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Cost Rationalization and Value Creation in Product Development at Ericsson BNET

Utilizing the approaches of Design to Cost and Should Cost

Master of Science Thesis in Supply Chain Management

ALEXANDER DAMLIN

DAVID SUNDQUIST

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Abstract

In order to remain competitive firms needs to integrate more functions and stakeholders in their product development. Ericsson has during the last decade begun to face fierce competition from Asian competitors in their core markets, increasing the need to create value and reduce cost throughout the whole end-to-end process. In order to meet this competition Ericsson is interested in the two approaches Design to Cost and Should Cost. The first of the two approaches, Design to Cost, is an approach focused on adding more value and reducing cost in the development process by assessing the core costs of design factors such as functionality, specifications, concept and manufacturability. The second approach, Should Cost, focuses on breaking down the cost structure of a supplier before purchasing in order to get the right cost from the start.

The aim of this thesis is to analyze how Design to Cost and Should Cost can be used in the product development process and the purchasing process at Ericsson in order to add value and reduce cost for both existing and new products. An abductive approach was used to perform a case study at Ericsson BNET in Mölndal in order to investigate how relationships, processes and cross-functional collaboration can be adapted to get the most out of the two approaches.

The analysis uses theory on Strategic Cost Management, Total Cost of Ownership, interaction, value engineering, product development and purchasing to analyze Design to Cost and Should Cost in relation to the processes and mindset at Ericsson BNET.

The thesis concludes that Ericsson has many aspects to consider in order to enable successful usage of Design to Cost and Should Cost. The major initiatives suggested involves focus on reducing silo thinking, enable cross-functional work earlier in the development process, adapting the sourcing process to enable better fit of Should Cost and start considering cost from a Total Cost of Ownership perspective instead of only focusing on price and other visible costs. In addition to this the analysis focuses on Ericsson's approach to suppliers and how Should Cost can contribute to better partnerships with suppliers and how Design to Cost can contribute to introducing better customer focus in the product development at Ericsson.

The discussion criticizes whether the use of Design to Cost and Should Cost are the most suitable concepts to work with for Ericsson or if additional initiatives are necessary to be able to work successfully with Total Cost of Ownership.

Keywords: strategic sourcing, product development, cross-functionality, Design to Cost, Should Cost, value engineering, Total Cost of Ownership, value creation, cost reduction, Strategic Cost Management

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Gothenburg, June 2013

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Alexander Damlin   David Sundquist

Table of Contents

List of Figures

1 Introduction

In this chapter an introduction to the thesis will be presented. The chapters start off with a background to the scope including a short description of Ericsson, the company in focus in this thesis, first from a broader perspective then moving on into detail. The result of the background is the purpose for the thesis which is presented at the end of this chapter.

Ericsson is a world-leading provider of telecommunications equipment and services to mobile and fixed network operators. Over 1,000 networks in more than 180 countries use Ericsson network equipment, and more than 40 percent of the world's mobile traffic passes through Ericsson networks. Eriksson's vision is to be the prime driver in an all-communicating world (www.ericsson.com, 2013).

To reach this vision a main target for Ericsson is to keep striving towards technology leadership by continuously grasping opportunities to add value in all functions. As the international competition in the telecommunications Industry hardens with tough competitors especially from Asia the need to reduce cost and add value is one of the largest challenges for Ericsson in order to pursue its goal of technology leadership.

Ericsson AB is structured in three Business Units: Global Services, Support Solutions and Networks. In this research focus will be on Business Unit Networks, BNET for short. BNET is responsible for the development and delivery of mobile and fixed networking solutions.

To support their strive towards technology leadership, Ericsson has introduced a Lean & Agile initiative. This initiative has led to focus on value flow which, for strategic sourcing, has led to focus on value adding activities and getting the right price for their purchased parts from the start. Two approaches that have emerged through this initiative are Should Cost and Design to Cost. Should Cost focuses on obtaining knowledge of the actual price of the product before purchasing in order to get a better negotiation position and map the "best-case" cost structure of the component. Design to Cost breaks down products in the design phase to their core costs to enable reduction of features that has no clear value addition to the customer.

Gadde and Persson (2004) describes what they refer to as "the revolution of purchasing" as a reorientation involving four major changes during the last decades, one of the most important ones being how the role of the purchasing function is being perceived. While before being regarded mainly as an administrative function, purchasing is now considered a strategic function for companies. The reason for this can be related to the ever-increasing part of the total cost for purchased goods and services.

Evans (1994) also addresses the importance of aligning the purchasing process in accordance to the stakeholders' need as well as the overall corporate strategy in order to remain competitive in an ever-changing market. With this in mind it is especially relevant to assess the purchasing function in the Lean & Agile initiative in order to enable significant cost reductions in Ericsson's IP and Broadband unit. A problem that Ericsson has encountered due to negotiations for major annual cost cuts is that the suppliers compensate for these expected cuts by increasing their initial prices.

Working with Should Cost from a purchaser's perspective gives a great possibility to improve the negotiation position a purchaser has. When knowing the Should Cost of a product there is a possibility for the purchaser to negotiate on what margin the company selling should have instead of only looking at the price in comparison to other similar products. This information can also be used to help the supplier optimize its cost structure and thereby reduce total supply chain cost.

When introducing an approach such as Should Cost it is important that the performance measurements is changed accordingly so that Ericsson do not keep setting goals on large annual cost reductions for products when a fair initial price already has been set. van Weele (2010) addresses the importance of aligning measurement with purchasing performance and emphasizes the important difference between cost reduction and cost avoidance. Cost avoidance, which is defined as: "the variance between the historical and the actual purchase price per unit" is not considered to be sustainable whereas cost reduction is sustainable in character and should be the aim for a purchasing department to work towards. Examples of cost reductions is change in specification or omitting unnecessary quality requirements, which both can be seen as the goal for the approach Design to Cost. Having this in mind, the approach of Design to Cost can be directly related to cost reductions.

van Weele (2010) argues for price being one of the most important elements in the purchasing decision since increases in material prices cannot always be passed on to the customer. Purchasing price is ultimately the result of environmental factors, both internal and external. Industrial salesmen will attempt to hide their cost structures since it is in their interest that this information remains obscure to the buyer. van Weele (2010) goes on emphasizing the need to constantly and systematically gather information that will yield insight into the seller's pricing methods and cost structures. With these insights in mind it is important to know the cost structure in order to make sure that the price is fair. Today, Ericsson has yearly negotiations about price with their suppliers and the goal with these are, from Ericsson's side, to cut the purchasing price with 10-15 percent. This can result in a price that starts of high, because the supplier knows cost cuts are coming, and ends up at a level that is lower than what is healthy for the supplier. Should Cost provides insight in the supplier cost structure and this enables Ericsson and the supplier to negotiate a "right-price" from the start and subsequently work together for healthy cost reductions for both Ericsson and the supplier.

To make the development process at a company efficient it is important with close collaboration with both different internal functions and external suppliers. One of the internal functions that handle the relationship with the suppliers is the purchasing function. The aim of this thesis is to analyze how the two approaches of Should Cost and Design to Cost can be used in the product development process and purchasing process at Ericsson in order to add value and reduce cost for both existing and new products. Ericsson's expected outcome of this thesis is an engagement model, a model that shows where in the existing development processes Design to Cost and Should Cost can be applied.

2 Theoretical framework

In this framework the theory that is used to make an analysis and reach the purpose of the thesis is presented. The framework begins with a description of modern purchasing, its role, challenges and relevance. This will provide a background to purchasing's role in a company and its influence on the product development process. An investigation of recent theory around cost is then presented, including subjects such as TCO and Strategic Cost Management. Further on the value of an enabling organization is discussed. The value of looking across company boarders is discussed in the Strategic Cost Management section and then further emphasized in the Interaction section. The section on Value Engineering gives an understanding of the latest methods in cost efficient product development. Lastly, the building blocks of the framework are connected to one another in the problem analysis, resulting in a breakdown of the aim in the form of research questions built upon the theoretical tools provided in this chapter.

2.1 A Background to Purchasing

Purchasing is not what purchasing used to be. Today, purchasing is seen as a strategic function (Gadde & Håkansson, 2001) and is widely recognized by managers as a key business driver (van Weele, 2010). Traditionally purchasing was considered as a clerical and administrative function with the task of buying in what others had specified (Gadde & Håkansson, 2001). There are several reasons for the increased significance and attention that purchasing has gotten. One is that purchased material often represents a dominant part of the total cost for a company (Dubois 2003; van Weele, 2010) and thereby a major potential for cost reductions. Another is that the attitude towards suppliers have changed from something a company needs to get their components to something that can significantly contribute to a more efficient business by finding win-win solutions and in the end add value to the company, thereby directly influencing the revenue side (Gadde & Håkansson, 2001).

It is not just the economical side of a company that can gain from a closer collaboration with suppliers. The design process can also improve by involving suppliers early in the design process. By doing this the company can receive valuable technical knowledge input in order to reach better designs both from a functional and a financial perspective (Gadde & Håkansson, 2001). It is of relevance to understand the current characteristics of purchasing in order to be able to assess the potential of future rationalization.

How a company interacts with a supplier depends on a variety of factors, one of these is how the buyer intend to outsource its products or components. van Weele (2010) describes two basic types of outsourcing, *Turnkey outsourcing* and *Partial outsourcing*. When a buyer elects to apply turnkey outsourcing, the supplier takes responsibility for the entire function or service. When it comes to partial outsourcing the buyer still has responsibility for some of the activities and coordination between them. One example of this can be the development of a component. In partial outsourcing the buyer might elect to design the component and outsource the production. In the case of turnkey outsourcing the supplier would deliver a product in accordance with the buyers' requirements for function and quality. Turnkey outsourcing results in a limited influence over the cost structure and

the price but on the other hand the buyer has a minimum of responsibility for the outsourced process.

2.1.1 The roles of purchasing

According to Gadde and Håkansson (2001) the strategic roles of modern purchasing can be divided into two major fields: rationalization and development. The rationalization role can in turn be divided into three different areas of rationalization. The first one is to find out what needs to be purchased. This part requires cross-functional cooperation in order to find out what to buy and what to make as well as specification of the purchases. The second type of rationalization is that of logistics. Initiatives in this area often include optimization of distribution centers, material handling, deliveries, transportation, etcetera. The third area of rationalization concerns administrative routines. The goal here is to find effective routines to handle huge number of transactions to secure long-term efficiency.

Gadde and Håkansson (2001) further states that the development role of purchasing is interesting due to the fact that suppliers may have great possibility to provide technical knowledge to the company. The trend of greater specialization within industry has increased the importance of utilizing supplier competence as a way to optimize technical development. Since purchasing often is the function with closest relationship to the suppliers there is a need to include purchasing early in the design phase in order to enable utilization of supplier knowledge as well as rationalize the design process through shorter lead times.

2.1.2 Challenges in purchasing

According to Gadde and Håkansson (2001) as the significance and role of purchasing changes, the importance of different issues in purchasing changes. These issues are most often in direct relation to the strategic orientation of the buying firm. With new issues as a result of a changing orientation, new challenges arise. The challenges in purchasing can be divided into two major fields: Challenges in cost reduction and challenges in development and innovation.

Gadde et al. (2010) argue for the relevance of seeing beyond a single purchase and beyond price since that single purchase is related to other transactions over time. Ferrin and Plank (2002) describe this as the reason for the increased popularity of the total cost approach. Gadde et al. (2010) claim that the approach the buyer has also affects the cost for the counterpart. With this in mind, collaboration with the supplier, for example in the design phase of a new product, will be able to lead to lower cost for both parts and thereby win-win solutions. Manufacturing costs and development costs are two costs which can be reduced with this collaborative effort.

Gadde et al. (2010) promote the analysis of total cost to be performed jointly with suppliers and state that this can open up opportunities for improvements for the buyer. These efforts are all part of the strategic effort of rationalization. Rationalization in purchasing includes all the daily work performed to decrease cost over time. These efforts all require active involvement of suppliers.

An important role for purchasing when it comes to rationalization is to specify what supply is needed. This includes the choice on whether to make or buy but also the important work of formulating the requirements for the components, systems or services that are to be purchased. In

order to reach increased effectiveness in these efforts cooperation with other functions such as R&D and Production can increase awareness of the offers of different suppliers.

Another important role for purchasing when working with rationalization is to look into administrative routines. The cost of handling a purchase order can range from anywhere between 20 USD for simple products to up to 150 USD for complicated products. With this in mind, considering large companies with millions of transactions per year it is of significant importance to find effective routines to handle huge amounts of transactions instead of optimizing a single purchasing decision (Gadde et al., 2010).

With the trend of specialization the role of suppliers has changed. Some suppliers should be regarded as important resource providers of technical development and innovation in the buying firm. When it comes to the strategic role of development within purchasing the capabilities of suppliers is one of the most important areas in which rationalization can take place. Since up to 80% of the total costs of a product are determined in the design phase it is important to coordinate internal R&D activities with those of suppliers as early as possible. Early involvement may also speed up the process of development and thereby shorten lead times (Gadde et al., 2010).

Monczka and Morgan (2000) present a list of the six most critical issues related to purchasing and procurement. This list is based on an analysis of the environmental factors affecting purchasing and is presented here:

1. Increasing efficiency requirements
2. Making use of information technology
3. Integration and consolidation
4. Insourcing and outsourcing
5. Strategic cost management
6. Network management

Monczka and Morgan (2000) argues that the most important issue of the list is Strategic Cost Management with the motivation that most companies only assess the "top of the iceberg" when it comes to where actual cost resides and which cost drivers are considered.

2.2 Total Cost of Ownership

As previously mentioned by Gadde et al. (2010) the focus of purchasing has switched from focusing on price and single purchases towards more total cost focus. The practice of Total Cost of Ownership or TCO is, according to Ellram (1995), one way to work with a total cost perspective which is considered key aspect in business today.

The practice of Total Cost of Ownership (TCO) differs from the traditional approach to supplier selection and evaluation. TCO not only regards the external cost, the price played for the product, but incorporates the cost for the entire transaction and life-cycle cost of the product or service being purchased (Ellram, 1995). The goal of TCO is to identify the true cost associated with an activity, this may include cost assosiated with quality inspections, dealing and communicating with the supplier, maintenance, shipping and other costs not associated with the purchasing price (Ellram & Siferd, 1993).

This results in a complex method with several different costs that can be taken into consideration. When using TCO it is up to the purchasing organization to determine what costs are the most important to consider and use them for their evaluation (Ellram, 1995). To structure these costs Ellram & Siferd (1993) divides them into six diffrent categories, as illustrtated by Figure 1 below.

Figure 1 - Aspect of Total Cost of Ownership. Extracted from Ellram & Siferd (1993) p. 166

Figure 1 above describes the different aspects of TCO and gives some examples in each category. When performing the analysis many different methods exist, this is due to the broad spectrum of the concept and the variety of the situation in which it can be used. Two main categories can be identified; First, focus can be on direct cost associated with the purchase. Here, costs are tracked down and allocated to the purchased product. While the method itself is fairly complex the results are straight forward and relatively easy to understand and explain. The second cluster of methods is the Value based approaches. These approaches are generally more complex and their aim is to combine cost data with other performance data. The complexity comes from combining qualitative and quantitative data. To keep the complexity down they tend to focus on a small number of major cost issues (Ellram, 1995).

The purposes of the TCO analysis can be several. It can be used as a tool in the supplier selection and sourcing decisions. When purchasing a product it is important to consider not only the purchasing cost but also other cost associated with the supplier. It is not always the case that the supplier that provides the lowest price is the most preferable to use (Ellram, 1995). Another purpose can be to measure the performance of an existing supplier. This evaluation can then be used in negotiation purposes or to identify and drive supplier improvements (Ellram, 1995).

One part of the total cost is the cost for purchasing the product. An analytical tool that relates to this cost is the Should Cost analysis. Should cost is a method of using external information to construct a suppliers cost structure for a certain product being purchased. This is done by using estimates for the key cost aspects of a product or service. When shared with the supplier this important data can be the basis for information sharing and greater understanding of cost structures. (Ellram, 1996)

This method can be quite complex and time-consuming to perform and it is after all an estimate of the actual cost (Ellram, 1996). However, it does not have to be performed on all product and even if all cost structures of the item or service being purchased are not identified the results can be valuable. According to McDuff (2001), approximately 20 percent of the products represent 80 percent of the cost and this means that the resources for the Should Cost analysis can be concentrated on a smaller selection of products. The same is true for the cost analysis itself. About 80 percent of the cost comes from 20 percent of the cost driver so all cost drivers do not need to be identified as long as the most substantial ones are assessed.

2.3 Strategic Cost Management

According to van Weele (2010) in order to manage all costs, both internal and external, the concept of Strategic Cost Management was introduced. This concept broadens the focus to stretch outside the company's boundaries in order to achieve cost rationalization for the entire supply chain, which according to Dubois (2003) is necessary in order to not just move cost from one actor to the other but make sustainable cost reductions for the end customer.

van Weele (2010) describes strategic cost management as *"the identification of all costs, cost drivers and strategies aimed at reducing or eliminating cost throughout the supply chain"* (van Weele, 2010, p. 192). Concepts such as cost models and value stream mappings are useful in order to enable successful work within this area.

Dubois (2003) discusses strategic cost management across the boundaries of the own firm and thereby in accordance to van Weele's definition. The discussion is focused on costs of purchasing and the possibilities for rationalizations in the supplier base. Dubois (2003) argues that the number of suppliers are the major cost driver in purchasing and motivates this by focusing on the lack of possibility to perform sustainable cost rationalizations with multiple sourcing strategies due to lack of understanding for the major cost drivers for that many different suppliers. Therefore, the reduction of the supplier base is considered a prerequisite to enable cost rationalization.

Dubois (2003) thereby goes against researchers in favor of the portfolio models and a differentiation on the desired involvement with each supplier and claims that, since the major cost driver is the number of suppliers, to stimulate competition among suppliers and work with internal cost rationalizations would be futile work since the major cost driver cannot be assessed. Instead Dubois (2003) argues for the importance of continuous joint learning about one's counterparts cost structures in order to reach extensive cost rationalization.

2.4 Organizing for product development

The rise of the contribution of purchasing to corporate success and the importance of interaction with suppliers relates to that now, more than ever, a great number of the resources and knowledge needed for future success lies outside the company (Luzzini & Ronchi, 2011). The purchasing or supply function can be the interface between internal and the increasingly important external functions (Dubois & Wynstra 2005). One area where the purchasing function can add value is in the product development (Mascitelli, 2007).

To be highly efficient in new product development can be a greatly effective strategy for a company and at the core of this strategy are the teams working with the development process. The objective of these teams is to understand information from diverse sources such as the market, technology, competitors and resources and from this information create a successful product (Valle & Avella, 2003). Having access to good external communication and being able to make use of it is a key success factor in product development (Williams & Smith, 1990).

The diversity of the input has resulted in the cross-functional team being one of the most popular ways of organizing the new product development (Valle & Avella, 2003). As implied by its name a cross-functional team is combined by resources from several different functions within a company. The result of this is a team that has a better opportunity to understand and make use of information from different sources and therefore function with higher productivity (Mascitelli, 2007). The cross-functional teams can be structured in different ways and make use of different functions within the company. In many cases the teams consist of persons from functions directly involved in the development, such as engineering, design, manufacturing and different areas of technical expertise (Mascitelli, 2007). This is important to make the actual development process run smoothly.

If one function within the company becomes isolated, a so called functional silo, some of the benefits of the cross-functional team is lost. Therefore, it is important to find these functional silos and incorporate them in the rest of the development process (Mascitelli, 2007).

The cross-functional nature can contribute even more value to the company if it incorporates more of the supporting functions (Valle & Avella, 2003). One function that has much to contribute and whose role should be incorporated in the development process is the purchasing function (Williams & Smith, 1990; Nijssen et al., 2002).

The purchasing function can contribute with its traditional function early in the process, for instance with aiding in selecting parts and products with a sourcing perspective in mind. A purchaser can also help reduce the cost of the final products by having the total cost for purchased products in mind (Nijssen et al., 2002). Involving the purchasing unit early also means that they can start their work on the new product introduction early. This can shorten the lead time as the purchaser can work parallel to development and have everything ready by the time the product is ready for release. As a result, the time to market can be reduced and the product introduction can run more smoothly (Nijssen et al., 2002).

But the purchaser can contribute with other information as well. The work of a purchasing manager is to its nature cross-functional. They come into contact with different functions within the company but they also have contact with suppliers and customers. This means that they can obtain

information about trends in the industry, new technologies and customer needs, all of which can be useful when designing a new product (Williams & Smith, 1990).

Nijssen et al., (2002) has discovered that, in the investigated companies, the ones that had an early involvement from the purchasing function in the development of new products had a signifacntly higher success rate of the new products, in terms of both sales and profit. The purchasing function was involved in different ways, sometimes it was a member of a cross-functional development team and sometimes it acted as a supporting function for these teams. In both cases the purchasing function seemed to have a positive impact on the development process and it could not be concluded that one method was better than the other, as long as the purchasing function was involved the results were more satisfactory.

2.4.1 Stage-gate development

In order for different functions in the company to cooperate the organizational environment needs to facilitate cooperation (Mascitelli, 2007). One way of accomplishing this in the development process is to clearly structure the process and create engagement points for the different functions. By implementing a stage-gate system a company creates engagement points that can work as decision-making forums for the new development project.

The stage-gate system is a way of dividing the development process into a pre-determined set of stages, composed of a number of prescribed activities (Cooper, 1990). These gates work as a "road map" for the projects and as gates with demands that need to be met by the project in order to be allowed to continue (Hart et al., 2003). The gates seperete different stages of the development process, and their position can be adapted to fit specific companies. The example in Figure 2 originates from Mascitelli (2007) and is described by him as a generic example of the process.

| Gate 1 | Gate 2 | Gate 3 | Gate 4 |

Concept/Planning → Design → Prototyping → Execution → Verification
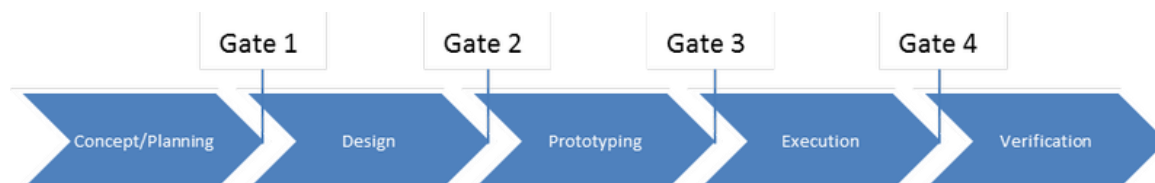
Figure 2 - An example of the stage-gate process derived from Mascitelli (2007)

The process described in Figure 2 explains how the gate process can be implemented in the development process. In order to pass from the concept phase the projects need to stand up to certain criteria aimed at making sure that it has the potential for becoming a successful business case (Mascitelli, 2007).

Making use of the gate model inherently results in a strong quality focus, something that is lacking in many new product development programs (Cooper, 1990). The gates can be compared to quality control inspections in a production line, something that is common in production but rarer in development projects (Cooper, 1988). Resources in the new product development are important and it is crucial that they are allocated where they have the best opportunity to produce a successful product. Therefore, it is important with continuous evaluation of the development projects, this is built in to the gate development process because a project cannot pass a gate without passing the

evaluation criteria for that gate (Cooper, 1990). The gates also make sure that no crucial steps in the development process is omitted, that the goals and deliverables are set for the next gates and that an action plan to reach these goals are agreed upon (Cooper, 1990). The decision on whether a project has fulfilled the criteria for passing a gate is made by a cross-functional decision council (ibid).

Cooper (1990) argues that the pre-development phase in any development project is crucial to its success. In his study it was concluded that, on average, a successful product development spent twice as much money and nearly twice as much man hours on the pre-development stage. This phase is important because it answers questions key for the project's success. The questions regard the economic validity of the project, who the intended customer are, what differentiates the product as a winner on the marketplace and how the product can be developed at the right cost (Cooper, 1988).

Another advantage of the gates are that they provide an interaction point between different functions in the company (Mascitelli, 2007). When the project reaches a gate, input from several different functions can be put forward and it can be discussed how each function can continue to contribute value to the project (Cooper, 1990). This forces the functions to cooperate and makes sure that no functions are overlooked or left behind. This becomes a structural and formal way for the functions to cooperate and aid in the transition from functional silos to a more cross-functional way of working (Mascitelli, 2007).

2.5 Purchasing performance

Gadde & Håkansson (2001) state the importance of correct measurement by a known quote: *"what is measured will be done"*. Further, they emphasis the value of looking and measuring beyond price with the motivation that hidden costs can account for 250% of the visible ones which relates back to the importance of TCO mentioned in section 2.2. Some of the costs that can be affected by purchasing are production costs, storage costs, supplier handling costs, development costs and administrative costs.

According to Trent and Monczka (1998) the most important strategic factor for any buying firm is to achieve the *"absolute linkage of sourcing, purchasing and the supply chain – to the financial plan or the economic-value-add contribution of the business"*. In other words, aligning objectives between functions in order to reach synergies.

Numerous benefits can be derived from measuring performance in purchasing; Decision-making might be better through analysis of variances from the planned result. Communication between functions can get better by measuring relevant aspects. Visibility will increase and problems can be assessed instead of ignored. Measuring performance will enable feedback both on personal and group level as well as lead to the recognition of purchasing as a function. Measurement can also work as a motivator for buyers to constantly do better (van Weele, 2010).

van Weele (2010) states that in order to be able to choose how and what to measure it is important to define what purchasing performance is. Purchasing performance can be seen as the outcome of two elements: purchasing effectiveness and purchasing efficiency. Uniting these to definitions purchasing performance can be defined as: *"the extent to which the purchasing function is able to*

realize its predetermine goals at the sacrifice of a minimum of the company's resources, i.e. costs." (van Weele , 2010, p: 305).

According to van Weele (2010), how a company measures purchasing activities is greatly influenced by how management looks upon the role of purchasing in the organization. If purchasing has an operational role only very quantitative parameters will be used such as order backlog and number of orders. The more strategic the purchasing function is considered the more significant and qualitative the measures will be. In a strategic purchasing function focus will be on make-or-buy strategies, Should Cost analyzes, supplier involvement, revenue contribution from suppliers and supplier base reduction etc.

2.6 Interaction

Gadde & Håkansson (2001) argues for the relevance of interaction between functions in a company as well as the interaction between companies. Ford et al. (2008) argues that the core of business got more to do with what happens between companies than what happens within a single company. Industrial Marketing and Purchasing (IMP) research have concluded that interaction between companies form and define business activities, resources and actors. This conclusion makes interaction a core aspect in business development.

Traditional economic research sees interaction as a generalizable mechanism between independent actors (Wilk, 1996). IMP research, on the other hand, suggests that interaction is far from generalizable and simple, and this is especially true for interaction that is said to have substance. Substantive interaction always affects the people involved in it and it always has a cost for the actors involved. However, the likelihood that the benefits will be worth more than the cost is always high which forces company to interact with others in order to remain competitive (Ford et al., 2008).

It is important to have in mind that interaction almost never affects only two companies since the interaction between these two companies are likely to affect the next interaction both companies has. Therefore, the processes of interaction are connected through a network which will lead to changes in activities and resources across several organizational boarders continuously. In fact, interaction seems to be the most influential mean to systematically relate and combine resources and activities between companies. Interaction is said to form the working structure for the network and may promote change and dynamism in companies as well as cooperation and stability between companies (Ford et al., 2008).

Håkansson and Ford (2002) state that despite all the possible gains from interaction there are those interactions that will involve more cost than benefits for one or both the companies. Buttle and Naude (2000) state that it is often difficult to know beforehand which interactions may prove to be profitable and therefore the company need to engage in a large number of transactions in order to find those that are worth developing further. Ford et al. (2008) state that the continuous interaction with other companies provides stability in an unpredictable world influenced by unknown factors. Due to this, interaction can be seen as working both to stabilize a company as well as to make it more dynamic.

According to Ford et al. (2008) there are three different way of conceptualizing interaction. The simplest is that of exchange where, as seen in Figure 3, the interaction is of no relevance to the outcome. The typical interaction is seldom as simple as this.
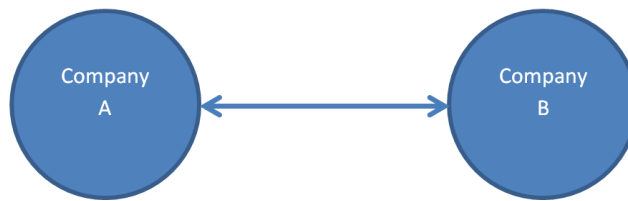
A more realistic description of interaction is shown in Figure 4. In here the spiral in the middle constitutes the process of interaction and is a unique content directly affected and developed by both parties but not fully controlled by either of them. The characteristics of all products, services, deliveries, developments and payments between the two involved parties are all formed and determined by this unique interaction. The arrows away from the spiral represent the interpretation and assessment of the current process and the arrows into the spiral represents the company's reaction and approach to the process.
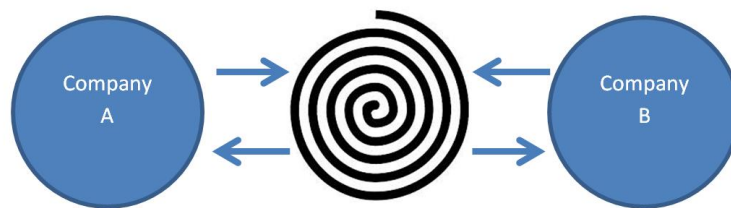
Figure 4 - Interaction between two companies (Extracted from Ford et al. (2008), p. 86)

To increase the complexity further the input to each company is seldom limited to the interaction process of only one company, as previously mentioned. Figure 5 shows that the assessment of interactions with other companies will also affect the input to the process in focus, making the interaction process even harder to anticipate and control.
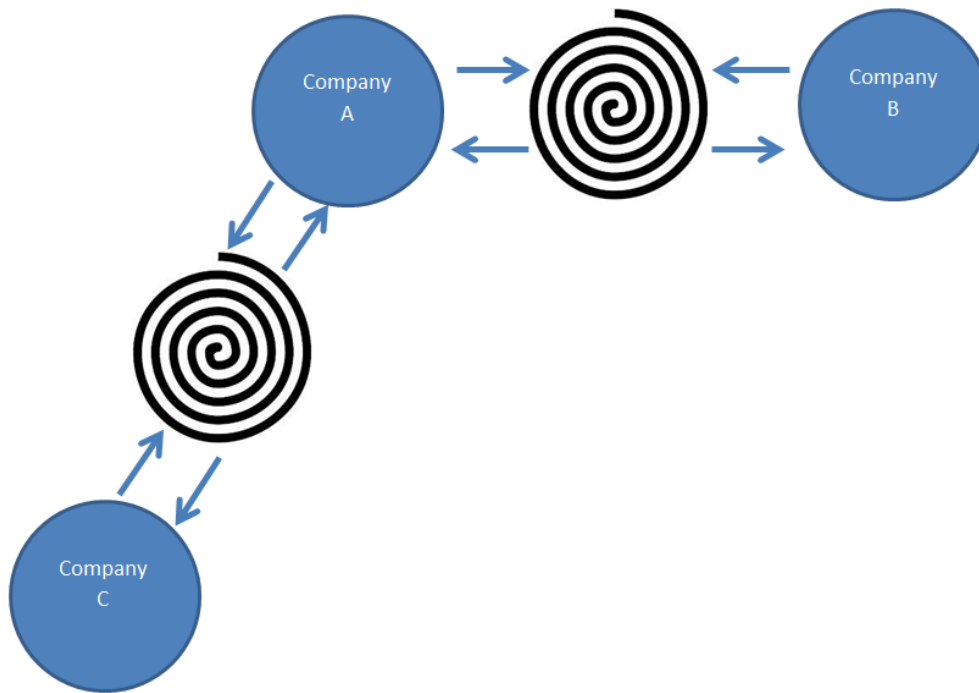
Figure 5 - Interaction between three companies (Extracted from Ford et al. (2008), p. 87)

With these three figures in mind, Ford et al. (2008) come up with the following conceptualization of interaction: "Interaction is the *substantive* process that occurs between business actors through which *all of the aspects of business*: material, financial and human and all of the elements of business: actors, activities and resources *take their form, are changed and are transformed.*"

With this new conceptualization in mind, analyzing business interaction requires the company to go beyond the ideas of purchasing and sales, beyond products and services and most importantly beyond the boundaries of the single company. To do this managers will need to see further than organizational development and look into possibilities of evolution in cooperation with others.

2.7 Value Engineering

According to Mascitelli (2007), in order to get all internal functions to work together and to aid in the collaboration with external functions it is important to set clear goals early in a project. Equally important is it that there is a process for making sure that there is some follow up on these goals. One method for working with this is Value Engineering (McDuff, 2001).

According to Lane Davis (2004) value engineering is a possible solution for owners to maximize value, reduce unnecessary life-cycle costs while maintaining or improving required functions and without sacrificing safety and quality.

The idea of value engineering was first introduced during the Second World War by an engineer working at General Electrics. Because of the lack of material and high prices during the time of the war he got the idea to start specifying products in terms of functions and criteria's instead of what they should look like, how they should be built and how they should be used. The core activity of value engineering is the function analysis which enables the production of the best and cheapest possible product for a specific function.

13

After this value engineering has evolved into a systematic step by step process designed to increase the return on investment (ROI) or/and the value for the customer.

2.7.1 The value engineering process

A thoroughly tested job plan has been developed to guide the work with value engineering. This job plan is most often is performed by a value engineering team. The job plan, as presented by Lane Davis (2004), is described in this list:

1. Goal definition – A clear goal is defined to keep the focus on essential tasks

2. Information collection – Information is gathered on everything that can affect the design development process. Examples can be criteria, operational requirements, regulations etc.

3. Function Analysis – The project is described in terms of functions. This forces the team to think "outside the box". The functions are suppose to be described in the easiest way possible by two word phrase, one active verb and one measureable-noun descriptor. These functions are then placed in a decision-logic diagram making the analysis a powerful tool to lead to development work.

4. Idea generation – When the criteria and functions have been defined the idea generation phase starts. In this phase quantity is premiered before quality and openness to new and strange ideas are necessary to maximize the outcome of the idea generation. Initiatives that should be kept in mind here is material changes, tolerance relaxation, standardization and alternative sequencing.

5. Evaluation – When ideas have been generated they need to be evaluated. In the evaluation several aspects are included in order to find the best solution. Feasibility, cost and value are estimated through different analyses. Also non-economic measurements are considered such as safety, reliability and environmental impact.

6. Develop into recommendations – In this phase the ideas chosen in the evaluations phase will be developed into value engineering recommendations. These recommendations should include cost of implementation, pros and cons of the idea and enough supporting data to be able to make an informed decision.

7. Presentation – The ones involved in the value engineering process present the results to the decisions makers.

8. Implementation – The decision makers choose which value engineering recommendations to use.

A value engineering initiative can be applied anywhere in the product development phase but will yield greater results when applied as early as possible. The reason for this can be seen in Figure 6.

14
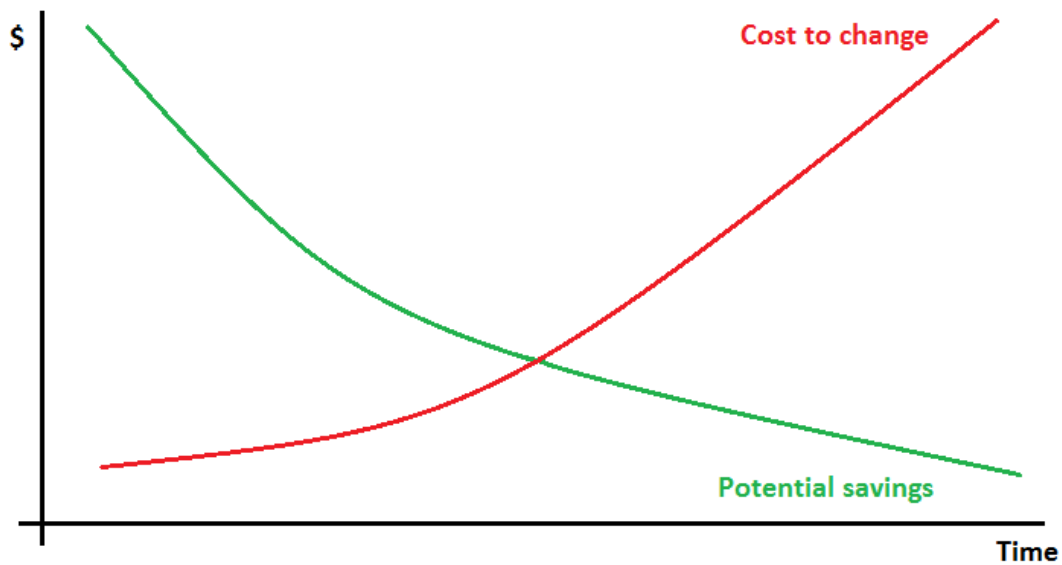
Figure 6 - The cost of change vs. potential savings over time. (Extracted from Lane Davis, 2004, p. 24)

As seen in Figure 6 the cost of change increases over time and the potential to save decreases. With this in mind the earlier value engineering can be applied the more potential for saving there is and the cheaper it is to make these changes.

2.7.2 Cost reduction in the whole product life cycle

Cooper and Slagmulder (2004) present an integrated cost management program which can be used for the full life cycle of the product. This program is mostly focused on R&D and manufacturing and does not focus on purchasing and negotiations. However, one of the five techniques in the program is called "target costing". Target costing is a: "technique used in the design stage as a feed-forward mechanism through which engineers retool the design of a new product to reduce costs while maintaining a desired level of product functionality and quality". (Cooper and Slagmulder, 2004, p. 46)

To reduce cost *value engineering* can be used in four different areas:

1. Reduction of number of parts

2. Elimination of expensive, labor-intensive and mechanical –adjustment processes

3. Material change to cheaper types of material

4. Supplier pressure to reduce cost more aggressively

Target costing is especially of interest when considering short product life cycles such as electronics since changes are hard to realize when manufacturing has begun.

Cooper and Slagmulder (2004) however puts most focus in their cost reduction initiatives in manufacturing and emphasizes the potentials of savings in this part of the value chain trying to

15

disprove the widely held assumption that a large percentage of costs are locked into the design of the product.

2.8 Problem analysis

When outsourcing components Ericsson loses the knowledge about the cost structure of the component and therefore it is difficult to estimate what a reasonable price is. They also lose much of the control of the cost structure. Ericsson can negotiate about the price but it is more difficult to influence the cost structure behind the specific component. van Weele (2010) argues that the lack of influence is especially significant when outsourcing the complete responsibility for a product or component, so called *turnkey outsourcing*. Ericsson is interested in addressing these problems with Should Cost analyses.

Should Cost analysis proposes a way to rationalize the process of interaction with suppliers in order to reach prices that are motivated and correct from the start. According to Ellram (1996) sharing the data from Should Cost analyzes with suppliers also proposes a great basis for information sharing which can lead to greater understanding of cost structures between companies. With this in mind Ericsson BNET is interested in knowing in what situations Should Cost can be a useful tool and where in the organization this tool can be utilized.

Performing Should Cost analyses addresses the manufacturing cost but much of the total cost is related to the design of the product and therefore it becomes important to have a cost focus also in the design stage (Gadde & Håkansson, 2001). However, this is not always the case and the design and development focuses more on technical performance (ibid). Since Ericsson is used to being the technology leader in a technology driven industry the design function has a strong focus on technology and Ericsson wants to bring in more of a cost focus using Design to Cost.

Taking into consideration the statement that as much as 80 percent of the cost is bound in the design the combination of the two approaches seems to be a great way to assess cost from two perspectives, Design to Cost addresses the cost before the release of the product and Should Cost both before and during the life time of the product. Thereby, assessment of cost reduction is enabled through the whole end-to-end cycle. Ericsson wants to investigate when in the end-to-end cycle it is suitable to perform Should Cost and Design to Cost.

Monczka & Morgan (2000) and later also Dubois (2003) highlights the importance of finding the main cost drivers before starting to reduce cost thereby emphasizing the need for analysis before jumping into initiatives of cost reduction. Combined with the focus on Total Cost of Ownership, where finding both the major cost drivers and the products driving the cost are emphasized, there is a need for analysis before diving into cost reduction.

In order to reach the aim for this thesis it needs to be broken down into manageable research questions. Trent and Monczka (1998) emphasizes that the goal for any buying organization should be to link SCM, sourcing and purchasing with the core of the business. What this link essentially comes down to is how purchasing can utilize the full potential of its suppliers. Dubois (2003) argues for joint learning about one's counterpart and Ford et al. (2008) is on the same track arguing for the connection between the core of business and what is going on between companies. The common

denominator for both arguments is the value of relationships. Therefore the first breakdown of the aim, and the first research question, will be:

Research question 1:

- *How should Design to Cost and Should Cost be used for different relationships?*

Ellram (1995) state that two categories of analysis of Total Cost of Ownership exist: direct cost approach and value based approach. The former focus on the direct cost and the result is straight forward but does not cover the whole picture since some researchers claim that indirect cost accounts for 250% of direct costs. The value based approach on the other hand takes a broader spectrum of cost and value add into consideration making it more useful when trying to obtain the whole picture but also much more complex to perform and interpret the result. According to Lane Davis (2004) a way to work with maximizing value, reducing unnecessary life-cycle costs while maintaining or improving required functions, is to implement Value Engineering. The Design to Cost initiative is closely related to the mindset and methods applied in value engineering. With the mindsets of TCO and Value Engineering in mind the second breakdown of the aim will be:

Research question 2:

- *How and when can Design to Cost and Should Cost be used to add value and/or reduce cost?*

Various studies advocate the value of a cross-functional approach to product development (Mascitelli, 2007; Valle & Avella, 2003; Williams & Smith, 1990; Nijssen et al., 2002). Nijssen et al. (2002) points out that involving purchasing early in the design process can lead to lower costs, smoother product introductions and shorter development lead times. Dubois & Wynstra (2005) argues for the purchasing function or the supply function as the best interface to suppliers during both the development phase and during the product life-cycle. Nijssen et al. (2002) has empirically discovered that in companies where the purchasing function was involved early in the development process this had a significant impact on the success of the products, in terms of both sales and profit. With this research in mind in combination with the emphasis from van Weele (2010) on the impact on performance from seeing the purchasing function as a strategic function the last breakdown of the aim will be:

Research question 3:

- *Where in the organization (involving which actors?) should Design to Cost and Should Cost be applied to reach their full potential?*

Together the three sub-questions combine how the approaches are useful in different relationships, how they add value and how the internal organization can adapt them. These are all different and important aspects of the aim and combined with the theoretical framework they will identify how and when the two approaches are most useful for BNET.

3 Method

To study how Ericsson uses the approaches of Should Cost and Design to Cost and how they can use them in the future a literature study has been performed to form a base of knowledge concerning the subject. This base of knowledge is presented as a theoretical framework that is used both to analyze the findings from data collection and to guide the data collection itself at Ericsson.

The study is performed in the form of a qualitative single case study of the type that Bryman & Bell (2007) call *the representative or typical case.* This means the intent is to study a case that represents an everyday situation within an organization. In this case the focus is on one organization, Ericsson BNET. Ericsson BNET wants to include more of a cost focus into its development processes. The purpose of this study is to investigate how the approaches of Should Cost and Design to Cost are relevant in Ericsson's situation. In order to achieve this the aim has been divided into three research questions; how can the two approaches, Design to Cost and Should Cost, be used in different supplier relationships, how can they add value and reduce cost and where in the organization are the approaches most useful. This is a single case study meaning that one specific situation is studied in depth and empirical data gathered all come from Ericsson. By analyzing one single case this analysis can be more in-depth and all of the resources can be focused on the same case.

3.1 Study approach and data collection

The study or research approach describes how a researcher has chosen to perform the study and how theory and the empirical world are combined. Bryman & Bell (2007) describes two traditional ways of approaching the study, the *deductive approach* and the *inductive approach*. Of these the deductive approach is the most common. This starts with theory that is used to form the basis for a hypothesis, which is then tested against the empirical world. The empirical data is used to either reject or confirm the hypothesis and then the theory is revised accordingly. Bryman and Bell goes on to explain that an inductive approach starts from the empirical data. An hypothesis is devised from observations and this hypothesis can then be tested and the results can lead to new theory being developed.

The approach for this study lies in between the deductive and inductive approach and is that of systematic combining described by Dubois & Gadde (2002). This approach is grounded in, and similar to, an abductive approach, but with the systematic combining approach empirical data is matched with theory continously. As illustrated in Figure 7, the matching of theory and empirical data helps a framework of knowledge to evolve and this can be used to analyze the case. Together these four aspects continously direct and redirect the studies (Dubois & Gadde, 2002).
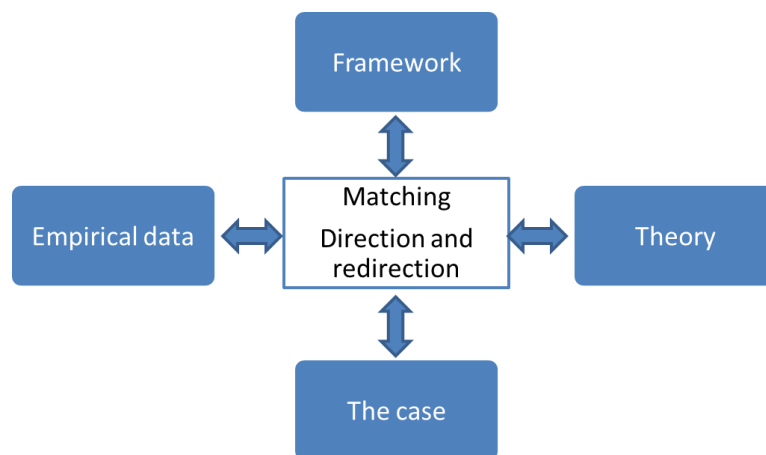
Figure 7 - Systematic combining approach to research (Dubois & Gadde, 2002)

The process illustrated in Figure 7, systematic combining, is an iterative process that continues throughout the study and continuously builds knowledge to reach the end goal.

One of the tools used to gather information in this study was semi-structured interviews. A semi-structured interview opens up for a flexible interview that gives the interviewer the possibility to go deeper in to interesting subjects that arise. This is well in line with the systematic combining approach, where Dubois & Gadde (2002) advocate the use of semi- or unstructured interviews to gain "active" data. "Active" data is information associated with discovery, meaning that it is something that came up during the inteview but not something the interviewer set out to find (Dubois & Gadde, 2002). This helps the reasearcher direct the investigation into new and interesting directions.

3.1.1 Process of the study

The work process was initiated with a pre-study focused on familiarization with the current status at Ericsson. To do this several documents regarding the Cost Engineering initiative where provided by the supervisor at Ericsson. This work was also complemented with early studies of theory on subjects considered relevant in accordance to the early empirical studies. Furthermore, another helpful tool has been an old thesis performed at Ericsson also focused on introducing Cost Engineering but without the Design to Cost concept.

The first interviews performed focused on obtaining a good picture of the approaches. It was noticed early that very limited information was available from interviews on Design to Cost since this type of work had not yet been initiated at BNET. The information on Should Cost however was more significant. During the study, theory was used for input to the empirical study. The theory functioned as a guide to what questions to ask during the interviews and also to judge what functions from which it might be of interest to find interviewees. A new interview guide was created before each interview because each interview had a different focus to gain a more complete view of Ericsson BNET. The interview guide worked more as a guideline for the interview and follow-up questions and new subjects were added during the interview when new information was revealed. After each interview the data was analyzed with the theory as a base and during this process, ideas for new theory that could be useful was generated. This new theory resulted in new input for interviews, in

some cases this resulted in interviews with new interviewees, some subjects were asked for a new interview and some question were answered with follow up question via email. In one case an employee was able to agree to a non-scheduled interview explaining some of the development process in more detail since it was realized that the initial interview did not fully cover how the different process were connected. This iterative process help the authors to, piece-by-piece, build up knowledge about the subject.

During the study the focus broadened from focusing on purchasing to focus more on processes and product development including different functions such as Supply, PDU and PL. The information gathered at interviews was complemented with documents from the internal intranet on processes, standards, methods and guidelines.

The writing of the report was performed continuously as new data was collected and new theories was found. The research questions developed during the building of the theoretical framework but eventually converged into focusing on relationships, value-add, cost reduction and organization. When these were set the data collection went easier and the case began to take its final shape and a framework of knowledge was accumulated. At this point documentation gathered at the beginning of the study at Ericsson started to make much more sense and ended up being a great contribution to the case as a whole. Quite late in the process a business case on cost savings by reducing the variation within a specific product family was presented to the authors and it ended up providing additional insight of the limitations of Design to Cost.

3.2 Quality of the study

The use of a single case study has its limitations, for instance it can be difficult to draw generic conclusions from a specific case (Bryman & Bell, 2007). But, as argued by Dubois & Gadde (2002), situations change over time, rendering specific findings irrelevant. Therefore a specific phenomenon is best understood by an in-depth case study conditioned by the context in which it exists. Important to have in mind is that the conclusions drawn are conditional to the environment in which they were observed and as a researcher one have to mindful not to generalize the findings without their context. Therefore, the current situation at Ericsson BNET has been described in background and empirical findings. Explaining the situation has also been an important part of the process of understanding how the approaches of Should Cost and Design to Cost can be implemented in the Ericsson organization. The current state description does not only provide the reader with a database of knowledge for determining whether the findings are transferable to other situations, as recommended by Bryman & Bell (2007), but has also been a crucial part in reaching the conclusions. Another aspect that is important to note, as explained by Bryman and Bell, is that a qualitative study needs to be flexible, impose a flexible structure and not be pre-determined in its nature. Because of this, the research questions evolved and were narrowed down during the course of the research as the knowledge about the studied phenomenon increased. This flexibility also makes it easy for the researcher to "go off track" and expand the investigation to a point where the core focus becomes lost or diluted. In order minimize this risk the data collection was narrowed down to Ericsson BNET IP & Broadband in Mölndal.

Bryman & Bell (2007) further argues that when a phenomenon is studied in a qualitative manner several different accounts of the phenomenon might exist. Therefore, it is important to ensure that

the study captures the different aspects of the studied phenomenon. This can be done via triangulation, i.e. asking several interviewees with different relations to the studied phenomenon about their view. During the studies at Ericsson representatives from several different functions have been interviewed about the approaches and the current state of the development process. In this case is has been absolutely necessary in order to understand the process as a whole since several functions act in their own "silo" and few have an overall picture of the entire development process.

Another situation where flexibility is important but also something to be mindful about is in the semi-structured interviews. While Dubois & Gadde (2002) argue for the importance of active data, requiring a semi-structured or unstructured interview, Bryman & Bell (2007) points out that there is a balancing act between collecting active and passive data. During the interview the interview guide is used just as a guide and interesting discussions are followed even if the data they generate are not a part of the guide. However, if these discussions are allowed to take up too much of the time there is a risk of missing out on some of the questions in the guide and thereby miss out on data that the interviewer had set out to gather. At Ericsson, we were fortunate enough to have great support for our interviews and there was usually time to follow up interesting discussions and still have time to complete all of the questions in the guide. During the study, knowledge of how many questions that was reasonable to ask during a certain time was developed and made the prioritization of questions in the guide easier. During the interviews both interviewers were transcribing the interview simultaneously. This lead to some quiet moments when the interviewer were taking notes but it was soon discovered that this gave the person interviewed time for afterthought which often lead to an expansion of their answer after a short period of silence. In order to reduce a source of interpretation from the interviews they were held in English. This turned out to work well and all of the interviewees claimed to feel comfortable with English as a language. One reason for this might be that Ericsson is a global corporation and its employees are used to speaking English in their everyday work environment.

4 Empirical findings

In this chapter the outcome of the empirical investigation at Ericsson will be presented. The chapter starts off by presenting the organization, the different functions and their role at Ericsson to provide a background to the case. The second section focuses on the processes of the different functions which are relevant to assess in order to realize the aim of finding out where in the processes Design to Cost and Should Cost will fit best. The third section focuses on cooperation between the different functions at BNET which is of relevance in order to investigate possibilities for cross-functional cooperation in the product development process. The fourth section goes deeper into the different decisions and capabilities within product development which is relevant to investigate in order to try to find suitable engagement points for the two focal approaches presented in section five. The sixth section investigates Ericsson's approach to suppliers and the seventh presents a business case concerning product variance and possible gains to be had from working with this. The business case is further discussed in the discussion chapter.

4.1 Organization

The cost engineering initiative at IP & Broadband where the two approaches of Design to Cost and Should Cost are located is considered as a program that currently supports the Sourcing function. The plan is that the program eventually should support Product Line (PL), Product Development Unit (PDU), Sourcing and Supply in their work with cost reduction. Within BNET there are three separate PL and PDU functions; *Radio*, *Core & IMS* and *IP & Broadband*. This study is focused only on IP & Broadband and when PL and PDU are mentioned it is a reference to PL IP & Broadband and PDU IP & Broadband. These functions are all placed under BNET in the Ericsson organization. A simplified organizational chart can be seen in Figure 8
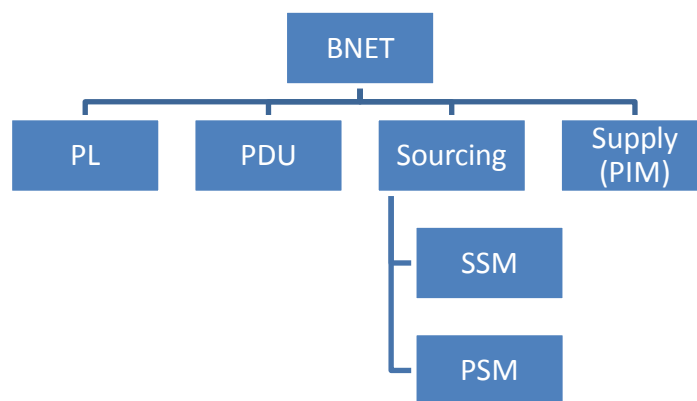
Figure 8 - Simplified organization chart over Ericson Business Unit Networks (BNET)

 The sourcing function consists of two different sub-functions: Strategic Sourcing Management (SSM) and Project Sourcing Management (PSM). SSM works with negotiations, the supplier base and setting up preferred suppliers to the Preferred Supplier List (PSL) and other core purchasing activities. PSM works as an interface between SSM and the designers at PDU. Right now, there are a few people working specifically with Should Cost analyses i.e. breakdown cost calculations. These people are currently a part of the PSM and the SSM function and work specifically with cost engineering, currently mostly supporting SSM in its negotiation with suppliers.

Product Line is in charge of the money at BNET and have budget responsibilities on a yearly basis. PL supplies PDU with funds by ordering product development services from them. In rare cases PL can acquire this service from other sources. This can happen if there is a lack of resources at PDU or if there are other strategic reasons to consider. Strategic product managers' work at Product Line and their work are to define the product strategy in order to maximize the profit for Ericsson. To do this they analyze the market and cooperate with PDU in the product development. One of Product Line objectives is to work long term and analyzing where the market is heading in the upcoming five or more years.

Once the market analysis is complete the project is handed over to PDU to start development. The product development at BNET is considered to be technology driven. It focuses mainly on improving the old products by adding features and functionality rather than developing a completely new product. PDU has a wish to become more customer-need-driven but this is not the main focus area.

To get better understanding of the different roles of the other functions a value stream can be seen in Figure 9. Product Management, in which PL is a sub-function, can be seen in the figure. This value stream does not include neither suppliers nor the sourcing functions. As seen in the figure, the development of new product should start with the customers and their demands.

The function most in contact with the customers are Product Management which provide PDU (where both Systems & Technology and Product Development is included) with input from their market analyses and customer insight. Further down the supply chain we find Production, which are in charge of producing the products developed by PDU, and the Supply Chain, which is responsible for the delivery of the product. Both of these areas are located in the same function called Supply.
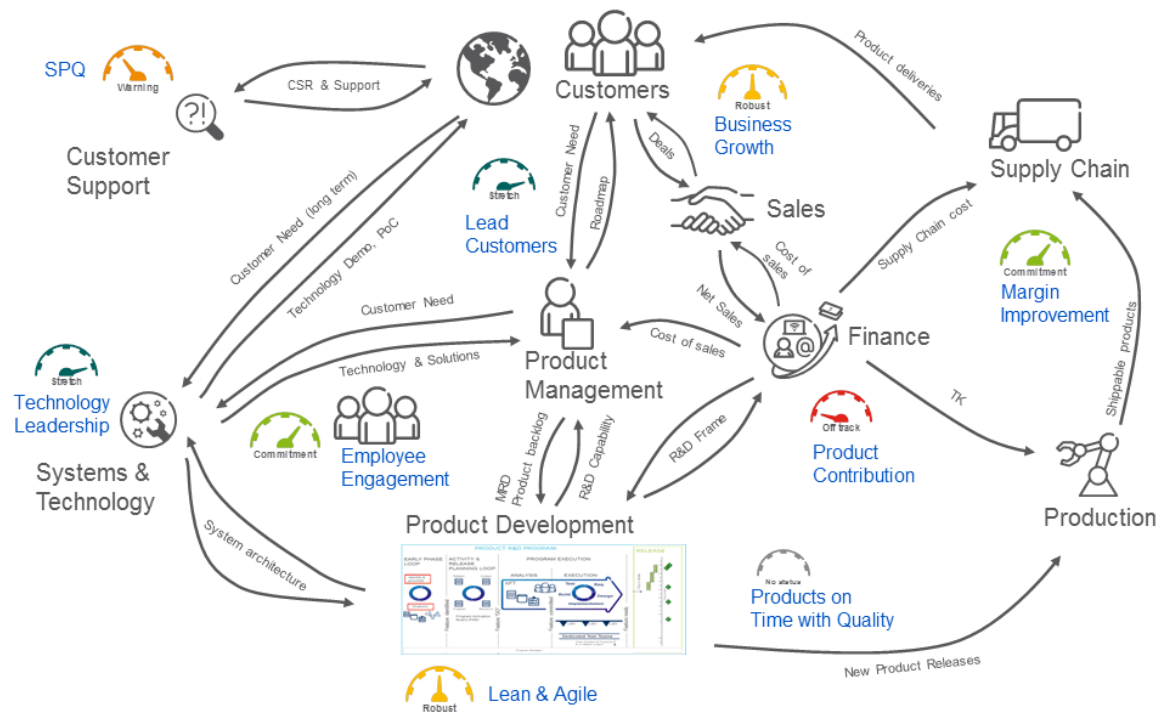
Figure 9 - The value stream at Ericsson

4.1.1 Supply

Supply's role at BNET is very broad. They are responsible for a product from the collection of components until the product is delivered to a regional warehouse. The different sub-functions included in Supply are therefore logistics, production, packing, assembly, order handling, local sourcing etc. To sum up, the responsibility of Supply is:

1. Buy the components (from the suppliers chosen together with Sourcing and PDU)
2. Plan the production
3. Secure the delivery

Part of the work Supply performs is also to give input to Product Development. Input given to PDU includes selection of components, securing production, packaging and assembly of the product through cooperation in development. The cooperation is technical and on a product level.

To perform all these tasks several processes are involved:

- New Product Introduction Process
- Order process
- Forecast Process
- Inbound Process
- Production Process
- Delivery Process

Besides these processes runs the continuous improvement process where all employees contribute by coming up with suggestions for improvements. If there is a business case in the suggestions an improvement project is launched to implement the improvements.

Performance in Supply

Supply is measured on many different aspects since there are many steps involved in the different processes. Some of the more important measures are summarized in the short list below:

- Inbound: Material availability
- Production: Inventory turnover, lead time, on cost and quality
- Outbound: Delivery precision

4.1.2 Sourcing

Strategic Sourcing Management

SSM is responsible for choosing suppliers with the input from the other functions, PDU, PL, PSM and Supply. SSM is also in charge of negotiation on new contracts with suppliers. Suppliers at Strategic Sourcing Electromechanics, which is one of two sourcing units at IP & Broadband, are divided by category. The different categories are *Interconnect, Small Mech, Sheet Metal, Antennas, Climate and Power, Packaging* and *Die Casting*.

Project Sourcing Management

The role of PSM at IP & Broadband is to be a link between Sourcing, PDU, PL and Supply in the development of new products. PSM's mission is to secure that Ericsson has the ability to source all the components necessary to build the new product. The design owner is responsible to meet the cost targets set by the PL but the PSM drives the cost work for the selected components and creates visibility in the development projects. PSM work with so called TK-reduction initiatives. These are reactive initiatives to reduce cost of products already released. These are most often initiated by PL to handle escalating cost and trying to improve margins. These initiatives can involve cost reductions in PDU, Sourcing and Supply.

The roles of the different Project Sourcing Managers (PSMs) are divided by product. Every PSM has his or her own product focus. PSM works with two major goals: risk avoidance and cost reduction. In order to avoid risk, Ericsson tries to source as much of their goods as possible from multiple sources. This decreases the dependence that single sourcing leads to. Cost reduction is mainly achieved through negotiation. The focus of Sourcing is limited to direct material cost.

4.2 Processes

In this section the different relevant processes at BNET are presented. The streamline process focuses on parallelization of the development of features and is a result of the agile initiative at Ericsson. The goal with the Product Life Cycle Management Process is to continuously reduce cost

during the entire life cycle of the product. Lastly, the VPA process is the process controlling the work with contractual agreements with suppliers.

4.2.1 The Streamline Process

PDU works with a development process called streamline development. The process flow of the streamline process can be seen in Figure 10. In this figure it is important to understand that this is a feature flow and that each product release consists of several new features. Ericsson considers the streamline process as an agile way of working promoting flexibility and fast throughput times through parallel work.
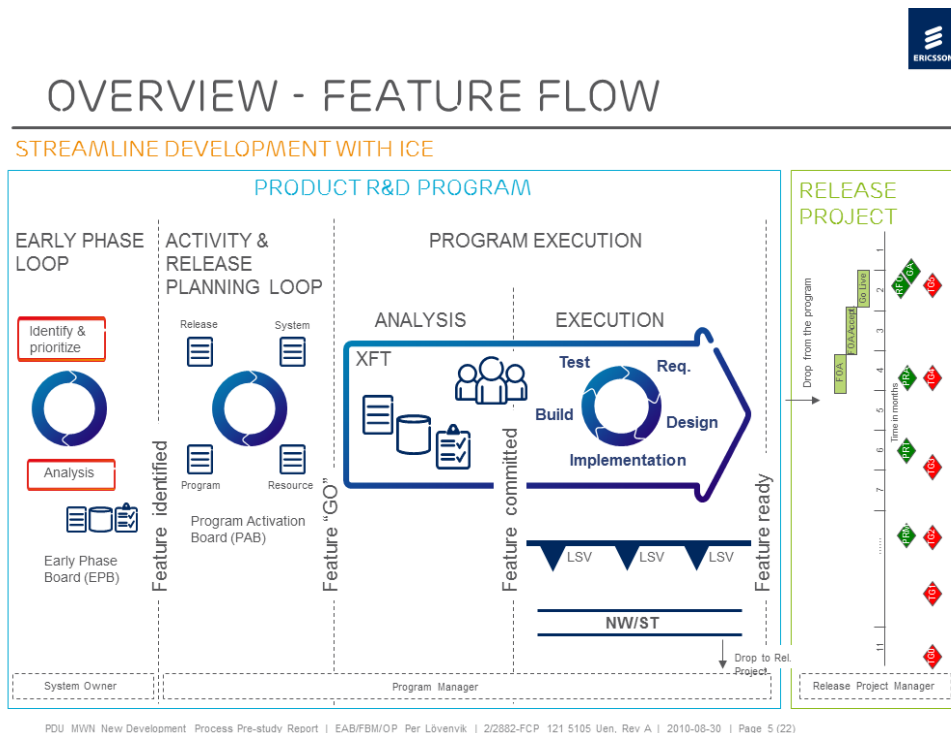
Figure 10 - The Streamline Development Process. Source: Ericsson's internal webpage

The first step, early phase loop, includes a system group and a system manager. The goal of this step is to make a technical analysis trying to identify new possible features for the product. In the second step, the activity & release planning loop, the different features are continuously prioritized in implementation order. This step is performed in cooperation between PL, PDU, Line managers and program management and is continuously interacting with the first loop, making new prioritizations as new features are developed. When the decision has been made to develop the new feature the third step, the program execution phase, can be initialized. In this step, a cross-functional development team consisting of one system engineer, one to three testers and three to five designers, work with the development of the new feature. To assist them in their work several supporting functions, among them Sourcing and Supply, are at the development teams disposal, however the use of these are limited. When the feature has been fully committed to the development team continues its cycle of updating the feature continuously finishing Last System Versions (LSVs) and continuously going through the development cycle setting new requirements, designing a potential solution to these requirement, implementing the solutions, build the feature

27

and lastly test the feature. When the choice to release has been made the updating of the feature stops and the LSV is used.

The thought is that the streamline process should be used for all types of features, both hardware and software, however to use the same methodology for hardware has proven very difficult due to the need for compatibility between different hardware elements. This issue leads to obstacles in making the development parallelized. Due to this issue hardware are often still developed in the old waterfall process which is a linear step-by-step process.

4.2.2 PLCM at Ericsson

When the product is released it enters the Product Life Cycle Management (PLCM) process shown in Figure 11. A focus from Ericsson perspective is to try to reduce cost throughout the whole product life cycle. This is where the PLCM process becomes useful. From a purchasing perspective there are three different stages in the PLCM process. The first stage is the "ramp up" where the product is introduced and hopefully steadily increases in sales volume. In the first step sourcing is determining the sizes of agreements and trying to get the best prices for the specific volume ordered. The second stage is "the maintenance stage" where the volumes are quite stable and the main focus is to keep them at a stable level and to reduce cost through *TK-reductions*. TK-reductions can also be used in the ramp up phase to try to increase the volumes by lowering the price. The third stage is the decline where the focus is to try to keep the profitability up despite the lowering in volumes.
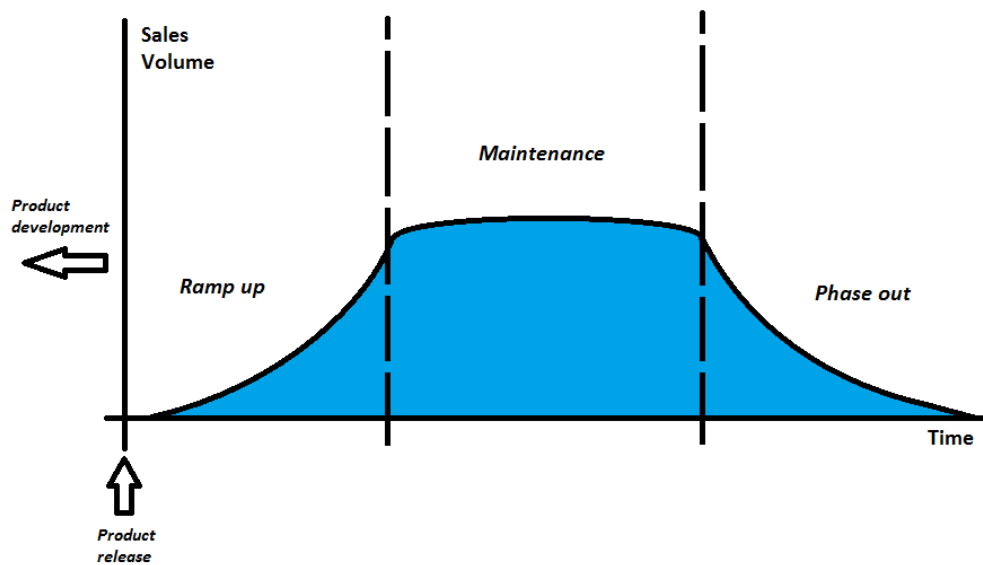
Figure 11 - Product Life Cycle Management Process

4.2.3 VPA Process

To reduce costs during the PLCM process strategic sourcing works in accordance to the *VPA (Volume Purchase Agreement) process,* seen in Figure 12. Ericsson re-negotiates purchasing agreement annually for each supplier, however the number of suppliers contacted in the RFx and Negotiation phase varies depending on the relationship desired by Ericsson and other factors such as availability. This process is considered necessary in order to keep profitability up for Ericsson as the value of the products decrease over time due to competition, inflation and new emerging technologies. The

manage supplier part of Figure 12 is the methods and tools described in section six of this chapter and is performed parallel to the VPA. Each category is also managed in a specific way to handle the differences in different markets. This work is also performed parallel to the VPA.

VPA, Volume Purchase Agreement process
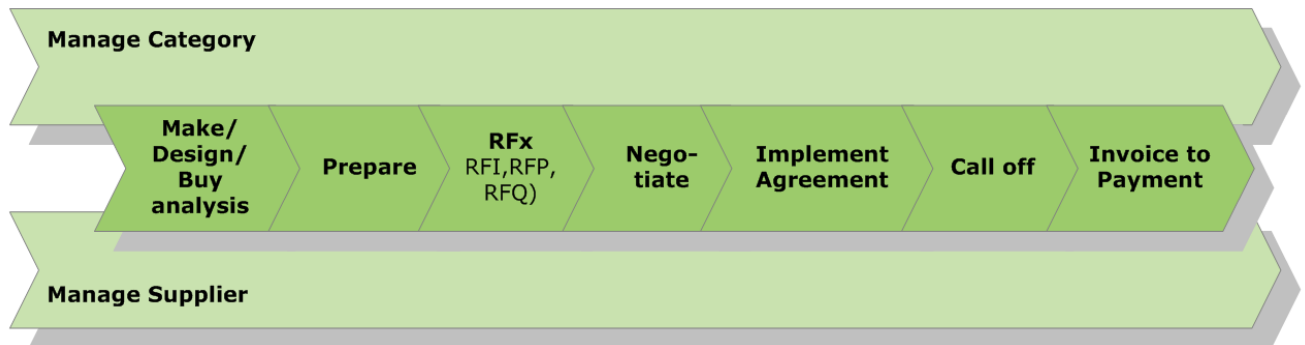
4.3 Cooperation

For the development of new product to work as efficiently as possible it is important that the different function work well together. Figure 13 describes the different focal functions studied during this thesis and the way they interact with each other. Under each function the focus areas for that function is presented. The arrows between different function can be seen as one function providing another function with input. It should be added that the PSM function works as a connector between PDU, SSM and Supply so most interaction between these different functions takes place with PSM as a middleman. It should also be added that this figure is a simplified way to look at the functional interactions and that different forums exist to enable these different interactions.
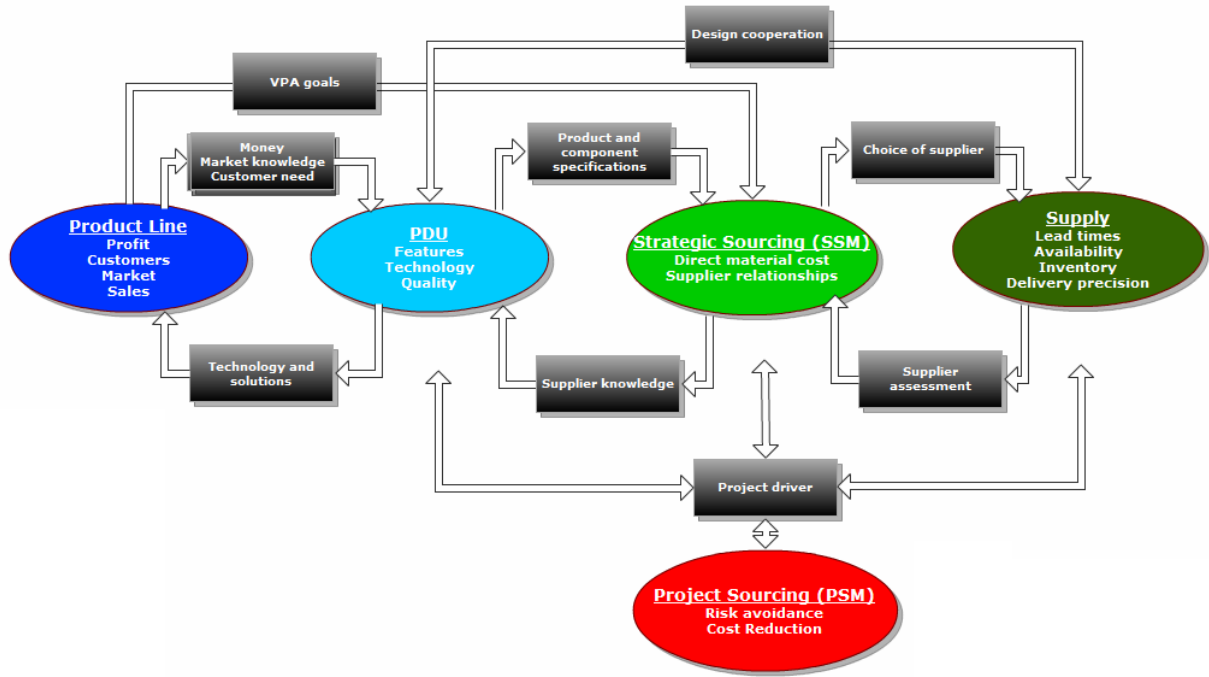
Figure 13 - Interactions between functions at Ericsson BNET

4.3.1 Cooperation within Supply

The cooperation within Supply's different sub-functions works very well. The major reason for this is that if something goes wrong, the production stops and Ericsson cannot deliver their products to its customers. Due to this urgency to deliver on time and with quality there is a help-mentality in Supply rather than a "we-and-them-mentality" as between many other functions, also known as "silo-thinking". The cooperation with other functions is considered reactive. Supply's employees feel the work could be more proactive.

4.3.2 Cooperation between functions from a sourcing perspective

Sourcing feels a lack of understanding and a reluctance to change is greatly hindering the cooperation between functions within Ericsson. The functions have a tendency of becoming silos that isolate themselves from other functions. There are examples of Program Managers considering Sourcing as sub-function of hardware development instead of a function of strategic importance. The cooperation between different functions has a tendency of being dependent on cross-functional personal relationships instead of understanding and acceptance.

SSM emphasizes the need for Product Line to see sourcing as a strategically significant function. A greater understanding of the potential of sourcing and supply from Product Line is necessary to enable a more significant contribution of these functions to the bottom line. Sourcing would like to be more involved in the decision making process when developing new hardware, however, there might be a need for higher technical competence in sourcing in order to better understand the complexity and thereby be able to contribute both by including suppliers earlier in the decisions and by enabling a better picture of the total cost at an earlier stage.

A problem that affects the possibility of close collaboration between functions is the misalignment in focus between the different functions. While PDU and PL have a distinct focus on software, Supply and Sourcing have full focus on what affects them, the hardware they source and handle.

Something mentioned by several people interviewed is that PL has a tendency to think too much as product developers instead of working with the whole perspective. Since PL are project owners in new development projects they have the ability control who is attending meetings instead of opening up meetings to those that feel they could contribute. Sourcing feels that PDU and PL have great technical competence and focus but needs input on marketing and supply perspective from Sourcing and Supply. PSM wants to become more proactive and work more with a long-term focus. In order to make this happen a greater understanding from PL and PDU of the capabilities of other functions might be necessary.

4.4 Product Development

When it comes to development of new products Ericsson has different approaches to different markets. The approaches are first and foremost determined by the market level Ericsson wants to achieve in that specific market. In certain markets Ericsson is a technology and market leader, this means Ericsson has certain capabilities on these markets. These capabilities are for example yearly meetings with the top buyers where the future is discussed on a five year basis. In these markets Ericsson focuses significantly more on being technology leaders and driving the market forward than on producing a product that is "good enough" to the lowest possible price. This also due to fact that the customer seldom knows specifically what he or she wants or needs in five years. For the markets where Ericsson is not the number one player but maybe the fourth or third the customer focus is considered more important since Ericsson do not drive that market forward on their own but purpose an alternative to the market leader. Product Line sees especially great potential in putting more focus on cost reduction and assessing it earlier in the development process for the markets where Ericsson is not the market leader but also considers it an important aspect to assess for the leading markets in order to increase profit.

4.4.1 Releasing a new product

In order to go through the product development process several decisions have to be made. These decisions are divided into two categories: Product Decisions (PDs) and Business Decisions (BDs). There are a total of six PDs and five BDs. However, only four of the PDs and two of the BDs are a part of the release and the rest are decisions made during or after the life-cycle of the product. The majority of the PDs are made in collaborations between PDU and PL however the decision is owned by PL since they are the function in charge of the money. The thought is that each PD and BD should be made in a cross-functional team including Supply, Sourcing, Services, Pricing, Packaging, PDU and PL which should all contribute with expertise in its respective area. However there is also a limitation of ten participants in these meetings which have led to that some functions are not represented at all resulting in lack of consideration to some important aspects.

The goal of the BDs, which are strategic decisions made on a high level, is to assess how to address a certain market. The following list shows what each BD should consider:

- BD1 - "Decision to start further analysis of opportunity"

- BD2 - "Decision to include in portfolio and start pre-marketing"
- Delta BD2 - "Business review and decision for further investment"
- BD3 - "Decision to start phase-out of product"
- BD4 - "Confirmation of product termination"

As can be seen in the slogans of the different BDs the first two are decided before the release of the product. To get an information base to BD1 Product Area, PA, which is one step higher in the organization than PL, performs market analysis to get information on what type of products and technologies the market is requiring at the moment. If PA finds an opportunity to penetrate the market the BD1 is taken and further analysis is made. The analysis made between BD1 and BD2 focuses on what Ericsson should deliver to the market: Value proposition for the customer, competition to beat, cost not to exceed etcetera. The characteristics of BD2 can be seen in Appendix I. The Delta BD2 is a business review made during the life-cycle of the product to decide if it is worth investing further in it or not. If the decision is to not invest further in it the process moves on to BD3 and the initiation of the phase out of the product. And lastly, BD4 confirms the definite termination of the product.

The different PDs are decisions taken on a product and technology basis. The closer you come to a release the more emphasis is put on logistics. The PDs are initiated by BD2, the decision to include the product in the portfolio. The following list shows what each PD should consider:

- PD1 - "Decision to start development of commercial offering/release"
- PD2 - "Decision to commit to scope/timing and start marketing"
- PD3 - "Decision to start sales"
- PD4 - "Decision to approve general availability"
- PD5 - "Decision to phase out release"
- PD6 - "Decision to end support for release"

The different BDs and PDs all have checklist's that should be considered before making the decision. These checklists consider four major areas: Product & Portfolio, Commercial, Financial and Capability and Infrastructure. It is of great importance to assess all these areas in order to make a qualified decision.

Between each PD there is a process that works as the input upon which the decision is based. The different processes before the release in BD4 is presented in Figure 14.
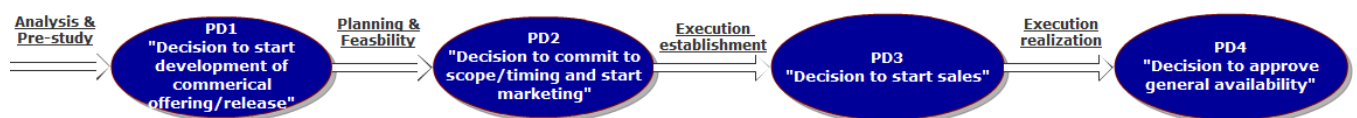
Figure 14 - The PD process

The PD2 can be seen as the stage-gate that sets the design. Everything that happens before is considered a pre-study and everything that happens after is part of the execution. The pre-study phase includes before PD1 is broader and more on a concept level whereas after the PD1 the focus is more on planning the release and looking into the feasibility. The Streamline Development Process runs before PD2 continuously prioritizing which functionalities or so called features should be part of the next release. For products that are not entirely new the Streamline Process continuously fills up its pipe with new features as new ones are released. When the PD2 is taken the features that are prioritized are developed in the execution phase. Ericsson has two releases each year for each product, one in June and one in December.

4.4.2 Cost focus in Product Development

The focus on cost rationalization has become clear during the last couple of years. However when releasing a product there is always a balance of adding new features and functionalities and reducing cost for the whole product. The focus is more often on adding new features than it is on substantial cost reductions. The major initiative when trying to reduce cost is to change material and components.

In the beginning development of a product there is a lack of targets regarding total cost of a product. PDU sees the need for this type of target and feels that focus on high functional growth may have led to a lack of cost focus. PDU believes that closer collaboration with Sourcing and Supply could

lead to cost reduction through lower variance but still states that the cooperation with other functions fulfills the need.

4.5 The Focal Approaches

In this section the two approaches in focus in this thesis, Design to Cost and Should Cost are presented. Both these approaches are bought by Ericsson from different management consultancy agencies and are both part of the Cost Engineering initiative at Ericsson introduced to increase the profitability of Ericsson's products. A new approach called Value Argumentation is also introduced which focuses on finding the best solution for a customer from an overall perspective.

4.5.1 Design to Cost

Design to Cost is a new approach within Cost Engineering. It has not yet been implemented by Ericsson. Ericsson has bought tools for the usages of Design to Cost from a management consultant agency but these tools are currently not in use and not known to many people across the organization. The driver of the Cost Engineering initiative believes strongly in Design to Cost.

Simply put, Design to Cost is about getting down to the core cost of the product. The goal is to reduce non-core parts of the products for example features that are not considered vital for the company. The aim for the approach is to get the best possible cost level for a product given a defined specification. Things to work on to achieve this are to reduce over-specification, modulize, improve production and actually challenge the original concept of the product. The approach can be performed both for existing products and for new products. Working with existing products could lead to short-term wins whereas performing Design to Cost on new product development is seen more as a long-term initiative with good future potential savings.

The approach of Design to Cost provides a methodology and a set of tools for facilitating continuous cost reduction efforts. The work is centered around five workshops and associated preparations and follow-up activities, all designed to identify the core cost of a product. Each workshop renders an estimated savings potential and a set of ideas for realizing this potential. Design to Cost is performed in a cross-functional team in order to capture the full savings potential by looking into all aspects of the product. This team should consist of people from Sourcing, Supply, R&D, Product Management and Production. Specific suppliers can also be included where it is suitable to add even more perspective. A team is preferably supervised by a Design to Cost Champion who supports a team leader in the selection of tools and opportunities. The team leader drives and coordinates the work within the cross-functional team.

Each workshop follows the same main path beginning with a preparation phase through a standardized worksheet unique for each specific workshop. After that an idea generation is performed followed by a prioritization of ideas with regards to ease of implementation and savings potential. The focus here is to find the "quick wins" and prioritize these. After the prioritization has been performed the ideas are synthetized and ultimately lined up for implementation. This process can be seen in Figure 15. The ideas are also later used as input for the further analysis. The synthetized ideas are all developed into viable business cases with consideration to risk and detailed calculation of annual savings and cost to implement the idea.
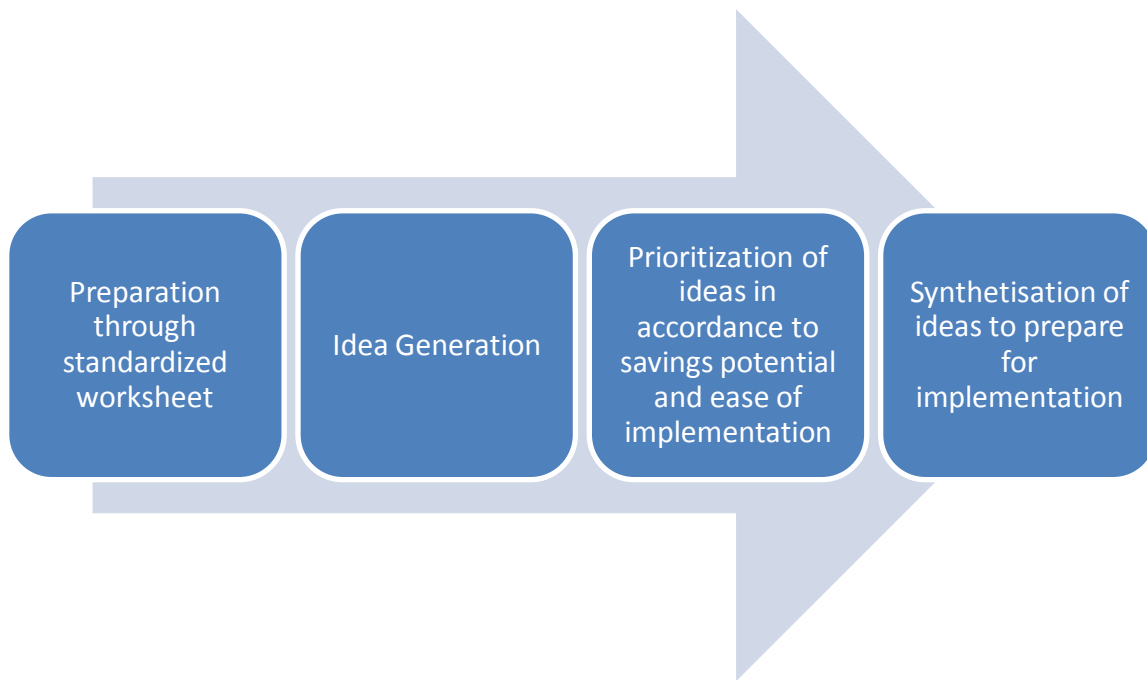
Figure 15 - Design to Cost Process

The five different workshops all have a different theme to focus on. Here is a numbered list of the different workshops:

1. Core Function Analysis
2. Core Specification Analysis
3. Core Concept Analysis
4. Manufacturing Process Analysis
5. Core Factor Cost Analysis

The Core Function Analysis identifies functions that should be considered for elimination. This is done by identifying which functions are core and non-core and estimating the cost of providing each function by allocating the cost of each component. The first non-core functions that should be considered for elimination are those without significant impact to the customer value. Other functions might require more consideration of customer benefit versus cost of the function.

The Core Specification Analysis identifies cost reduction opportunities by aligning specifications with requirements. This is done by firstly identifying all specifications that drive product cost. The absolute theoretical minimum specifications required to deliver the product are then determined, through both internal and external investigation. The cost associated with this theoretical minimum is considered the core-cost of the product. A comparison is made between the current specifications and the theoretical minimum in order to identify non-functional specifications for elimination or re-formulation.

The Core Concept Analysis identifies the potential through the development of improved design solutions at the concept level. This is done by looking into functions with high potential for optimization and assessing other possible ways to design these.

35

The Manufacturing Process Analysis identifies opportunities to reduce manufacturing cost through product design improvements. The process for this is to determine the cost per manufacturing step, then identify the key design cost drivers for each step and lastly identify the theoretical minimum part count as a basis for opportunities of elimination of parts. A result of this analysis is the identification of opportunities to improve Design for manufacturability and assembly.

The Core Factor Cost Analysis identifies opportunities to realize savings by re-locating production, change suppliers and outsource. In other words, finding the optimal player to perform the production of the product and the delivery of the parts.

The attendees of each workshop vary with regards to their possible contribution. For example, production might not have that much to contribute to the functional analysis but might be the most important attendee for the manufacturing process analysis.

4.5.2 Should Cost

Should Cost is, as mentioned in the background, a way to know how much something should cost before buying it, in other words, to get the right price from start. Ericsson believe in the approach of Should Cost and states that even though the calculated cost seldom is 100% accurate there are still gains to be had. The reason for this is that the thought of this approach is not that it is to be used to intimidate the suppliers, but to bring up the discussion around the breakdown of the price. Ericsson still believes that suppliers should keep healthy margins in order for the relationship to be sustainable but still want to secure that the price they get for their purchase goods is the correct one. When making a cost analysis like the one in Should Cost it opens up the possibility of having a discussion around the costs of the supplier during negotiations and for the supplier to motivate their costs and in the long run, reduce their and even their own suppliers cost in order to reach a more efficient supply chain. An interesting development around this is that in some cases the suppliers have also been able to reduce their cost through these discussions by receiving information from Ericsson on possibilities of cost reduction such as too high prices from their own suppliers.

Should Cost and calculations

The choice of which supplier to calculate upon is made in regard to several aspects but foremost in regard to volume value i.e. large and important purchases. The calculations performed by the cost engineers are performed by implementing a tool that Ericsson has bought from a management consultancy firm. This tool takes many factors into consideration to make an estimate as close to the truth as possible. Examples of these aspects are: cycle times, wages, electric costs, area cost, rent cost, interest rate, depreciation, machine cost, investment in machinery, footprint of the machine, set up time, tooling cost, development costs, test cost etc. These costs are updated regularly by the management consultancy firm providing the tool. In order to be able to use the information gathered from the Should Cost in negotiations, process and manufacturing knowledge is recommended to understand the dynamics of the tool and to enable a valid discussion around the outcome of the calculations.

Should Cost and negotiations

In order to get the most out of Should Cost, Ericsson believes in an open dialog instead of forcing the calculations on the supplier. The approach however differs from purchaser to purchaser since there are no clear guidelines on how to use the cost calculations during negotiations. Ericsson considers

this link between Should Cost and negotiations an area where further development is required and sees great potential in the concept of "fact-based negotiations" which Should Cost enables. In the few cases where Should Cost analyses has been made the cost engineering who has made the calculations has been a part of the negotiations to bring technical expertise into the negotiations.

What is important to remember while negotiating with the back-up of a Should Cost analysis is to still be able to give something back to the supplier in order to enable a lower price. Ericsson sees the opportunity here to negotiate with higher volumes and longer contracts in order to reach win-win solutions that benefit both parties and enable a strong relationship. Ericsson sees the benefit of open books and considers this an opportunity for the future to increase the transparency in the supply chain and thereby enable additional cost reductions.

Should Cost and performance measurement

Since performance in Ericsson's Strategic Sourcing Unit is measured by the annual cost cuts in their VPA negotiations the introduction of Should Cost poses a problem in how to measure. The problem at hand is that with the introduction of Should Cost the initial prices of purchases can decrees to a point where the possibilities for major cost cuts annually are reduced. Ericsson will be able to lower their Total Cost of Ownership (TCO) but the results presented in the VPA negotiations will show a lower performance for the sourcing unit. Ericsson feels the need to assess this problem and come up with a different way to measure performance.

Should Cost from a SSM point of view

SSM sees the potential of Should Cost analyses to contribute to an increase in the value added by suppliers. They see potential uses in during both negotiation and when designing a new product. Should Cost will be useful for suppliers that create more value for Ericsson, such as collaborative and executive suppliers. The analysis can be used to spread the understanding to suppliers how they can add more value to Ericsson but even more importantly, when Ericsson know the price they pay is right and has greater knowledge about the suppliers cost structure, this opens up for significant improvements. Improvements such as smarter and cheaper design, more efficient manufacturing, cheaper material will be able to receive more focus and enable closer collaborative cost reductions together with suppliers, trying to find win-win solutions.

SSM proposes a change of their current VPA process to fit in Should Cost in a better way. The structure that is proposed is a more continuous process, working actively all year around to reduce cost together with suppliers by better knowing how their cost structure is built up through Should Cost analyses. When knowing the current structure the possibility to discuss rationalization from both sides will be significantly greater. The one year contracts should also be changed to become more flexible and enable closer collaboration to aid in striving towards open books. To make all this happen better awareness of how to approach suppliers with fact based negotiations is necessary.

4.5.3 Value argumentation

Something that is emphasized by Supply and also by the CEO at Ericsson, is the approach of value argumentation. Value argumentation is about finding the optimal solution for the end customer from an overall perspective. This does not necessarily mean the best technical solution, the best quality, the fastest delivery or the cheapest possible product, but the best full solution for the customer. In order to reach this Ericsson needs to create a competitive edge in all parts of the

company via common business plan that everyone at Ericsson can relate to. This requires a holistic view of the business.

Supply describes Value argumentation with the metaphor of "adding the extra decibel". In PDU the focus has always been to reach the optimal technical solution. But the optimal solution from a technical perspective is very seldom the best overall solution. The example of adding an extra decibel is that one must think beyond the technical data and on what value it actually gives to the customer with this extra decibel. Will that extra decibel be the difference between the choice of Ericsson's product or the competitor's or the difference between a satisfied customer and a non-satisfied one? If the answer to these questions is "NO", then it is probably not worth investing money in adding the extra decibel.

4.6 Suppliers

Suppliers can sometimes be involved very early in the Product Development process. There are scenarios when suppliers have been involved as early as the pre-study. Since PL and PDU are the ones in charge of the pre-study and the business decisions (BD) they have a tendency to contact suppliers on their own without consulting sourcing first. This has led to that suppliers marked as "banned" or "not appropriate" has been chosen to cooperate in an early design phase without consideration to the "Preferred Supplier List" and without any input from Sourcing. This has led to that when Sourcing first is involved in the development process the choice of supplier is already too established to be changed making it impossible for Sourcing to work proactively with the choice of supplier.

Supply is also involved the choice of suppliers to some extent. However, the employees consider themselves to be a little vague in the argumentation against Sourcing and PDU. Sourcing has a strong cost focus and PDU focuses on quality and functionality that they can rely on in the argumentation but the employees at Supply are the ones dealing with the suppliers on a daily basis making it important for them to get their voice heard. Once again it comes down to value argumentation. For Sourcing the scenario might be that the price might be 10% lower but the deliveries are seldom in time, what is worth more, good delivery accuracy or cheap price? For PDU it might be that a supplier might deliver an outstanding component but it is almost impossible to fit it into the supply chain due to high lead times or complex assembly. To assess these questions a deep understanding of total cost is required.

4.6.1 Supplier Governance

The suppliers are segmented in four segments: *transactional*, *tactical*, *collaborative* and *executive*. The work with segmenting suppliers is called supplier governance and the purpose of it is to secure that the supplier is managed in accordance to the importance the supplier has for Ericsson. The transactional suppliers are those of least strategic importance and the executive are the once of highest strategic importance.

The typical executive supplier at Ericsson is business critical and has a very high impact on Ericsson's business. Therefore it is critical to monitor and follow-up the supplier performance and to manage a good supplier relation on an executive level. The typical collaborative is also business critical supplier that has high impact on Ericsson business, is also critical to monitor but requires management of the relationship on management level. A tactical supplier is not business critical but

still has medium or low impact on Ericsson business, requires only monitoring and follow-up but not focus on the relationship. Lastly, the transactional supplier is not formally monitored but managed when issues occur, the contract is not followed or there is an escalation in bad performance.

There are several factors that determine how the different suppliers should be segmented. Here is a list of the most important aspects to consider when deciding on the segmentation:

- *Spend* – The higher the spend with a supplier the higher priority
- *SLA* – Suppliers with service level agreements should be prioritized
- *Need for monitoring* – Suppliers which have key aspects that need monitoring should be prioritized
- *Single source* – Supplier critical for Ericsson's business and with high switching cost should be highly prioritized
- *Managed supplier* – Supplier to which Ericsson has sold or are contractually obliged to manage should be prioritized

For the different segments there are different forums of communication with suppliers. The two most important once are Executive Business Review (EBR) and Management Business Review (MBR). The main focus of EBR is to perform a strategic planning for the future and the main focus of MBR is to develop the performance of the relationship. EBR is only performed for executive suppliers with the purpose of maintaining and developing the relationship between Ericsson and the supplier. These meetings are held 1-2 times per year and focuses on aligning the strategies of the two companies, updating the counterpart on the current status of the business and finding new opportunities and solving issues in the relationship together. The people attending these meeting from Ericsson's side are: Supplier Responsible, Sponsor, Executive Management from Sourcing, Design, Product Line, Region and/or Supply. The people representing from the supplier is often only people from the executive team or relevant business unit heads. The outputs of these meeting are often action plans for both companies and input to the supplier's strategy.

The MBR is performed on suppliers in the segment collaborative and higher, i.e. executive suppliers have both MBR and EBR. The MBR is performed 1-3 times per year for executive suppliers and 2-4 times per year for collaborative once. The ones representing Ericsson in the MBR is the same with the exception being that the executive managers are switched to normal managers from Sourcing. The representatives from the supplier is often the same as for the EBR. The focus and output of both meetings are quite similar but MBR focuses more on performance than strategic goals.

Other types of supplier governances are:

- Supplier Performance Evaluation
- Supplier Status and Risk Card (SRC)
- Financial Risk Evaluation
- Supplier Self Assessment, SSA

These are performed for all supplier that are governed, in other words, all suppliers except transactional ones which are not considered important enough to be governed.

4.6.2 Supplier Relationship Management (SRM)

Supplier governance is one of two main parts of the Supplier Relationship Management. The other parts focus on supplier value creation. Together these two parts constitutes the base for Ericsson's SRM house that can be seen in Figure 16.
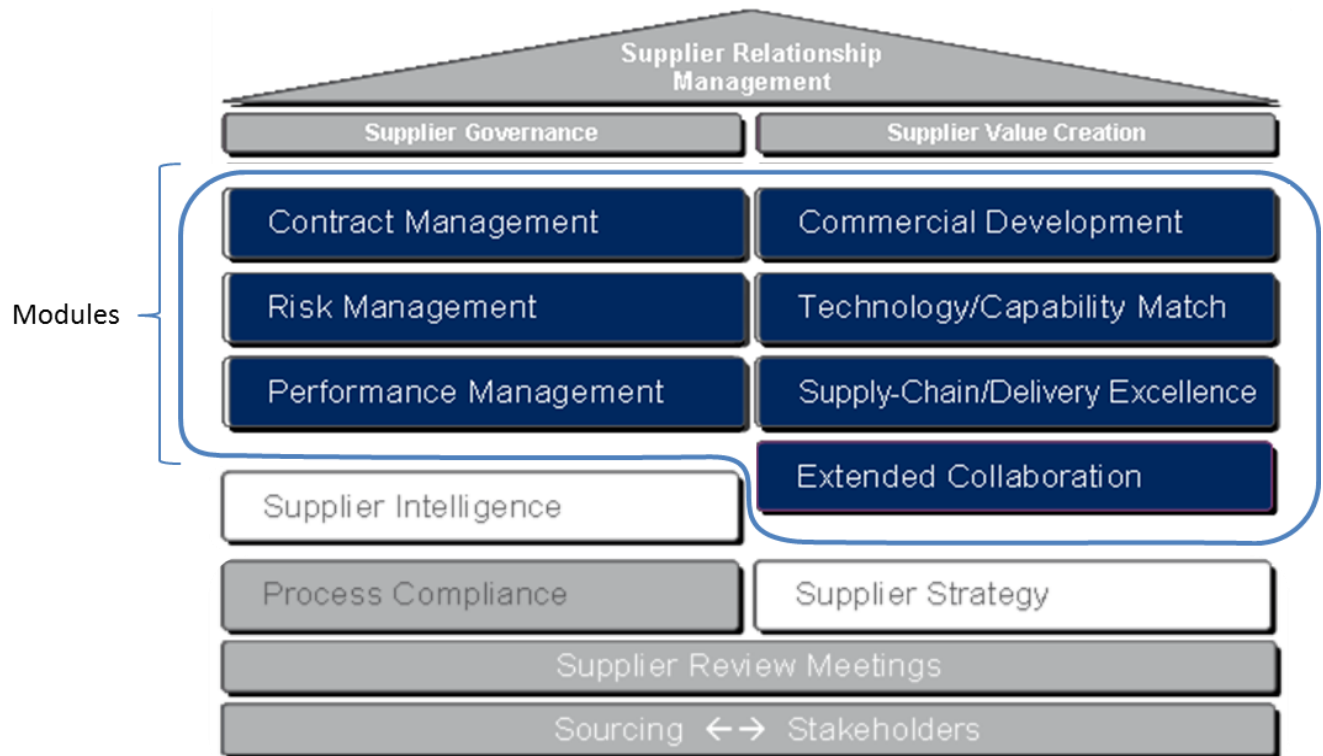
Figure 16 - Supplier Relationship Management at Ericsson

The blocks marked in Figure 16 are called modules and are all handled with the same methodology: First the current state is mapped, then the desired position for the future is determined by Ericsson and lastly a strategy to reach the desired position is developed. The different strategies for each module constitute the supplier strategy block when gathered together. The supplier intelligence is a description of the supplier based on a general analysis in combination with the supplier's business and strategy with Ericsson.

4.7 Business Case –Product Variance

This section presents a concrete example of how Ericsson can achieve lower costs through a holistic approach looking at many products at the same time. In this example cost reduction is achieved through reduction of variants of products. This specific example concerns an important component in a strategically important product for Ericsson. The initiative to reduce to variance of this component was initiated by Product Line and is an explanatory example of Total Cost of Ownership thinking.

Originally the total amount of variants for this specific product was 288 and 80% of these where outsourced. Handling 288 different variants was a problem for foremost logistics, who had to handle the flow of so many different components but also to keep appropriate stock levels to have an acceptable material availability for the different variants. These issues were costing Ericsson

money and due to new competition on the market the cost where becoming increasingly important to assess in order to remain competitive.

In the first reduction the total amount of the component where reduced to 210 variants without losing any significant functionality. The current goal is to reduce to 152 variants by making the component tunable through software steering. If this goal is reached Ericsson estimation is that the total cost of the products can be decreased by 20-25 percent. The main savings is through lower inventory costs, lower delivery costs and lower order handling cost. Further, there are large savings to be had in production since the possibility to standardize and automatize increases when the variance decreases. Something that is also important is that the customer will also be able to lower its inventory cost making this a win-win solution.

The future goal is to investigate if it is possible to reduce the number of variants to a total of 36 by making them even more adjustable and flexible. This reduction is estimated to reduce the cost with an additional 15% percent.

This variance reduction is very welcomed by foremost Supply at Ericsson but one reason that it is not performed more often is that the sourcing cost actually could increase due to a more complex product. However, this cost is often just a small proportion of the total savings to be had from this type of action. This type of total cost focus is quite new at Ericsson and the reason for looking into this for this specific component was that it was a quite mature product for which manufacturing costs already had been reduced quite heavily and the volumes were at a high and stable level. The first focus when releasing a new product is always to get the volumes up, once that has been achieved, cost reduction in manufacturing and quality is often the focus. The driver of this project sees great potential in having variance reduction in mind already in the design phase in order to assess this issue as early as possible.

5 Analysis

In the analysis theory and empirical data are analyzed together in order to answer the research questions and fulfill the purpose of this thesis. The analysis is structured in accordance to the three research questions looking into supplier relationships, value add and cost reduction and lastly organization and how these different aspects affect the outcome of Design to Cost and Should Cost and how they can be handled to increase the usefulness of the two approaches.

5.1 Design to Cost and Should Cost in Ericsson BNET's supplier relationships

As stated in the problem analysis an important part to maximize the output of both Design to Cost and Should Cost is to understand the value creation that suppliers can contribute with. Both Ford et al. (2008) and Dubois (2003) highlights the value of understanding a supplier's cost structure, through interaction, in order to reach a closer collaboration with a supplier and eventually utilize the full potential of this relationship by finding win-win solutions and add actual value to Ericsson. It is also of interest to look into for which type of supplier relationships Design to Cost and Should Cost can be used and if there is a need to differentiate the methods used in accordance to different relationships. Furthermore, it is relevant to assess which type of interaction is suitable for different relationships in order to allocate the resources in an efficient way. By analyzing these different aspects research question 1 is answered in this section.

5.1.1 Should Cost approaches for different relationships

Since suppliers are segmented in four different segments; transactional, tactical, collaborative and executive; in accordance to their desired relationship and importance for Ericsson the use of Should Cost and fact-based negotiations will differ in approach in regards to this. Dubois (2003) suggest that the goal always should be to strive towards collaborative partnerships in order to work with Strategic Cost Management by analyzing the cost structure of the supplier in order to try to find real sustainable cost reduction. At Ericsson it is also a question of limited resources that limits the possibility of working closely with only a few suppliers.

McDuff (2001) argues that only 20% of the products represent 80% of the cost. With this in mind a prioritization should be possible on these 20% when initiating closer collaboration with some suppliers. Factors that also need to be considered when choosing which suppliers to start with in an initiative like this are risk and strategic impact of the suppliers.

The desire by Ericsson, which also is in line with theory by Dubois (2003) and Gadde & Håkansson (2001), is to use Should Cost as a basis for a closer partnership with strategically important suppliers. This would be especially suitable for suppliers in the segments executive and collaborative where the suppliers with greatest impact on Ericsson's business are located. In order to achieve this, a very open minded approach will be necessary in order to make the suppliers understand that Ericsson's goal is not to "eat up their margins" but to reach significant cost savings for both parties through joint development and integration with the supplier. In this case Should Cost can be used as a tool to try to find areas of improvement together with the supplier. Examples of these improvements is

when Ericsson can compare their prices for raw material or components with suppliers in order to try to find opportunities for lower purchasing costs, through information sharing regarding changes in demand, through optimized ordering between the two companies, through increased understanding of the manufacturing capabilities of the supplier and other improvements made possible through closer collaboration between the two parties.

Regarding ways to perform this type of work Ellram (1995) emphasizes the need to work with TCO. To broaden the scope of Should Cost and work with suppliers from a TCO perspective continuously looking into where the majority of cost resides would be the most suitable way to utilize Should Cost. One has to have in mind however that the resources required for this extensive collaboration is very high and not all suppliers have an impact large enough to work with in this fashion. For some suppliers, for example transactional ones which most often deliver commodities, a different approach would be necessary. The approach suitable here might be to use the findings from Should Cost as a demand in a reverse auction and leave it at that. But it is also important to remember that no sustainable cost reduction for the whole supply chain can come from this type of behavior.

Regarding use of Should Cost in negotiation a more standardized way to do this is necessary in order to be able to secure the alignment in approach from Ericsson towards its suppliers. When looking closer on the different models of interaction between companies by Ford et al. (2008) and how this effect not only the other counterpart but also the own company and other companies as well, the need to be aligned in the approach towards suppliers is of great importance. With this in mind a steering document on the way to use Should Cost on different type of suppliers needs to be established and spread to all people involved in order to secure that the perception of Ericsson as a company is the same regardless of the person in contact with the supplier. It is important to emphasize that each supplier relationship is unique and should be treated as such but the steering document can instead work as clear guidelines to try to reach better alignment in approach towards suppliers.

5.1.2 Early involvement of suppliers in R&D

As explained by Gadde and Håkansson (2001) involving suppliers early in the design process can greatly contribute to both the functional and financial perspective of design. Since sourcing seldom are involved in the early design phase there are a lot of potential in doing this since sourcing is the function with best knowledge about supplier capability. At Ericsson the area where the highest potential gain is to be found is when it comes to hardware development since that is the areas where sourcing has the best knowledge and the majority of the sourcing is performed. Gadde et al. (2010) emphasizes that a company can have a lot to gain by coordinating internal R&D activities with those of suppliers as early as possible thereby enabling a much more proactive way to work with suppliers. Ford et al. (2008) takes this even further and suggests that the core of business got more to do with what happens between companies than within a single company. These initiatives will be an important part of the Design to Cost initiative with the motivation mentioned by Dubois (2003) that one of the major cost drivers is the size of the supplier base together with the fact that up to 80% of the total cost of a product is determined in the design phase. Dubois (2003) also emphasizes the need for single sourcing to reach significant and sustainable cost reductions together with suppliers. With these theories in mind the authors would like to emphasize the need to include strategic suppliers in the work with Design to Cost when this is possible and major gains can be had from it. For specific products this might be taken as far as including them in the cross-functional

group performing the workshops within Design to Cost and including them in early design work surrounding the PD decisions. To perform this kind of initiative a close partnership, trust and water-proof confidentiality agreements is prerequisites to secure that Ericsson's confidentiality is kept.

5.2 Value creation and cost reduction through Design to Cost and Should Cost

In accordance to the aim as well as the title the goal of working with the two approaches, Design to Cost and Should Cost, is in the end to reduce cost for Ericsson and create value for the end customer. In this section of the analysis different ways to do this is presented and elaborated on thereby answering research question 2.

5.2.1 Suppliers as resources

As can be seen in the value stream performed by Ericsson, Figure 9, both the sourcing function and suppliers are excluded. A conclusion that can be drawn from this is that suppliers and sourcing are not considered to add value to the company. According to Gadde & Håkansson (2001) suppliers have the ability to greatly contribute to a more efficient business and thereby have the ability to be a competitive advantage for the company. In order to get the most out of Should Cost and Design to Cost the view of suppliers and sourcing as a function must change and start to be seen as functions that can add value to the company. As mentioned by Ellram (1996) Should Cost data can be a basis for information sharing and greater understanding of cost structures which according to Dubois (2003) is the most important way to reduce cost in a sustainable way. Another motivation for this, mentioned by Luzzini & Ronchi (2011), is that a great number of resources and knowledge needed for future success lies outside the company. And as mentioned earlier in the analysis suppliers can greatly contribute to the value add in R&D further increasing the importance of top management to start regarding suppliers as resources. It is firstly when this is done that the real value-add and cost reductions can be gained by working closely with suppliers to reduce cost and create value. As mentioned before a good basis on which to start this type of closer relationship with suppliers is through Should Cost.

However, in order to achieve a high degree of integration and higher involvement Dubois (2003) suggest that the need for supplier base reduction is eminent since she considers the size of the supplier base to be the major cost driver for any buying firm. By actively reducing the supplier base the opportunity to work closer with a larger portion the supplier base will increase thereby solving the problem with insufficient resources to handle all the strategic suppliers in an active and involved way.

5.2.2 Design to Cost in product development

With the empirical approach of value argumentation in mind in combination with Value Engineering there are important aspects to analyze. Value argumentation emphasizes the need to consider the value added for the end customer of each planned functionality or improvement and analyze whether it is more or less than the cost of the improvement itself. By continuously securing that the value-add is greater than the cost of an improvement the risk of over-designing and ending up with costs that has gotten out of control will be significantly lower.

This new mindset in combination with Mascitelli's emphasis to set clear goals on cost early in the development and secure that there is a process to make sure these are followed, is two of the most important aspects of the implementation of Design to Cost at Ericsson. An example of a suitable process is presented by Lane Davis (2004) who purposes that a dedicated value engineering team is assigned to implement value engineering in product development. As stated in the research there is a clear lack of cost focus as well as clear cost targets when designing and these two problems needs to be assessed in a systematic way preferably through the Design to Cost initiative's five workshops which can be seen as inspired by the ideas of value engineering.

It is important to understand that the proposition is not that Ericsson stops designing to be technology leaders or changes its focus towards cost leadership but works in accordance to Lane Davis (2004) definition of value engineering by maximizing value, reducing unnecessary life-cycle costs while maintaining or improving functionality, safety and quality. By working in this way a suitable combination of functional growth and cost awareness can be possible.

5.2.3 Design to Cost and sourcing

As pointed out earlier in the analysis suppliers can contribute a great deal in the development of new products. But to do this in an efficient way Dubois & Wynstra (2005) suggests purchasing to be the most suitable interface between suppliers and the rest of the company. Nijssen et al. (2002) claim that early involvement from the purchasing function in the development of new products had a significant impact on the success of the new products, in terms of both sales and profit. With this in mind, and with the desire from purchasing to be more involved at Ericsson, it is recommended that capabilities to ensure increased involvement of sourcing in the early design phase are worked out by managers. The unit most suitable for this type of work is PSM since they already have a cross-functional way of working with both SSM and PDU. Two different approaches could be interesting for management to consider. Either PSM is included in the current decision forums or a new forum is introduced where sourcing can contribute both on its own in the selection of components and products from a sourcing perspective, through its knowledge of supplier capabilities and through contact with suppliers through relationships that are already established. This type of cooperation between functions will greatly contribute to the initiative of Design to Cost by broadening the perspective of cost which is very much in line with the focus on Total Cost of Ownership emphasized in the theoretical framework.

5.3 Organizing to use Design to Cost and Should Cost

To be able to answer the research question 3 there is a need to assess where in the existing processes Design to Cost and Should Cost are most suitable to be used. A broader perspective of this issue is considered when addressing the problem of Silo Thinking within the different functions at Ericsson. On a more detailed level specific engagement points for each approach is presented by analyzing the current process in combination with the capabilities of the different approaches as well as the theories.

As explained early on the Cost Engineering initiative at Ericsson is currently driven by PSM. The PSMs involved perform cost breakdowns in order to perform Should Cost analyses. In order to succeed with Design to Cost the involvement of Cost Engineering needs to be broaden to include people from other functions. This can be motivated by Macitelli (2007) who states it is important for this type of

cross-functional development team to include people directly involved in the development in order to make it run smoothly. Since both PDU and PL are closely involved in the development process it would be recommended to include people from these two functions to work actively with Design to Cost in order to get acceptance and attention from these functions.

A similar problem has been observed in PL. In here a vast majority of the employees have a background in PDU making this function, which should have a broad market and customer focus, quite subjective. Other functions have experienced a lack of understanding of their possibility to contribute in the development and the focus has been very technical. According to Valle & Avella (2003) it is important for a product development team to understand information from diverse sources such as the market, technology, competitors and other resources such as suppliers and from this information create a successful product. With a subjective view some of these important elements might be disregarded or not prioritized resulting in the products not living up to its full potential.

5.3.1 Silo-thinking and TCO

Looking deeper into sourcing a lot of issues was revealed. Regarding cooperation it is becoming clearer each day that the "silo-thinking" is a problem within Ericsson as an organization. These problems require management attention in order to enable the reduction of cost from a total cost of ownership perspective. Three important problems when it comes to TCO at Ericsson are: the narrow focus of only looking at the direct material cost, not being able to work proactively due to the silo thinking of foremost PDU and PL and not seeing and utilizing the potential gain of closer partnerships with suppliers to enable win-win solutions and significantly reduce total cost within the supply chain.

What much comes down to is to start seeing suppliers and relationships as resources. As discussed in the section regarding Strategic Cost Management by Dubois (2003) in order to get down to the core cost a company must start to look beyond its own boundaries and try to find ways to integrate the work with suppliers. However, an important issue here is in order to enable integration in the supply chain, integration within the own organization must work properly. As stated by Trent and Monczka (1998) the goal should always be to find the "absolute linkage of sourcing, purchasing and the supply chain – to the financial plan or the economic-value-add contribution of the business". With the "silo-thinking" in mind, Ericsson has a long way to go to achieve excellence and a lot of management focus to this major issue is required in order to enable alignment in objectives between functions.

One of the problems that results in this silo-thinking the different functions do not share the same goals and how they cooperate differs from project to project and assignment to assignment. For instance, both supply and sourcing's involvement in a new product development seem to depend on the project manager. In some projects the cooperation starts early and continues throughout the project. While in some cases supply and purchasing are involved in a later stage where the project has progressed to a point where it is difficult for sourcing and supply to influence the choice of components. In day to day operations this presents itself when PDU decides to use a component from a specific supplier without consulting with supply, who are responsible for sourcing the component. Another situation where it becomes evident is when sourcing chose a supplier without consulting supply, who are responsible for supplying component from this specific supplier. As described by Ellram (1995) it is important with a TCO perspective in order to reduce the risk of one

cost reduction leading to a cost increase somewhere else in the cost structure. When the different functions are not coordinated the TCO focus is lost, for example; if sourcing changes to a supplier with a lower purchasing price without consulting supply there is a risk that the supply chain cost increase and consume the savings in purchasing price.

Mascitelli (2007) states that it is important to have an organizational environment that facilitates cooperation in order to function efficiently when it comes to cross-functionality. One way of creating such an organization is to have a well-defined stage-gate development process that provides interaction points for the different functions to interact with each other in a structured setting. Another advantage with the stage-gate model is that it provides a "road map" for the development process and facilitates goal-setting and follow up. Setting goals early on and be able to follow up on them is something that is important in all kind of value engineering (Mascitelli, 2007).

Therefore, several problems at Ericsson can be addressed through a stage-gate development model. Ericsson already have a version of a stage-gate model with their BD and PD decisions but as it is now they do not facilitate cooperation in the manner recommended by Mascitelli (2007). While there are recommendations within Ericsson saying that several functions should be involved in and in preparation for these decisions this is not always the case. What Ericsson could do in order to engage more function early on is to make sure they are involved in the BDs and PDs. This would give each function the possibility to contribute to the new product and prepare them for tasks to come (Mascitelli, 2007). It would also be easier to align the goals between the functions and give different functions the opportunity to influence the goals set on the project. Such goals could be related to cost and provide sourcing with the opportunity to introduce Design to Cost to the development process.

For making these changes work (Mascitelli, 2007) recommends that the changes should be supported by the Decision Council that formally take the stage-gate decisions. In the case of Ericsson it is the Product Council that is responsible for PD and BD decisions. Each of the different functions should have a position in this council and be allowed to take part in each of the meetings. Also there should be a methods for consulting the different functions on a lower level and if these have not been followed the project has not fulfilled the requirements for passing the gates.

5.3.2 Organizing for Design to Cost

Design to Cost is closely related to the concept of Value Engineering. *The Core Function Analysis* in Design to Cost is basically the same mindset as the one invented by the engineer at General Electrics. The Design to Cost process is also in line with the value engineering process described in theory. As seen in Figure 6 in the theoretical framework the cost to change increases by time and the potential savings decreases. This fact emphasizes the need to implement Design to Cost as early as possible in the product development process thereby working proactively with cost reductions as emphasized by several functions. However, there will also be a need to have a model on how to assess existing products in severe need of cost reductions. Design to Cost focuses on finding the core cost of the product which aligns it with the objectives of both TCO and Strategic Cost Management. In Figure 17 we see an example of the potential savings from using Design to Cost.
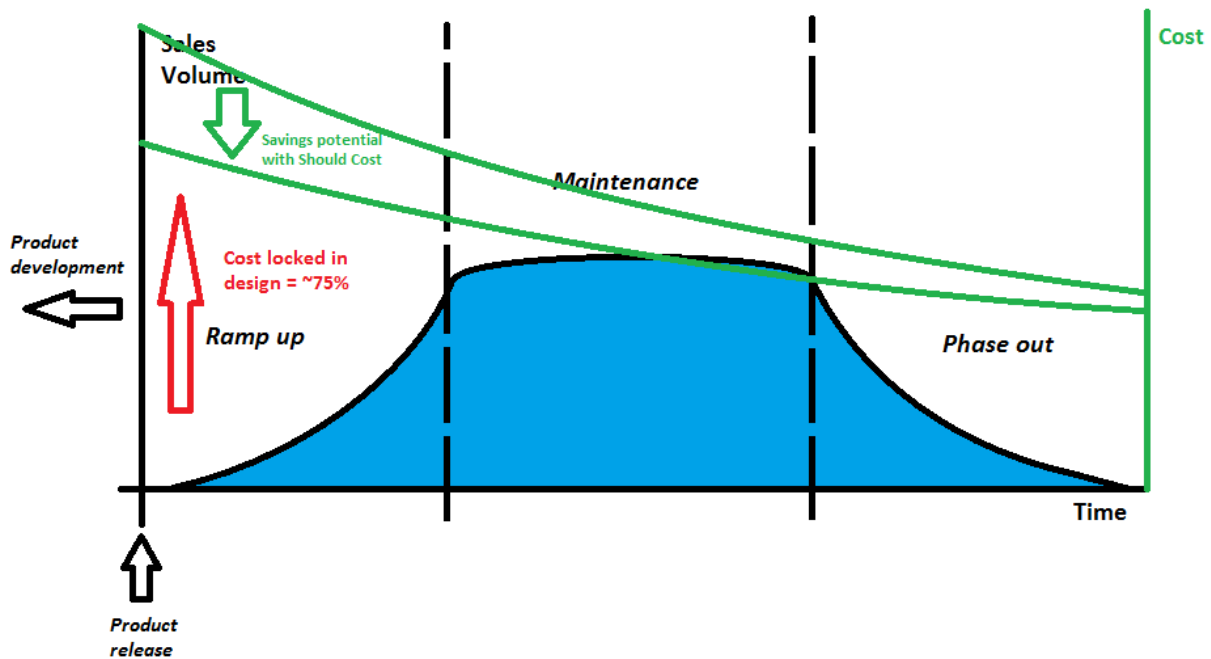
Figure 17 - Should Cost and Design to Cost in the PLCM process

Figure 17 describes the PLCM process and shows both the potential savings in Should Cost as well as the potential savings of Design to Cost, which is the cost locked in the design. A fully performed Design to Cost initiative goes all the way back to questioning the actual concept of the product, therefore assessing the most important 75-80% of the cost which is locked in the design. It is important to understand that changes made on existing products will not be as flexible as changes made in the development of a new product and the cost of late changes will also be much higher as can be seen in Figure 6 in the Theoretical Framework describing the cost of change versus the potential savings over time.

The five different workshops and analyses in Design to Cost cover a very broad spectrum of cost reduction making it a very extensive approach. All workshops, especially manufacturing analysis and factor cost analysis, require the team to be very cross-functional and occasionally include suppliers to enable proper analysis which is very much in accordance to theory by for example Gadde & Håkansson (2010) and Dubois (2003) who all emphasizes the potential of including suppliers early in the development process.

5.3.3 Organizing for Should Cost

Currently, the Should Cost initiative is focused on giving SSM a better negotiation position against it suppliers by advocating the usage of fact based negotiations. According to van Weele (2010) this type of behavior can be considered as cost avoidance which is not considered a long-term sustainable effort. Due to this a new approach of Should Cost is necessary to enable sustainable cost reductions together with suppliers as emphasized by Dubois (2003). This new approach is presented in the engagement model for Should Cost.

5.4 The engagement model

Ericsson's desired output of this thesis was for the authors to provide them with an engagement model for each of the two approaches, Design to Cost and Should Cost, in the current available processes of the product development at PDU IP & Broadband. The engagement model for Design to Cost is presented below and is divided in two scenarios. Thereafter, the Should Cost engagement model is presented.

5.4.1 Engagement model – Design to Cost

With the analysis above in mind an engagement model can be created. There will be two different scenarios in the model: One for new products and new releases of current products and one for existing products in need of major cost rationalization. In both cases champions that will guide the work will have to be educated. These champions will be specific for each analysis since each analysis requires extensive expertise in the specific area of improvement. For the first three analyses; *The Core Function Analysis*, *The Core Specification Analysis* and *The Core Concept Analysis*; people with a design background but with a very broad and cross-functional mindset are preferably trained to become champions. For the *Manufacturing Process Analysis* someone with a background in manufacturing and production will be trained to become a champion. Lastly, for *The Core Factor Analysis* someone with background in logistics and/or sourcing is preferably chosen to be able to handle questions on outsource vs. insource and production relocation.

Scenario 1 – A New Product

For the first scenario with a new product introduction the work with Design to Cost will spread out in different phases of the product development, see Figure 18. *The Core Concept Analysis* should be performed on a pre-study level which is as early as before PD1. Here it will be able to serve its full purpose to question the very concept of the product. *The Core Specification Analysis* is also suitable here in order to analyze the specifications before the design is initiated. *The Core Factor Analysis* will be useful to perform before the PD2 is taken as an input to the make-or-buy strategy as well as in the choice of suppliers. *The Core Function Analysis* is preferably assessed before PD2 to question the functions before development has begun in foremost the hardware part of the development, to introduce a proactive cost focus as early as possible in the product development process. Lastly, *The Manufacturing Process Analysis* would be most suitable to be performed during the development in order to be able to find opportunities for initiatives within Design for Manufacturability and Design for Assembly in order to reduce cost by having production and assembly in mind while developing.
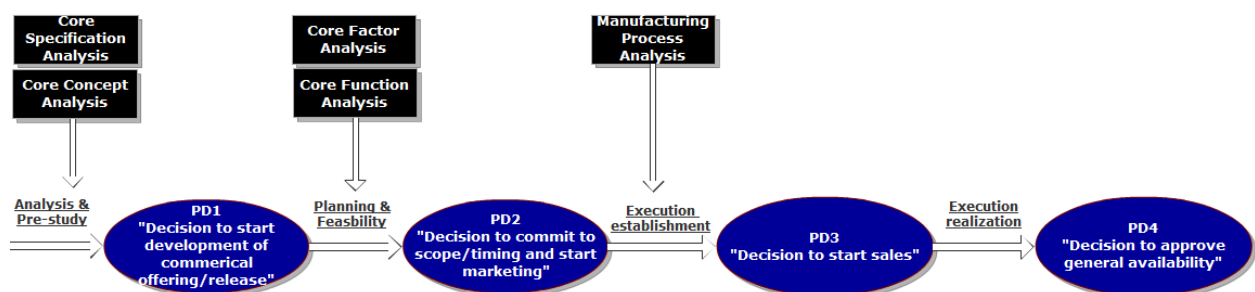

Figure 18 - The Engagement Model

The majority of the analyses in Design to Cost are focused on hardware and it is in this aspect the major wins can be had. A tweaked software focused function analysis however can preferably be performed in the second step of the Streamline Development Process, the activity & release planning loop where different features are prioritized. It is also in here real *Core Function Analysis* needs to be performed. These analyses will be valuable in order to constantly assess the question if each specific feature is a core function for the customer and if the customer benefit outweighs the cost of developing it. It is important to remember that all the analyses should still be performed in cross-functional teams as specified in the Design to Cost description and in accordance to Valle & Avella (2003) and Mascitelli (2007) who both emphasizes the value of cross-functionality in product development.

Scenario 2 – PLCM

The second scenario is focused on existing products i.e. products in the PLCM process. The authors propose that this should be run on a project level by champions following the Design to Cost Process presented in the empirical findings. Each of the different workshops should be thoroughly performed in accordance to the management tool bought by Ericsson from a management consultancy agency.

To know where to start, a team that investigates products which have a high potential of cost reduction will need to be created. One way to find these products with high savings potential is through so called TK-reductions initiated by PL which are made regularly for products that has too high costs, most often in combination with the release of a product. To use Design to Cost on existing products would be a great way to standardize the work with TK-reductions and try to introduce a TCO way of decreasing cost in the PLCM process. These initiatives will mostly be oriented in the ramp-up and maintenance stage of the PLCM process since it is quite late to make changes in design when the product is approaching phase out. The process of how to work with Design to Cost in the PLCM process can be seen in Figure 19.

Figure 19 - Using Design to Cost in the PLCM process

The necessary capabilities and steering forums to enable this kind of initiative will need to be established. Since this type of work requires extensive cross-functional cooperation, re-design of current processes and allocation of resources, top management approval and drive is essential to succeed with this effort. To get this kind of attention and approval a pilot should be launched for a product with extremely high savings potential resulting in a clear summarizing business case of all the savings done in the five workshops proving for management, PDU and PL the potential of this type of work.

Ericsson should have in mind that the type of work in scenario 2 is a reactive way of working and that changes after release always are much more expensive than changes during development. This type of work could however secure necessary short-term wins by improving margins and enable higher volumes through lower prices.

5.4.2 Engagement model – Should Cost

As the usage of Should Cost increases the database with information gathered increases as well giving the sourcing function at BNET greater knowledge about supplier capabilities but also greater market knowledge. Through this knowledge sourcing will be able to contribute more in the product development process especially regarding decisions on make-or-buy strategy and also in the choice regarding black box vs. white box. This new contribution may lead to earlier involvement for sourcing in the development process in line with several authors, such as Gadde & Håkansson (2001), Mascitelli (2007) and Nijssen et al. (2002) who claims that this is a wise business decision. So a new engagement point for the Should Cost can be before PD2 to enrich the input for the make or buy decisions and the black box vs. white box decision, see Figure 20.
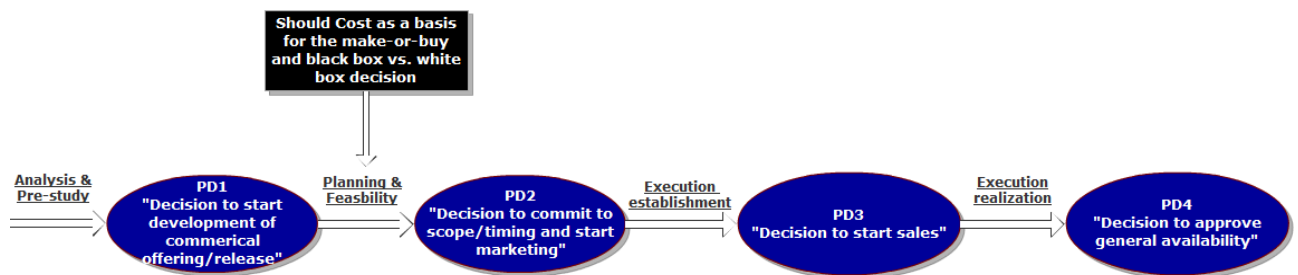

Figure 20 - Should Cost as a basis for the make-or-buy and black box vs. white box decision

Furthermore, as mentioned earlier in the analysis, the most suitable engagement point for Should Cost would be as a basis for joint development with suppliers. With Dubois (2003) thoughts in mind on, trying to break down the cost structures of suppliers in order to reach a better understanding and eventually a better cooperation between Ericsson and the supplier. According to SSM the way the annual VPA process works today is not suitable to handle supplier in the most efficient way possible. The VPA process is strictly performed annually and does not allow SSM to sign contracts for more than one year at the time. In order to build closer partnerships it will be necessary to sign longer contracts with suppliers in order to be able guarantee large volumes to that supplier and thereby enable better work with long-term cost reductions and integration with strategically important suppliers. Therefore, *a new and more flexible VPA-process is proposed* where cost and price reduction can occur more continuously as cost is reduced through the joint development of the relationship and its capabilities. The focus suppliers for this type of work being executive and collaborative suppliers and suitable engagement points for this can be either the MBR or the EBR depending on the desired level of the people involved. An investigation if new interphases are necessary to create in order to enable these closer partnerships will need to be performed, preferably by the ones most involved in the contact with the suppliers.

Lastly, another useful engagement point that is already utilized today is Should Cost in negotiation with suppliers and as mentioned earlier *clear guidelines on how to use Should Cost for different relationships is proposed* in order to reach alignment in BNET on how to handle suppliers. To sum up, Should Cost can be used in several positions at the company and with several different goals but it is important to remember that the using Should Cost is not a goal it itself but rather a tool to gain better understanding of the situation for the supplier and its possibilities to improve its work and its cooperation with Ericsson.

6 Discussion

In this chapter discussions are held that are somewhat outside the scope of the thesis. The authors found it necessary to discuss not only if Should Cost and Design to Cost can solve some of the challenges faced by Ericsson BNET but if they are the most suitable approaches to use.

6.1 Critique of Design to Cost

A weakness with the approach of Design to Cost is that it does only consider one product at the time. The workshops bought by Ericsson mention nothing about organizing for several products at the time or to look into administrative handling of many products at the same time. A more holistic approach will be more useful for Ericsson to reach long term profitability since products seldom can be seen in an isolated perspective. Just as interaction with other companies affects other interactions and other companies, as described by Ford et al. (2008), products will be affected by other products, their own product families, different customer relationships as well as the overall brand image of Ericsson. These holistic viewpoints are at the core of the IMP research and the major lesson to be learned from this is that it is impossible to look at both products and relationships in isolation and without regards to context. Due to this, it will be hard to enable such initiatives as mentioned in the case study on product variance where product families and number of variants in the product flora is optimized to reduce cost in the supply chain by only applying Design to Cost on one product at the time. This type of holistic work is a great example of TCO-thinking and to enable TCO-initiatives additional workshops added to the Design to Cost methodology will be needed to complement the existing workshops and thereby broaden the initiative. In the case with Ericsson this type of work becomes increasingly relevant when so many variants of each product and component exist.

6.2 Critique of Should Cost

The largest problem with Should Cost is that it is solemnly focused on price i.e. direct material cost. Gadde & Håkansson (2001) emphasizes the value of looking and measuring beyond price since the majority of cost is not located in the price but in hidden costs such as production cost, goods handling etc. This makes the scope of Should Cost narrow and not at all in line with TCO. If the sourcing function instead could broaden its focus and start working with reducing costs in a TCO fashion much more was to be gained. The background to the need of Should Cost is also an interesting issue. A large part of the reason that suppliers set to high prices for Ericsson is that they do know that Ericsson demand at least 8% reduction of price each year. This in combination with Ericsson only allowing one year contracts puts the supplier in a very tough situation. Because in order to invest in cost reductions the suppliers need to know that they will have the volumes for longer than a year and since Ericsson cannot guarantee this but still demands annual cost reduction the supplier has to compensate with a higher price. Therefore, it is in fact Ericsson's approach that might be the reason that their suppliers act the way they do. The constant demand of lower prices each year in combination with contracts that do not last for longer than a year does not emphasize neither trust nor development in the relationship. With this in mind the recommendation to Ericsson to change their view of suppliers as well as the VPA process might open up the information sharing between Ericsson and some of Ericsson's suppliers so much that Should Cost will no longer be

necessary since the supplier is willing to share information on cost structure and prices. This scenario is ideal and might not be that likely to occur, however, when this type of relationship with a supplier is starting to become realizable, Should Cost would be more useful to use as a benchmark on where the supplier could improve instead of a demand on where the supplier needs to be to get the sale.

If, however the Should Cost tools becomes widely used Ericsson BNET needs to look over how they measure performance of the sourcing function. Today the sourcing function is evaluated upon the cost cuts in the VPA-process. If Should Cost is implemented, the price will be lower from the beginning and therefore it follows that the yearly cost reductions will be lower. An evaluation method that promotes long term thinking and collaboration is recommended.

6.3 Will Design to Cost be realizable at Ericsson?

The authors think that the initiative of Design to Cost will be problematic to realize in its full scale. There are three major hinders standing in the way: silo thinking, lack of profit focus in the product development and the embedded inertia that comes from having such a large company as Ericsson. Both the first problems are management related and can be handled through top management push and attention. It can also be wise to consider external help to push such a huge initiative into the organization. The problem with inertia is harder to handle but one way to do it is to start small through a pilot with the focus on emphasizing the potential of the approach through smaller examples. This type of initiative can be a good way to start something off in order to reach acceptance and understanding among employees at Ericsson without the need of a huge investment. It can also be a way to emphasize for management, though example, that this type of initiative has a great savings potential thereby enabling management approval which is necessary to be able to launch an initiative on a full scale.

7 Conclusion

The aim of this thesis has been to look into where and how Design to Cost and Should Cost can be most useful for Ericsson BNET. Looking into the first approach of Design to Cost an engagement model has been created which was the major output Ericsson desired from this thesis. This model suggests two different approaches, one with a more long-term focus to include Design to Cost in the development of new products, and one to handle existing products in the PLCM process. To create value and reduce costs five different aspects of the design should be assessed and challenged while working with Design to Cost: functionality, specification, concept, manufacturability and factor cost (who delivers and produces). In order to get even more out of this initiative the authors recommend Ericsson to include suppliers in this process in order to become even more competitive and create even more value for the customer. The work should be handled in a cross-functional fashion in order to enable value creation in every part of the value chain. The main lesson to be learned for Ericsson is to always try to work with a long-term perspective in a holistic way in order to reach sustainable value addition and cost reduction. To do this the perception of value creation needs to begin to be seen from a broad TCO-perspective instead of one product, one customer and one supplier at the time. This type of work will also increase the customer focus in the product development which the authors find eminent for Ericsson's long-term profitability.

The second approach, Should Cost, is not value adding in itself but is best utilized as a basis for closer supplier relationships. By trying to understand the cost structure of the supplier Ericsson builds knowledge about the supplier's work upon which a closer relationship can be built. In order to achieve this the goal must be to find win-win solutions and work long-term with suppliers. In order to assure that negotiators work with this in mind a steering document needs to be created to guide the negotiators in their work. The VPA process also needs to become more flexible to enable win-win solutions with suppliers through for example longer contracts where larger volume can be guaranteed in exchange for joint work with cost reductions together with Ericsson. To enable a larger percentage of close relationships a supplier base reduction is proposed which can lead to more resources per relationship and therefore the ability to handle a larger amount of closer partnerships with suppliers. A new engagement point for Should Cost should be located before the PD2 decision in order to enrich the input for the make-or-buy decision.

Lastly, it has become clear that Ericsson needs to look into its problems with silo-thinking in order to enable work with cost reduction from a TCO perspective. Currently, the functions seldom tend to think outside their functional boarder. The proposed way to handle this problem is through the construction of a more involving stage-gate process where more functions can contribute with the expertise early on and objectives of different function can become more aligned. In order to achieve this, decision forums should be regulated to include a wider range of functions and product management needs to increase the diversity of its people to broaden their view on value creation.

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Appendix

Interviews (in chronological order)

The following interviews were conducted from late March to late April 2013:

1. **Magnus Carlsson,** *Project Sourcing Manager working with Should Cost* – Cost Engineering (Should Cost)

2. **Bengt Oswalder,** *Manager Component Technology working with an approach similar to Should Cost for components* – Should Cost

3. **Fredrik Grunditz,** *VPA and Sourcing Data Management, driver of the Cost Engineering initiative at BNET* – Design to Cost

4. **Thomas Kaas,** *Head of Project Sourcing Management IP & Broadband, our supervisor* – Decision forums and processes

5. **Johan Blomqvist,** *Strategic Product Manager, PL* – The BD & PD process

6. **Magnus Zetterberg,** *Head of Strategic Sourcing Management, Electromechanics* – SSM processes, suppliers

7. **Angela Budillon,** *Project Sourcing Manager* – PSM, processes, cooperation and suppliers

8. **Lars-Erik Lindberg,** *Change Project Manager at PDU* – Streamline process, PDU work

9. **Jan Hagberg,** *Manager Process Design and NPI at Supply* – Supply perspective, value argumentation