has consequences for what is included in the total cost calculations and what cost drivers that are found relevant. The quality department will not spend resources on a relationship where it is impossible to affect the supplier, and the strategic purchaser will focus more on lowering cost of logistics rather than price and costs stemmed from quality defects. It clearly shows, in line with Bensaou's (1999) findings, that the power factor in the relationship has a strong implication on how the relationship is perceived from both parties and what sourcing strategy and supplier accounting techniques that are used. The examples we have found in our empirical studies show that, regardless of whether the firm as an overall single- or multiple sourcing strategy, they are forced into a single source situation, with low market power. Sometimes it is possible to break-out of a situation like this by acquiring higher competence in-house to enable sourcing on a lower detail level. In most cases we have found that this is not possible, since the supplier possesses capabilities and core competencies impossible to gain in-house. Hence, these factors will have implications on what supplier accounting techniques that are used and how. We have also seen that the power dependence not always comes from external actors. In one of the studied LBU:s we found that they have been ordered by central management into an integrative relationship with an internal strategic supplier. The internal supplier has gained very strong bargaining power from the purchaser's inability to expose the supplier to competition. As a consequence no SQP, audits or price negotiations are made, and the transparency in cost information is almost non-existent. This at the same time as full open book accounting is used in the relationship in the connective relationship with an external provider of switchgears, where the power is more balanced.

In another integrative relationship, the firm might find itself in a very closely tied relationship with a strategic partner co-developing a new product, e.g. a contactor. This relationship is described as symbiotic and both firms are very integrated. Here, both companies find high transparency with open book calculations and a mutual work in combating relevant cost drivers as a common interest. As Håkansson and Lind (2004) also have shown, there is a broad contact surface where technical-, business-, relationship-, and time units at both firms are intertwined, have close contact and where an ongoing informal evaluation always is present. The SQP, scorecards and rating system are also in this case closely followed, but with a more balanced power relationship the results have a higher authority. Although, it is almost impossible to replace the supplier during an ongoing project the scores from the evaluation tools will have a big impact in the final project evaluation, where it is decided whether the relationship are to continue as integrative or not. The total cost definition will also be affected since factors such as innovation, network and time will play a larger role. Possible achievements if continuing this relationship in five or ten year's time is considered, and cost-benefits trade-offs are made.

The same differences are discovered in the transactional, facilitative and connective relationships, where different sub-archetypes can be plotted inside each relationship. There are large differences in being a large or small customer in transactional relationships. ABB monitors the firm's volume share of the supplier's total volume in order to neither be too small or too large. A facilitative relationship with a supplier delivering large scale of a commodity is very different from supplier's producing a customized designed low volume product. In the total cost calculations costs of long geographical distances, communication difficulties and culture differences are accounted for, often disabling low volume purchases and close integrative relationships with supplier's far away, although the price per item might be lower or core competencies higher. In large highly divisionalized corporations such as ABB and Atlas Copco, using the Kraljic Matrix sometimes gives supplier relationships that are hard to interpret. In facilitative relationships that are large in scope with hundreds of different items, sometimes scattered in all four areas in the Kraljic Matrix, or when several LBU:s, BU:s and divisions within the same corporation have contracts covering different item classes with the same supplier, the supplier relationship is not easy to define. Hence, the appropriate strategy and supplier accounting technique is also hard to determine.

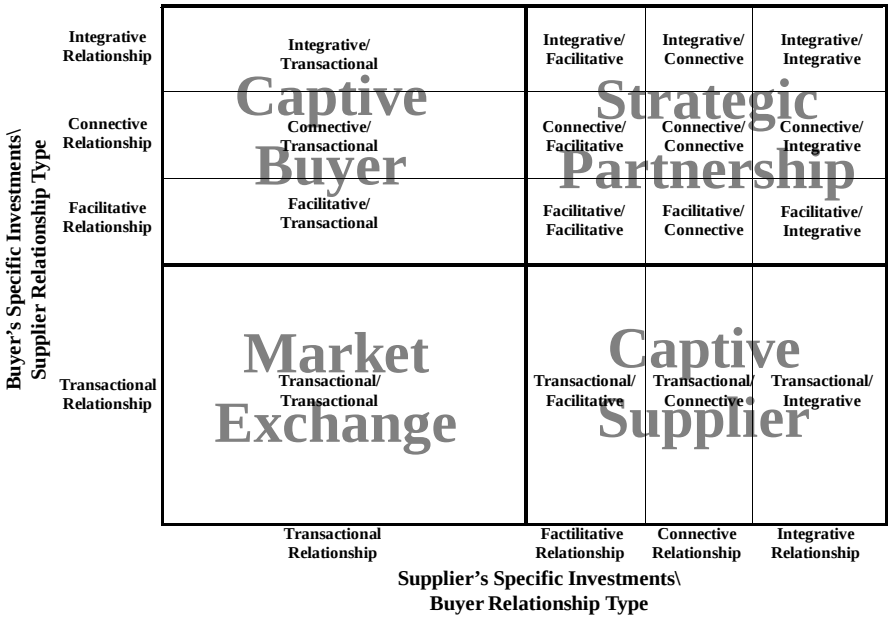
Among the connective relationships we have discovered two very different types. One type initiated by market demands not requiring a high organizational interface and one type of relationship to connected networks of supplier's developing system products. In line with Dubois and Pedersen's (2002) critiques of the Kraljic Matrix's transactional-based dyadic perspective, system products created by networks show that some purchased components are always subject to an ongoing joint development and that a dyadic perspective may cloak opportunities of enhanced productivity and innovativeness. This, since all parties are parts of networks and have other relationships that affect them as well as the performance of the system. Although, both firms' formally only takes a dyadic perspective on purchasing we have seen that informally, and maybe without the firms knowing it, the structural embeddedness described by Choi and Kim (2008) is a main variable for what network constellation that is used in integrative or connective relationships creating system products. A problem with the Kraljic (1983) Matrix might be that the development of these components are not made in a dyadic relationship but in networks, and that a relationship approach acknowledging a network perspective is required to classify these supplier relationship. The scorecards are constructed in conjunction with Kraljic's (1983) transactional and dyadic perspective only involving the first-tier supplier connected by two nodes and where this supplier is classified by the *item* it delivers. No formal parts in the SQP or the scorecards are taking network factors into consideration. The implication from this is that the evaluation techniques used becomes more subjective and open to the discretion of the strategic purchaser. As a consequence drivers of cost and innovation are not included in the formal evaluation system, and therefore are very dependent on the attentiveness and skill of the responsible strategic purchaser.

Conclusively, factors as the purchased items features and its strategic importance, the internal and external power relationships, the acknowledgment and assigned resources to the purchasing department, preferred sourcing strategy, supplier's heritage, track-record and structural embeddedness and especially technical and organizational resource interface towards them all impact the features of the relationship. The Lind and Strömsten (2004) Resource Interface Matrix captures many of these factors. However, it does not take the power dependence into account and it takes the perspective from only one part, either the supplier's interface towards the buyer or the buyers interface towards the supplier. Bensaou (1999) includes both perspectives and does take power into account but does not separate high or low tangible and intangible specific investments toward counterpart. The specific investments made which, argued by the authors of this paper, are the same in essence as having high or low technical and organizational interface. By not separating these two Bensaou (1999) misses a valid dimension that Lind and Strömsten (2004) captures as we have seen that there are large differences between e.g. facilitative, connective and integrative relationships where facilitative and integrative both have high organizational interface but connective relationships have not and where connective and integrative both have high technical interface but facilitative have not. In Bensaou's

model these would all have high buyer specific investments made, placing them in one of the two top boxes of the matrix, as either captive buyer or strategic partnership (Appendix A).

We argue that combined the Lind and Strömsten (2004) Matrix and the Bensaou Matrix (1999) cover all the most important factors of purchasing relationships. Hence, we suggest a combined model where Lind and Strömsten's four relationship archetypes depending on resource interfaces, or if you prefer counterpart specific investments, from both the buyer's and the supplier's perspective reveal the variations within the four relationship types discovered in the empirical section (Figure 4).

Fig.2 A Resource Interface Based Buyer-Supplier Relationship Portfolio Model



Bensaou (1999) classifies a relationship where the buyer and supplier both have made low specific investments as market exchange relationships. This means that both parties have low technical and organizational interface towards the other. Hence, a true market exchange will be when both parties perceive the relationship as transactional e.g. when a small customer buys small non-critical standard items from a supplier. When the buyer has made high specific investments and the supplier has not Bensaou (1999) classifies the relationship as a captive buyer relationship. Although, this means that while the supplier has a low technical and organizational interface towards the buyer, the buyer might have high technical *and* organizational interface towards the supplier or only *one* of the interfaces high, to be said to have high buyer specific investments. This gives three types of captive buyer relationships. A facilitative/ transactional relationship could be one where the buyer are buying a large scale of a commodity but are a relatively small customer for the supplier. A connective/ transactional relationship could be the supplier relationship Atlas Copco has with its GPS-provider. The buyer has to respond to a market demand by purchasing the GPS that is only a small part of the final product, but are such a small customer that it has to technically adapt to the supplier's standard. An integrative/ transactional relationship could be the one with the motor supplier at Atlas Copco, where URE is a very small customer, but the motor is the most critical component in the entire final product. All these three relationship have in common that it is the supplier that has the bargaining power, and that the buyer through its high resource interfaces, or commitments, are captives in these relationships.

The opposite situation occurs in the captive supplier area. Here the buyer perceives the relationship as transactional, while the supplier might perceive it as either facilitative or connective or integrative. A transactional/ facilitative relationship could be when the buyer is a large customer to a small supplier, hence receiving top priority by the supplier. A transactional/ connective relationship could be one when the buyer is a small customer and has designed drawings of a non-critical

component that the supplier is producing and needs for example a special machine for this. A transactional/ integrative relationship could be one similar to the previous, but where the buyer answers to a larger part of the supplier's revenue. In all these relationships the buyer has high bargaining power, due to the supplier's high resource interfaces.

The top right area is what Bensaou (1999) denotes as a strategic partnership. Here we have nine different combinations where it is likely that the power relationship is more balanced. Although the extent to which they are *strategic* might be very different. A facilitative/ facilitative relationship could be ABB:s relationship with its ball-bearing supplier where both are large customer and supplier respectively. Facilitative/ connective or facilitative/ integrative could be relationships where the supplier is producing a customized component answering to larger value. One connective/ facilitative relationship could be the LBU:s relationship to an external switchgear provider demanded by the market, where the LBU builds in the supplier's standard but also are the supplier's most important customer. An integrative/facilitative relationship could be Atlas Copco's relationship with its axis supplier, where the axis is as critical to the end product as the motor, but where Atlas Copco is a larger customer with a higher bargaining power. Whether these relationships are full strategic partnerships or not is open for discussion. But they truly have counterpart specific investments made by both parties different from in the previous mentioned non-strategic partnerships and the degree of integration is also different from the following.

The CPU supplier network at Atlas Copco could be described as connective/ connective relationships where some suppliers involved and Atlas Copco has to technically adapt to each others requirements. In this network the supplier relationship to the CPU developer could be a connective/ integrative relationship since the supplier develops the CPU hardware but where Atlas Copco is an important customer both financially and for innovation. An integrative/ connective relationship could be when the opposite occur. The most pure strategic partnership is then of course the integrative/ integrative relationship, such as the ABB LBU:s relationship to its old contactor supplier, where the companies are very intertwined, conducting R&D together and are extremely vital for each others continuous innovation. As Bensaou (1999) states, no relationship type is better than another, rather what is important is to use the most appropriate strategy and supplier accounting techniques for each relationship type. Therefore it is crucial to properly classify the supplier relationship after its unique features. It is our beliefs that the model in figure 4 brings forth the nuances of different supplier relationships which can be useful for helping firms achieving this task.

7. CONCLUSION

The aim of this paper is to investigate what supplier evaluation techniques that are used in different types of supplier relationships. The empirical findings support that a firm's supplier portfolio consists of various kinds of supplier relationships. In the study we have found eight supplier evaluation techniques that are used either before establishing a supplier relationship, during the relationship or after; the Supplier Qualification Process, Rating Systems, Scorecards, Total Cost of Ownership, Target Costing, Activity-Based Costing, Open Book Accounting, Disclosed Cost Data and Cost Tables, as well as Informal Methods. We conclude that different supplier evaluation techniques are used differently dependent on whether the relationships are transactional, facilitative, integrative or connective. These are summarized in Table 1 below.

The SQP involves similar actions across the two companies. Minor details differ but in general the steps are the same. They stand on common ground as regards to reducing the number of actions in transactional relationships. In transactional relationships the actions in the SQP that cover a supplier visit and audit are not included. The full SQP is run in all other relationship types. Another commonality that the two case companies have in regard to the SQP is that they are finalized at the purchaser's discretion, and suppliers are always evaluated on a case-by-case basis. This ensures flexibility as suppliers indeed look different and where in connective relationships the entire network has to be taken into account. The more financial impact the more stringent the SQP is. The rating system is a tool that exclusively is used at Atlas Copco. It has different roles in different types of

relationships. In transactional relationships the objective measures help the purchasers to sort out the good suppliers from the bad. In facilitative relationships the rating system is more important to rapidly spot problems to be dealt with before they cause large costs. In the integrative and connective relationships however, the rating system plays a minor role during a project, but the ratings is proven crucial in the project evaluation when it is decided whether to continue with a supplier or not. A scorecard is used at both companies. The notable difference is that Atlas Copco uses their scorecard on all types of supplier relationships. Also, their scorecard model is standardized and is entirely based on hard values making it strictly objective. The use of the information in the scorecard is different depending on the supplier relationship, and varies in the same way as in the rating system. ABB on the other hand only uses their scorecard in their most important supplier relationships. The explanation is that they are the suppliers to whom they should allocate their time, as it is with them ABB can create most value. ABB's model is not entirely standardized but uses one parameter that is set through discussions in cross functional teams. Thus, scorecards are used at both companies and they have many parameters in common even though there are some procedural differences. The scorecard used is not a Balanced Scorecard per se, as it measures the key drivers of cost only in the purchasing function. Although, purchasing costs have a large impact on profitability at both companies and the key drivers of purchasing costs could advantageously be included in the company's aggregated Balanced Scorecard.

Table 1: Summary of supplier evaluation techniques in different types of supplier relationships

	Transactional Relationships	Facilitative Relationships	Integrative Relationships	Connective Relationships
SQP	**Reduced**	**Full:** + informal parameters such as collaboration, processes	**Full:** + informal parameters such as location, culture, innovation	**Full:** + informal parameters such as network constellation, innovation, aftermarket
The Rating System (only Atlas Copco)	**Yes:** main purpose to sort	**Yes:** main purpose to rapidly spot problems	**Yes:** minor role during project but crucial in project evaluation *(main purpose)*	**Yes,** main purpose: minor role during project but crucial in project evaluation
The scorecard	Atlas Copco: **Yes** ABB: **No**	**Yes**	**Yes**	Atlas Copco: **Yes** ABB: **Maybe**
Open Book Accounting/ disclosed costs/ cost tables	**No**	**Unlikely** with open books, disclosed cost information is **preferred**	**Likely** with open books, disclosed cost information is **required**	**Unlikely:** is used in one case probably due to the power of ABB
Total Cost of Ownership	**Narrow:** freight, delivery costs, payment terms + some informal parameters	**Wide:** all formal parameters + informal parameters such as collaboration, processes	**Wider:** like facilitative + informal parameters such as location, culture, innovation	**Widest:** like integrative + informal parameters such as network constellation, innovation, aftermarket
Target Costing	**No**	**No**	**Yes:** mainly in connection with new product launches or very close collaborations	**Yes:** conducted ongoing during when projects
Activity-Based Costing	**No**	**No**	**Yes:** primitive ABC model, only used when transparency is high	**No**
Informal methods	**Minor role:** little interaction	**Moderate role:** relatively high degree of interaction	**Large role:** high degree of interaction	**Larger role:** interaction in the network

Open Book Accounting is found in facilitative, integrative, and connective relationships, but mainly within integrative relationships. The more integration, the higher trust and perceived fairness, balanced power relationship and the more win-win situation there are in a relationship, the more likely it is to find Open Book Accounting. There is also a scale as to how much information that is shared. Suppliers in facilitative relationships are more likely to supply cost tables than suppliers in transactional relationships and suppliers in facilitative relationship seldom work with open books. Open Book Accounting is cost sharing to the fullest extent; hence it is most commonly used in integrative relationships. The TCO philosophy is present at both companies and in all types of supplier relationships. At ABB total cost is formally defined while it is not at Atlas Copco. Nonetheless, both companies have at least informally defined measures that are used in evaluation. Another commonality is that the scope of the TCO philosophy is widened from transactional to connective. The TCO philosophy is present in all the formal methods of evaluation, the classification of suppliers and the

method that the companies go about dealing with these. It is found that parameters that are irrelevant in transactional relationships are vital in integrative relationships. Target costing is not used in transactional or facilitative relationships at neither company. When it comes to integrative and connective relationships, target costing is mainly conducted in connection to new product development. There are often discussions of different attributes, costs and implications of the different design options. No full ABC-model is found at the companies. However when there is a high degree of transparency purchasers make use of the open book information to perform calculations to identify the cost drivers. This is only found in integrative relationships as it is mainly in them we find the use of Open Book Accounting. We do not denote this an ABC-model since it is not fully and formally one, but the use of cost drivers and associated activities and costs are crucial parts of a proper ABC, hence we argue that it is in fact a primitive ABC-model. The varying degree of interaction in the different supplier relationships gives rise to an informal ongoing evaluation through e.g. frequent personal contact and cross-cultural exchanges. The informal methods play important roles in complex highly integrated relationships, such as integrative or connective networks, while transactional and facilitative relationships rely more on formal evaluation techniques.

Although, there are differences in the use of supplier evaluation techniques among the four relationship types, the empirical data shows that there are variances also within them. Factors as the purchased items features and its strategic importance, the internal and external power relationships, the acknowledgment and assigned resources to the purchasing department, preferred sourcing strategy, supplier's heritage, track-record and structural embeddedness and especially technical and organizational resource interface towards them, all impact the features of the relationship. In an attempt to explain the variances within the supplier relationships we introduce a model that combines the frameworks of Lind and Strömsten (2004) and Bensaou (1999), which takes a perspective including both how the buyer and how the supplier classify its buyer-supplier relationship. This reveals 16 different archetypes of buyer-supplier relationships that prove successful in explaining the discovered variances also within each relationship type. By revealing and fully understanding the features of all buyer-supplier relationships and their structural embeddedness in larger networks, a more holistic supplier evaluation system could be constructed. One that replaces many of the informal evaluations that are unintentionally and discretionally performed by individuals, but that if are not considered might have large impact on the firm's profitability and competitiveness.

8. SUGGESTIONS FOR FUTURE RESEARCH

The findings presented in this paper reveal some important conclusions that could lay the foundation for future research. Dubois and Pedersen (2002) explain the success of the Kraljic Matrix (1983) as it is fairly easy to understand and communicate partly because it gives practical guidelines for how to manage different purchasing situations, suppliers and/or supplier relationships. Research on what more precisely defines a firm's technical and organizational interface towards a counterpart would strengthen the applicability and acceptance of resource-based interface frameworks. Further, although our findings are supported by a large sample of supplier relationships they are all collected from only two firms. In order to support a generalization more case studies is therefore suggested. The empirical data exploited variances within each relationship type. In an attempt in explaining these variances a new model was introduced and proved successful. However, deeper research is suggested to test the validity of this model. Additionally, a similar study as the one conducted but by using the new resource-interface based portfolio model instead could be made to test our findings. Finally, more research on what variables that actually determines the features of supplier relationships is suggested.

9. REFERENCES

9.1 Theoretical sources

Axelsson, B. & Laage-Hellman, J. 1991. *Purchasing a management issue.* Stockholm: Mekanförbundets förlag

Axelsson, B. & Laage-Hellman, J. & Nilsson, U. 2002. Modern management accounting for modern purchasing. *European Journal of Purchasing & Supply Management*, Vol. 8, pp. 53-62

Bensaou, M. 1999. Portfolios of Buyer-Supplier Relationships. *Sloan Management Review*, Summer 1999, pp. 35-44

Bossert, J. L. 2004. *The Supplier Management Handbook.* 6th ed. Milwaukee: ASQ Customer-Supplier Division Quality Press

CIMA Official Learning System. 2006. *CIMA Certificate in Business Accounting: Fundamentals of Financial Accounting C2*, 2006 Syllabus. [pdf] Elsevier, Available at: http://books.google.com/books?id=6C9yT7ZrkmAC&pg=PA8&lpg=PA8&dq=cima+The+process+of+identification,+measurement,+accumulation,+analysis&source=bl&ots=HtI0MbG0ee&sig=II7IIaJb_GsBajG0jjZ6fO4Admw&hl=en&ei=BxcQSuOgLpiGsAbDhYyOCA&sa=X&oi=book_result&ct=result&resnum=1#PPP1,M1 [Accessed 2009-04-10]

Carr, C. & Ng, J. 1995. Total cost control: Nissan and its U.K. supplier partnerships. *Management Accounting Research*, Vol. 6, pp. 347-365

Choi, T.Y. & Kim, Y. 2008. Structural Embeddedness and Supplier Management: A Network Perspective. *Journal of Supply Chain Management*, Vol. 44, No. 4, pp. 5-13

Choi, T.Y. & Wu, Z. 2009. Triads in Supply Networks: Theorizing Buyer-Supplier-Supplier Relationships. *Journal of Supply Chain Management*, Vol. 45, No. 1, pp. 8-25

Cooper, R. & Slagmulder, R. 2004. Interorganizational Cost Management and Relational Context. *Accounting, Organizations and Society*, Vol. 29, No. 1, pp.1 -26.

Dekker, H.C. & Van Goor, A.R. 2000. Supply Chain Management and Management Accounting: A Case Study of Activity-Based Costing. *International Journal of Logistics: Research and Applications*, Vol. 3, No. 1, pp. 41-52

Dubois, A. & Pedersen, A-C. 2002. Why relationships do not fit into purchasing portfolio models – a comparison between the portfolio and industrial network approaches. *European Journal of Purchasing & Supply Management*, Vol. 8, pp. 35-42

Dyer, G. & Wilkins, A. 1991. Better Stories, Not Better Constructs, to Generate Better Theory: A Rejoinder to Eisenhardt. *Academy of Management Review*, Vol. 16, No. 3, pp. 613-619

Eisenhardt, K. 1989. Building theories from case study research. *Academy of Management Review*, Vol. 14, No. 4, pp.532-550

Eisenhardt, K. 1991. Building Stories and Better Constructs: The Case For Rigor and Comparative Logic. *Academy of Management Review*, Vol. 16, No. 3, pp. 620-627

Ellram, L.M. 1993. A Framework for Total Cost of Ownership. *The International Journal of Logistics Management*, Vol. 4, No. 2, pp. 49-60

Ellram, L.M. 1996a. Total cost of ownership. An analysis approach for purchasing. *International Journal of Physical Distribution & Logistics*, Vol. 25, No. 8, pp. 4-23

Ellram, L.M. 1996b. A structured method for applying purchasing cost management tools. *International Journal of Purchasing and Materials Management*, Vol. 32, pp. 11-19

Ellram, L.M. & Blancero, D. 1997. Strategic supplier partnering: a psychological contract perspective. *International Journal of Physical Distribution & Logistics*, Vol. 27, No. 9/10, pp. 616-629

Ellram, L.M. & Olsen, R.F. 1997a. A portfolio approach to supplier relationships. *Industrial Marketing Management*, Vol. 26, No. 2, pp. 101-113

Ellram, L.M. & Olsen, R.F. 1997b. Buyer-supplier relationships: alternative research approaches. *European Journal of Purchasing & Supply Management*, Vol. 3, No. 4, pp. 221-231

Gadde, L-E. & Snehota, I. 2000. Making the Most of Supplier Relationships. *Industrial Marketing Management*, Vol. 29, pp. 305-316

Glaser, B. & Strauss, A. (1967). *The discovery of grounded theory: Strategies of qualitative research*. London: Wiedenfeld and Nicholson

Hartley, J.F. 1994. Case Studies in Organizational Research, in *Qualitative Methods In Organizational Research: A Practical Guide*. London: edited by Cathering Cassel and Gillian Symon (1994), Sage

Hägg, I. & Hedlund, G. 1979. Case studies in accounting research. *Accounting, Organizations and Society*, Vol. 4, No. 1, pp. 135-143

Håkansson, H. & Lind, J. 2004. Accounting and network coordination. *Accounting, Organizations and Society*, Vol. 29, No. 1, pp. 51-72

Kaplan, R.S. & Atkinson, A.A., 1998. *Advance Management Accounting.* 3rd Edition. New Jersey: Prentice Hall International Inc.

Kaplan, R.S. & Norton, D.P. 1996. *The Balanced Scorecard: Translating Strategy into Action*. Boston: Harvard Business School Press

King, N. 1994. The Qualitative Research Interview, in *Qualitative Methods in Organizational Research: A Practical Guide*. London: edited by Catherine Cassel and Gillian Symon (1994), Sage

Kraljic, P. 1983. Purchasing Must Become Supply Management. *Harvard Business Review*, September-October 1983, pp. 107-117
Kulmala, H.I. 2004. Developing cost management in customer supplier relationships: three case studies. *Journal of Purchasing & Supply Management*, Vol. 10, pp. 65-77
Kulmala, H.I. & Paranko, J. & Uusi-Rauva, E. 2000. The role of cost management in network relationships. *International Journal of Production Economics*, Vol. 79, pp.33-43
Kvale, S. 1997. *Den kvalitativa forskningsintervjun*. Lund: Studentlitteratur
Lind, J. & Strömsten, T. 2006. When do firms use different types of customer accounting? *Journal of Business Research*, Vol. 59, pp. 1257-1266
Munday, M. 1992. Accounting cost data disclosure and buyer-supplier partnerships – a research note. *Management Accounting Research*, Vol. 3, pp. 245-250
Ryan, B. & Scapens, R.W. & Theobald, M. 2002. *Research Method & Methodology in Finance & Accounting.* London: Cengage Learning
Skjött-Larsen, T. & Schary, P.B. & Mikkola, J.H. & Kotzab, H. 2007. *Managing the Global Supply Chain.* Copenhagen: Copenhagen Business School Press and Liber
Taylor, S. & Bogdan, R. 1998. *Introduction to qualitative research methods: A guidebook and resource.* 3rd ed. Hoboken: John Wiley & Sons Inc.
Van Stekelenborg, R.H.A. & Kornelius, L. 1994. A diversified approach towards purchasing and supply. *IFIP Transactions. B, Applications in Technology*, pp.45-55
Yin, R.K. 1994. *Case Study Research: Design and Methods*. London: Sage

9.2 Annual Report

ABB Group, 2008. Opportunity in a world of change – The ABB Group Annual Report 2008. [Online] Available at: http://library.abb.com/global/scot/scot266.nsf/veritydisplay/119a07d88652b46ec1257577005f6f9a/$File/ABB%20Group%20Annual%20Report%202008_e.pdf [Accessed 29 April 2009]

9.3 Internal Documents

Atlas Copco. 2009. *"Documents"*
ABB. 2009. *"Documents"*

9.4 Internet sources

Atlas Copco. 2009. *Atlas Copco in Summary.* [Online] Available at: http://www.atlascopco.com/us/AtlasCopcogroup/ACinsummary/ [Accessed 29 April 2009]
Atlas Copco. 2009. Brief Description. [Online] Available at: http://www.atlascopco.com/us/AtlasCopcogroup/ACinsummary/briefdescription/ [Accessed 29 April 2009]
ABB. 2009. Our Business. [Online] Available at: http://www.abb.com/cawp/abbzh252/a92797a76354298bc1256aea00487bdb.aspx [Accessed 29 April 2009]

9.5 Transcribed interviews

Strategic Purchaser A, Underground Rock Excavation, Atlas Copco, 2009-03-27
Strategic Purchaser B, Underground Rock Excavation, Atlas Copco, 2009-03-27
Strategic Purchaser C, Underground Rock Excavation, Atlas Copco, 2009-03-27
Strategic Purchaser D, Underground Rock Excavation, Atlas Copco, 2009-03-27
Quality Engineer, Underground Rock Excavation, Atlas Copco, 2009-03-27
Supply Manager A, Automation Products Division, ABB Sweden, 2009-04-03
Supply Manager B, Automation Products Division, ABB Sweden, 2009-04-03
Supply Manager C, Automation Products Division, ABB Sweden, 2009-04-03
Supply Manager D, Automation Products Division, ABB Sweden, 2009-04-03

9.6 Telephone interviews

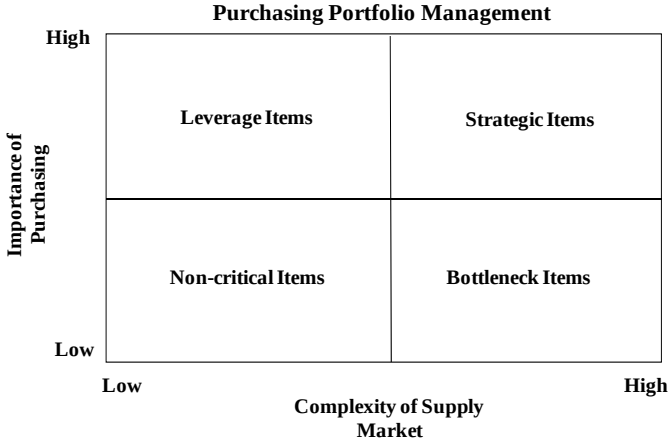
Strategic Purchaser A, Underground Rock Excavation, Atlas Copco, 2009-03-13
Supply Manager A, Automation Products Division, ABB Sweden, 2009-03-13

10. APPENDIX

10.1 The Kraljic Model

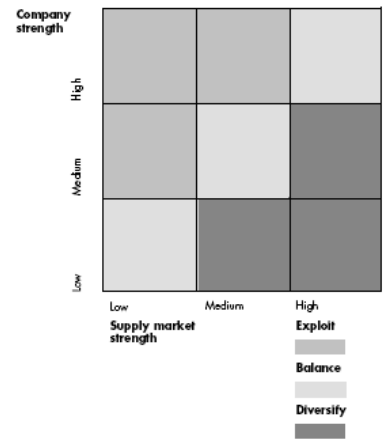
Kraljic (1983) introduced a method where acquired items are classified through a portfolio matrix (Figure 5). On one axis according to importance of purchasing (high-low), in terms of e.g. the value added by product line or their impact on profitability, and on the other axis supply risk (high-low), in terms of e.g. material scarcity, competition on supplier markets, logistics cost etc. The combination of the two axes results in four categories that each requires a distinctive purchasing approach. The item is denoted as non-critical, when the importance of purchasing and the supply risk both are low. Items are classified as leverage items when facing low supply risk but high purchasing importance, as bottleneck items for high supply risk but low purchasing importance, and as strategic items when both axes are high.

Fig.3 The Kraljic Model:
Purchasing Portfolio Management



After the classification the company weighs its bargaining power against those of their suppliers. Then the company positions itself strategically in the purchasing portfolio matrix (Figure 6) with regard to the items classified as strategic dependent on the power relationship between the buyer and supplier. The nine cells in the purchasing portfolio matrix correspond to three basic risk categories. For strategic items where the buyer is considered as strong and suppliers as medium or weak an aggressive strategy is suggested (*exploit*) for achieving favourable pricing and contracts, but with enough care so it does not jeopardize long-term supplier relationships. On strategic items where the buyer is weak and the supplier is strong or medium the suggested strategy is more defensive (*diversify*), where the acquirer should diversify the supplier base, integrate backwards or increase spending on supplier relations. For strategic items with neither apparent risk nor benefits a defensive strategy could be costly or too careful, while an aggressive strategy could damage supplier relations. For these relationships a *balanced* strategy is recommended (Kraljic, 1983).

Fig.4 - The Purchasing Portfolio Matrix



10.2 The Bensaou Model:

The Bensaou (1999) portfolio model is presented with buyer's specific investments on one axis and supplier's specific investments on the other (Figure 7). Economists denote these investments "credible commitments" or "hostages" while practitioners refer to them as "real commitment". Buyer's specific investments could be tangible investments, e.g. buildings or equipment dedicated to the supplier or in adaptations of products or processes to the items purchased from the supplier. It could also be intangible investments, in terms of people, time or effort spent learning the supplier's routines and business practices. Supplier's specific investments could be tangible, e.g. warehouses, specialized facilities or adaptations to the buyer's products, or intangible investments, as guest engineers, time spent or inter-organizational information systems. This results in four types of relationships. When both parties make low investments the relationship is denoted as a market exchange, where each partner can turn to the marketplace and switch counterpart at low cost. When the buyer makes large specific investments and the supplier does not the relationship is characterized as an asymmetric one of a captive buyer and a free supplier that easily can shift to another customer. When the supplier makes large specific investments and the buyer does not the relationship is the opposite with a captive supplier and a free buyer. The last case where both parties make large specific investments is denoted as a strategic partnership. Bensaou (1999) concluded that there are no general performance differences among the four cells, i.e. no relationship is better than another; hence what is important is to match the optimal type of relationship to the various product, market and supplier conditions as well as to adopt the appropriate management for each type of relationship (Bensaou, 1999).

Fig.5 The Bensaou Model:
Portfolio of Buyer-Supplier Relationships