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Purchasing Involvement in the Product Development Process

Master of Science Thesis

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Abstract

The purpose of this study is to clarify what role the purchasing function should have in the product development process in order to enable a correct supplier selection at an early stage. To fulfil this purpose a case study was performed at a global manufacturing company. The case study consisted of interviews with people from both the purchasing function and the product development function.

The initial literature review showed that purchasing activities has become increasingly important the last decades. The need for purchasing to take a more integrated and strategic role in the companies has with this emerged. Some trends have been supply base optimisation, buyer-supplier relationships and buyer-supplier product development collaboration. The purchasing function then has a key role, where they must coordinate these activities because they know the supply base. However, a gap in the literature was identified concerning the incentives why purchasing should be involved in the product development process as well as how this involvement could be managed.

Our conclusion is that involvement of the purchasing function in the product development process will result in cost savings of different kinds, increased product performance, reduced development time and that risks related to delivery are reduced. But to acquire these benefits this thesis has also identified several potential issues that might inhibit the integration of the purchasing function in the product development process. To avoid them it is important that the main objectives for both functions support this integration. Secondly, it is important that the communication between product development teams and the purchasing function is made earlier in the process and to further improve it templates for requests and also recommended parts list should be established. Thirdly, to ensure that suppliers are selected in a proper way the product development process should be complemented with such instructions and this should also be cross-checked at the gates. Finally, the purchasing organisation must be configured to facilitate this integration which can be accomplished by introducing a new role that coordinates purchasing related issues in the product development team.

Keywords: purchasing, product development process, involvement, integration

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Rickard Eriksson and Linus Rönnbäck

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1 INTRODUCTION

This master thesis concerns the role that the purchasing function should have in the product development process in order to enable a correct supplier selection at an early stage. In this chapter a background, the purpose and the limitations of the thesis is presented. An explanation of the overall report structure is also given.

1.1 Background

The competitive environment today is not what it used to be. New information technologies have had impact on the power balance between buyers and suppliers and it has resulted in a significant increase of competition in most markets. This has enabled the customer to demand tailored products and services with higher quality, faster delivery and lower prices. If not, the customer will turn to another provider (Monczka et al, 2009). This forces companies to find new approaches that can manage their daily operations in a more effective and efficient way.

Firms that are slow in bringing new demanded products to the market will soon see their market position fade away which will affect the financial performance (Wheelwright and Clark, 1992). At the same time, while many firms' product development expenses have gone up the profitable outcomes of these projects are less frequent (Billington and Jager, 2008). One important characteristic of successful product development projects is the use of broad technical expertise from critical functions, solving the problems in an integrated way. An integrated way of solving problems will prevent engineers to send problems back and forth and in the end result in a good use of the time which in turn will affect the quality of the product and/or the time to market (Wheelwright and Clark, 1992).

The growing competitive environment has also put pressure on firms' acquisition of materials and components. The ratio of purchases to sales in the manufacturing industries is today fifty-five percent (Monczka et al, 2009). With companies outsourcing much non-core activities it is likely that this ratio will increase. Since more than half of the money earned goes back to the suppliers it is not surprising that procurement is seen as a major area for cost savings. But savings can be in other forms than only the traditional way of bargaining for price reductions. One approach that is gaining popularity is to search for costs to eliminate together with the suppliers (Monczka et al, 2009).

Both the people working with the development of new products as well as the personnel responsible for the acquisition of materials are affected by the more intense competitive environment (Wheelwright and Clark, 1992; Monczka et al, 2009). They feel the pressure of achieving their functional goals even though the conditions have

changed. This, in combination with often very individual function-specific targets, has resulted in that efforts to support other functions in their development might be given low priority (Cousins and Spekman, 2003). One often mentioned solution to handle this new environment is to work cross-functionally. Many efforts have been made to increase the communication over the functional barriers but not all of them are successful. One cross-functional connection that in the literature has received increased attention is the one between purchasing personnel and development engineers. The benefits of having such a link and how it should be managed in practice is still not fully developed though.

This study will examine how companies can use suppliers with the right capability and the right risk for each situation by utilise personnel from the purchasing function in the product development process. In this way the two functions can together support a proactive choice of supplier leading to purchases made at the right price and also leading to a stable supply of components during the product's lifetime.

1.2 Case company background

The manufacturing company Alpha is a global supplier of mechanical products and components with presence in more than 100 countries worldwide. The product range varies from standard products manufactured in large volumes to customer-specific products manufactured in very small series. Their customers are original equipment manufacturers producing or assembling many different types of products. Alpha can be considered as a very large enterprise with production in a large number of countries. The industry that they operate in can be seen as mature and the competitive environment has become more intense, much due to new competitors operating in low-cost countries.

Alpha has a long history and has since the beginning been growing steadily. A long series of new factories and acquisitions have created the global reach that the company has today. The basic organisation consists of divisions which in turn are divided in different areas dependent on which group of customers that they serve. The product development efforts are mainly undertaken within the different areas which means a relatively decentralised product development organisation, but there is also a central research centre to support the different development teams. The purchasing organisation is divided in three different levels consisting of a central unit, a number of regional offices and a large number of local purchasing organisations mainly located at each manufacturing site.

The inclusion of the purchasing function in the product development process is today managed in an ad hoc and non-formalised way. Local development teams use suppliers in their proximity and if involving purchasing personnel this is often the local purchasing

organisation which is contacted after the design is frozen. This creates problems due to the chosen local supplier might not have the needed capabilities, the right level of risk or the right geographic location that the product requires when moving into production. A structured way of utilising the supplier knowledge could help the product development teams to at an early stage find the most appropriate technologies and design specifications, based on all the available suppliers. This could also result in selecting a supplier with the right manufacturing capabilities for each specific product.

1.3 Purpose

The purpose of this study is to *clarify what role the purchasing function should have in the product development process* in order to enable a correct supplier selection at an early stage. The purpose will be fulfilled by conducting a case study at the manufacturing company Alpha. The result of the study will give an answer to why companies should create a more structured link between the purchasing function and the product development process. The study will also examine what this link can consist of and how it might be managed.

1.4 Delimitations

The study will only cover the interface between the purchasing function and the product development process in manufacturing companies with significant size. Because of limitations in time the study will consist of one single case.

1.5 Report structure

To guide the reader some words about the disposition of the report will be given in this section. In chapter 1 *Introduction*, above, the background of this study, a brief description of the case company and also the purpose of the performed study are presented. Chapter 2 *Theoretical Frame of Reference* describes the existing literature within the studied field. On request from Alpha a wider mapping of the existing literature within purchasing strategies are given before narrowing down to literature directly concerning the purpose of the report. In chapter 3 *Problem discussion* gaps in the existing literature and practises are identified with the first two chapters as a foundation. Based on these gaps research questions are developed that will be answered in the end of this report. A description of how this thesis has been conducted as well as a discussion of the quality of it is presented in chapter 4 *Methodology*.

To be able to bridge existing gaps from literature and practices, interviews have been conducted at the case company Alpha and the outcome of these is presented in chapter 5 *Empirical study*. In chapter 6 *Analysis* the theoretical research and the empirical research are broken down and then compared. Recommendations for how Alpha should

proceed are given in chapter 7 *Recommendations for Alpha*. In the final chapter 8 *Conclusions* the research questions are answered.

2 THEORETICAL FRAME OF REFERENCE

This chapter summarise research relevant for the performed study. The area of purchasing strategy will first be mapped to explain its increasing importance. Secondly, the existing literature on purchasing and product development collaboration will be reviewed. Finally the logic behind gates in the product development process will be described.

2.1 Purchasing strategy today

A milestone in the purchasing literature was when Kraljic (1983) published his paper "Purchasing Must Become Supply Management" where he argues for a change of perspective on purchasing from operational to a strategic. This view laid the foundation for much of the modern purchasing theory. Lyons et al (1990) listed five strategic moves they could see as trends in the industry at that time. It was cross-functional teams, supply base rationalisation, longer-term contracts, outsourcing of professional services, and component and subassembly acquisition. These trends were confirmed by Gadde and Snehota (2000) who established that buying companies tend more and more to outsource non-critical activities, establish close partnership relationships with a supplier and reduce and trim their supplier bases. Also Das and Narasimhan (2000) had at this time found four practices encountered in many purchasing environments; supply base optimisation, buyer-supplier relationship development practices, supplier capability audit, and purchasing integration. The focus at this time was aimed at the supplier; first to handle the supply base and then to develop the relationships with the remaining suppliers.

Moving yet another couple of years ahead in time, Van Weele (2005) lists the following new developments in purchasing: building leveraged purchasing and supply strategies, global sourcing, supplier integration, early supplier involvement in product development, reciprocity agreements and compensation obligations, and environmental issues and business integrity. Most recently Monczka et al (2009) gives their prediction about the future of purchasing. That is expanding the mission, goals, and performance expectations of purchasing and supply, developing category strategies, developing and managing suppliers, designing and operating multiple supply networks, leveraging technology enablers, collaborating internally and externally, attracting and retaining supply management talent, and managing and enabling the future supply management organisation and measurement systems.

As can be seen, the change of perspective Kraljic (1983) argued for, has today more and more become reality. Even though the traditional supplier related issues are still very valid, one can see focus moving towards the strategic role of purchasing in the business, with strategy and involvement on top of the agenda. To have a successful purchasing

function today some areas can be identified as of particular importance; purchasing as a strategic function, supply base optimisation, buyer-supplier relationships and buyer-supplier product development collaboration. These will be described more thoroughly in the following part.

2.1.1 Purchasing as a strategic function

The need for purchasing to take a more integrated role has been fuelled by increased competition, global sourcing and more rapid changes in technology (Ellram and Carr, 1994). Due to an expansion of outsourcing activities a large part of a firm's performance is determined by the efficiency and effectiveness of purchasing activities and the performance of its suppliers (Gadde et al, 2010). The role of the supplier is today critical in a firm's development of a sustainable competitive advantage and as the key interface purchasing need to be a full participant in the strategic planning processes (Ellram and Carr, 1994).

To leverage the purchasing function into a more strategic level the external initiatives, such as supply base optimisation and buyer-supplier relationships, may have to be complemented with more internally oriented activities (Narasimhan and Das, 2001). As the purchasing function has moved away from being a truly cost-saving function (Cousins and Spekman, 2003) a greater focus has been put on how the purchasing strategy fits into the rest of the company's strategy and activities. This has been referred to as purchasing integration and can be defined as "the integration and alignment of strategic purchasing and goals with that of the firm" (Narasimhan and Das, 2001, pp. 593). This requires that purchasing participates in the strategic planning process, that purchasing has access to strategic information and that important purchasing decisions are coordinated with other strategic decisions of the firm (Narasimhan and Das, 2001). This will make it possible for the purchasing manager to regularly ensure that the current activities are aligned with the company's strategic plans.

The evolution of purchasing into a strategic function is a slow process and requires a change of attitudes both among the purchasing managers as well as top management. To be able to get the required attention top management must recognise, accept and operationalise the importance of purchasing (Ellram and Carr, 1994). This change can be a significant challenge, especially when differences in structure and culture among business units exist (Rozemeijer et al, 2003). To change the role of purchasing and improve purchasing performance talented and well-trained managerial personnel is necessary. Selecting and assigning the best available people to the purchasing function is important to fully utilise its potential (Watts et al, 1995). When purchasing can take on a more pro-active role and operate at a strategic level there is a great opportunity to attain competitive advantage through strategic purchasing (Ellram and Carr, 1994).

2.1.2 Supply base optimisation

One important part of the purchasing strategy is to decide the size and the mix of the firm's supplier base which is often referred to as supply base optimisation or supply base rationalisation (Monczka et al, 2009). The aim is to analyse the current and future need of suppliers for every purchased item and the main reason is often a need to manage suppliers more effectively (Goffin et al, 1997). At the beginning of this process the result is often a significant reduction of the supplier base but for some groups or families of purchased items it could also mean an increased number of suppliers. When performing supply base optimisation or rationalisation it is vital to analyse the overall system efficiency and the total cost not to sub optimise (Monczka et al, 2009).

Since the process of supply base optimisation and rationalisation aims at maintain only the most capable suppliers in the supply base this should result in real improvements when it comes to cost, quality, delivery and information sharing between buyer and supplier. Even though many buyers realises the potential of reducing the number of suppliers there are potential risks in trusting a smaller supply base, many of them related to eventual disruptions of supply. This risk has very often been argued to be the single most important disadvantage with a limited number of suppliers but many buyers have now concluded that carefully managed relationships with fewer and the right suppliers can actually reduce this risk (Monczka et al, 2009).

Many of the benefits and risks when reducing the supplier base are dependent on making the right choice when deciding which suppliers to maintain and which suppliers to eliminate. Cousins (1999) conclude that significant cost reduction and competitive advantage can be drawn from a smaller supplier base but this process need to be managed in a strategic framework and also not too aggressive to avoid risks of inadequate capacity of the remaining suppliers (Monczka et al, 2009).

The consolidation of purchases to a smaller number of suppliers might not be without difficulties. Managers with experience from supply base rationalisation conclude that the process is initially easy but as the amount of suppliers is reduced it gets more difficult (Goffin et al, 1997). In a case study made by Lonsdale and Watson (2005) they identify drivers for fragmentation of the supplier base, some technical and organisational, but it was merely politics and power that amplified the issue. It was first after the power shifted somewhat from the divisions to purchasing that the first steps towards consolidation was made, immediately resulting in significant financial results.

2.1.3 Buyer-supplier relationship

The main idea of the relationship between buyer and supplier is to create a win-win situation for both the buyer and supplier, compared to the traditional approach where the buyer had the power and could play the suppliers against each other just to

minimise cost. The collaboration should enable for example mutual cost sharing, joint improvement efforts, conflict-resolution and better communication (Monczka et al, 2009).

The goal with the relationship is often to improve within logistics, quality and product development (Van Weele, 2005). That kind of improvements should then result in economical wins, such as cost and revenue benefits (Gadde and Snehota, 2000). But it is often hard to prove that kind of correlation between relationships and economical gains, because they are usually only indirect connected. However, several studies have been able to see that a good relationship with the suppliers has led to success and positive economic consequences (Carr and Pearson, 1999; Gadde and Snehota, 2000). Examples of advantages that could give secondary effects in the long-run are trust and long-term contracts (Monczka et al, 2009).

Van Weele (2005) stresses the fact that developing relationship take time, it is the result of continuous efforts rather than a short-term technique. Other obstacles concerning closer collaboration are the confidentiality risk, limited interest by suppliers, legal barriers and a resistance to change (Monczka et al, 2009). There are also some direct costs that can be tied to the supplier relationships, for example procurement costs, transaction costs, relationship handling costs and supply handling costs (Gadde and Snehota, 2000). Because of this, Gadde and Snehota (2000) argue that partnering demands a lot of resources and can only be done with a limited number of suppliers. Therefore companies need to have different kinds of relationships with different suppliers, to get the most out of the resources available.

2.1.4 Buyer-supplier product development collaboration

As the relationship with key-suppliers evolves there is a possibility to also work together in the development of new products, sometimes referred to as early supplier design involvement (Monczka et al, 2009). The degree of the supplier responsibility in the product development process varies and may be described as white box, gray box and black box integration. White box integration means that development is made by the buying company but the supplier work as a consultant supporting the development engineers. In grey box integration the buying together with the selling firm initiates a joint development effort, shares technology and makes joint decisions regarding design specifications. In black box integration the supplier is informed on the design specifications and then takes the full responsibility for the design process (Petersen et al, 2005). The different degrees of supplier integration can be seen in Figure 1.

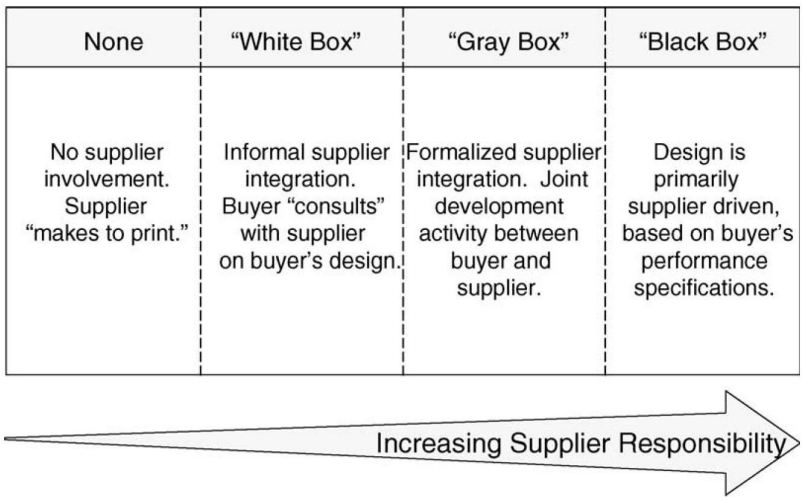

Figure 1 Spectrum of supplier integration (Petersen et al, 2005)

Another way of dividing the levels of collaboration is "project integration coordination" which means an extensive and continuous exchange of information between supplier and buyer, "disconnected sub project integration" where the supplier takes on a more independent role and finally "direct ad hoc contact" where the supplier is contacted whenever problems occur (Lakemond et al, 2006). The different approaches are visualised in Figure 2.

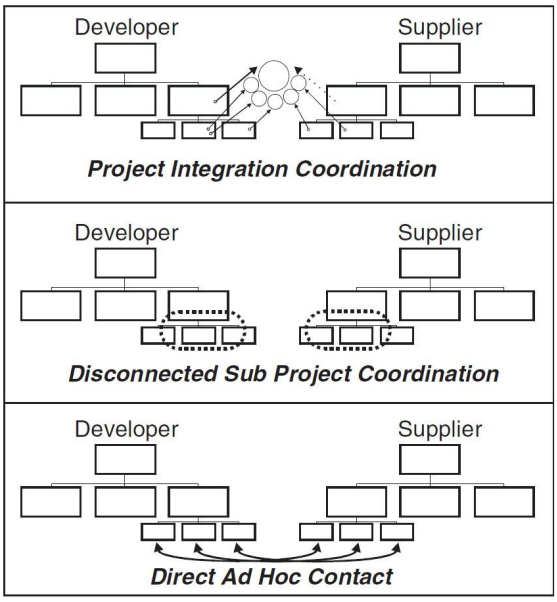

Figure 2 Coordination approaches for involving supplier in product development projects (Lakemond et al, 2006)

Earlier involvement of the supplier in the product development process may lead to improvements in product quality, reduction in development time, reduction in development and product cost (Birou and Fawcett 1994; Ragatz et al, 1997; Handfield et al, 1999; Hoegl and Wagner, 2005; Van Veele, 2005; Van Echtelt et al, 2008; Johnsen,

2009) as well as improvements in product manufacturability (Monczka et al, 2009). Also more long-term benefits such as better access to supplier technology, alignment of future technology strategies, better efficiency and effectiveness of future product development projects (Van Weele, 2005; Van Echtelt et al, 2008) and supplier contribution to product differentiation (Van Weele, 2005) can be the outcome when involving suppliers in the design process.

The logic behind early supplier involvement is relatively straightforward but making the day-to-day communication between the buyer and the suppliers work effectively is often difficult. Many of the difficulties seem to be related to a resistance of sharing proprietary information with suppliers and also a lack of knowledge on how to manage this sensitive process (Monczka et al, 2009). Three important aspects to succeed with early supplier involvement is choosing right suppliers for collaboration, develop and adapt the supplier relationship and also ensure that the right internal capabilities are in place with focus on internal cross-functional relationships (Johnsen, 2009).

The purchasing function's role in this have by many authors been ignored or at least not been explicitly stated (Schiele, 2010) but the involvement of non-traditional parties in the product development process, such as manufacturing, purchasing and logistics will have an ultimate positive impact on the firm's bottom line (Tracey, 2004). The literature on the contribution of purchasing, as the key interface to the suppliers, will therefore be investigated in the next section.

2.2 The role of the purchasing function in the product development process

Many companies are today forced to develop products with higher quality in less time than before. This requires new approaches which has drawn product development and purchasing functions closer over time (Monczka et al, 2009). Buyers are a great source of knowledge and have the capability to spot new technologies since they more often come in contact with suppliers, products and technologies than engineers working in product development. Early involvement of representatives from purchasing can add knowledge and increase the understanding regarding product architecture, choice of material, suppliers and could also lead to the introduction of supplier knowledge at an early stage (Van Weele, 2005).

Birou and Fawcett (1994) identified five facilitator roles that buyers can have in the product development process; cataloguing suppliers technical and design expertise, foster a committed environment making suppliers more creative and risk-taking, developing stronger relationships making suppliers invest in product development capabilities, contribute to early supplier involvement and facilitating better and more consistent communication. In this way the purchasing function is able to link product

development, marketing and production with the external suppliers when new products are being specified (Mol, 2003). With the accumulated knowledge on supplier markets regarding costs, quality and availability purchasing can coordinate the work and function as an intermediary between suppliers and the firm. In practice, this coordination should not be done by purchasing solely though. Other internal functions also possess significant knowledge about supplier markets and this work should therefore be done as an integrated task, in varying constellations, by several business functions. The degree of purchasing involvement in each project might vary but seems to increase with project complexity and project duration length (Lakemond et al, 2001).

2.2.1 Prerequisites

In order to successfully use the knowledge of the purchasing function the right prerequisites must be in place. To successfully involve purchasing in product development efforts firms need to demonstrate top management support for strategic purchasing (Nijssen et al, 2002). This means that purchasing must be recognised as strategically important for the business by people with power. The purchasing function must be given authority and this must be understood by all involved internal and external constituents (Dowlatshahi, 1998). Purchasing as an area must also be made a top priority on the strategic agenda and this must be communicated throughout the organisation (Nijssen et al, 2002).

Another crucial prerequisite is to have an organisation that facilitates communication and coordination. One enabling factor that would ease the communication is that the purchasers and engineers are specialised according to the same degree and dimension (Wynstra et al, 2000). Another enabling factor is the horizontal complexity of the purchasing function. If the purchasing function consists of both an operational and a developmental unit it will increase the ability to perform product development tasks (Wynstra et al, 2000). To get effective development intensive cross-functional integration is crucial. This integration rests on a foundation of tight linkages in time and in communication between involved people (Wheelwright and Clark, 1992).

It is also important to have the human resource capabilities for purchasing involvement in product development. Nijssen et al (2002) stress the importance of well-performing purchasing managers as a key to success. But not only the managers need to have the right capabilities, advanced competencies and skills of the purchasers also facilitate the purchasing involvement in product development (Lakemond et al, 2001). To increase the credibility of purchasing in cross-functional activities a high degree of technical expertise is desirable (Murphy and Heberling, 1996). One way to acquire this is to hire purchasers with product development background (Lakemond et al, 2001). Another way is training or education (Wynstra et al, 2000)

2.2.2 Difficulties

One of the perquisites for purchasing involvement was identified as developing purchasing into a strategic function. However, there has been reluctance from top management to give the purchasing function that acknowledgement (Cousins and Spekman, 2003). A common problem concerning this is the way the purchasing function is being measured. According to Cousins and Spekman (2003) it is usually measured with tactical parameters such as time, quality and rejects. They argue that this is a problem, because ”if you measure a function tactically, they will behave tactically”. Then it is counterproductive to initiatives like cross-functional teams. Van Weele (2005) instead propose “Purchasing`s involvement in new product development” as a measure for purchasing performance. Another problem can be that purchasing personnel are reluctant to take on a strategic role (Cousins and Spekman, 2003). A reason for this can be that purchasers often are occupied with daily operational tasks and can find it hard to devote time (Lakemond et al, 2001)

A problem recognised by Schiele (2010) when purchasing are involved in product development projects are their dual role which demands for contradictive responsibilities. On one hand they should contribute to the development of new products, while on the other manage the overall costs. An example of this is that increased competence and specialisation in one commodity may require many different purchasers needed to be involved in one project, which demands resources and is costly.

A challenge in the collaboration between the product development and purchasing functions that must be considered are their different functional goals (Murphy and Heberling, 1996). Examples of this are that engineering have limited concern for cost and want to use ideal materials. Purchasing on the other hand aims for lowest total cost and want to use adequate materials. Furthermore, the engineers do not have much interest in supplier availability nor supplier relationships, and then again purchasing has the opposite interest in mind.

2.2.3 Enablers

Much of the research examining purchasing participation in product development mentions factors and difficulties related to attitudes and acceptance among top management and between functional departments as key to success. Literature on how to practically overcome those gaps are however more limited. The found enabling methods or tools on how to structure this collaboration are presented below.

Apart from consider this area when recruiting, motivating and training employees Burt and Soukup (1985) identifies six other enablers for enhancing the integration between the two functions. They are collocation of personnel, formal reviews where functions

can contribute with knowledge to design projects, projects team consisting of also purchasing and supplier personnel, recommended parts list established by purchasing, procurement engineers working with design engineers on daily basis and finally employee rotation between the two functions.

In contrast to the traditional functional way of performing product development Murphy and Heberling (1996) suggests a change of direction to what they call integrated product teams. These teams are assigned the responsibility for a complete product or process and consist of all needed competencies required to bring the product to the end customer. Personnel from the purchasing function can either support the project part-time, and still report to the functional manager, or they can be dedicated to the project and report only to the team leader. This role is new to the purchaser and training in team skills, education in cross-functional knowledge and mandate to make necessary decisions in the team is important to make the participation of purchasing successful (Murphy and Heberling, 1996).

Based on earlier theory on how to integrate functions Lakemond et al (2001) proposes two different roles that a purchaser may take in the product development team. In projects with high complexity the author suggests the purchaser to take a coordinating role creating an interface to different specialists in the purchasing function that needs to be utilised during the project. In projects with significant size the integration of a certain purchasing specialist might be more valuable, and the degree of involvement can be either ad hoc, part-time or full-time. The option of having a purchasing coordinator or not and the three different degrees of purchasing specialist involvement creates six different configurations that might be chosen depending on project size and complexity (Lakemond et al, 2001). The decision on what type of purchasing involvement to use can be supported by the matrix in Figure 3.

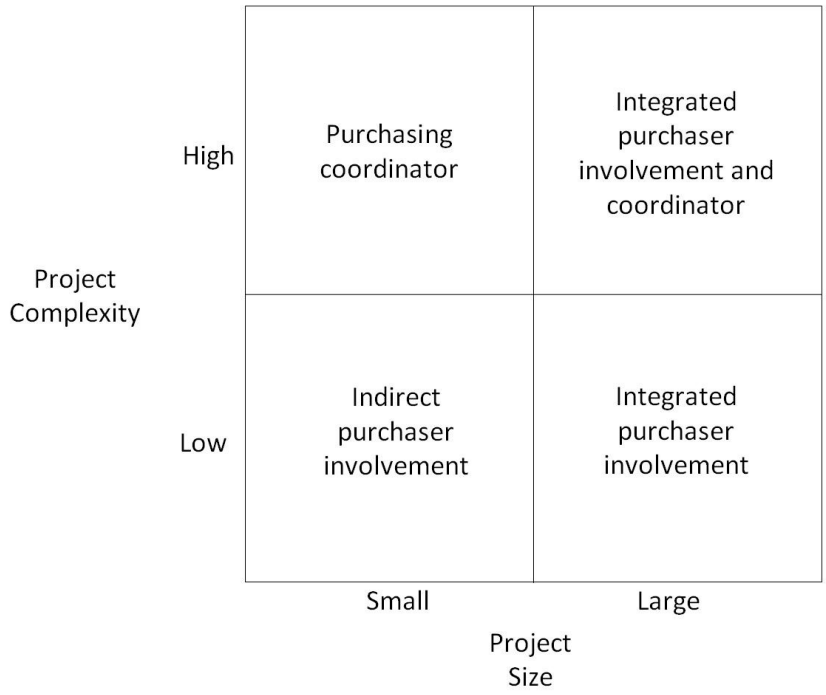

Figure 3 Purchasing involvement configurations for different contingencies (Lakemond et al, 2001)

The dual roles of purchasing is further developed by Schiele (2010) which sees the problem for purchasers being both generic in the coordinating role, supporting product development, as well as specialised in the management of a certain commodity. In five of six studies on best-practice firms he identifies the division of the strategic purchasing function into two groups, apart from the strictly operational purchasing activities. The first group of people, in the article referred to as the advanced sourcing department, is responsible for the product prior to production and they are integrated into the product development teams. Members of this group consist of engineers or purchasers with a strong technical background. The second group of people, referred to as strategic sourcing department, has the product responsibility after start of production. Members of this group have a greater commercial focus and are responsible specialists in a certain commodity area. Important enabling tools in this setting are the use of innovation meetings together with suppliers as well as the use of technology roadmaps that can link the innovation strategies with the sourcing strategies (Schiele, 2010).

2.3 Gates in the product development process

The idea of every product development process is to develop an idea to something that fills a market need, that is not too costly and that can be manufactured. The process' three major challenges are to maximise the input, narrowing down the number of project ideas along the way and ensure that chosen projects deliver. Maximising the number of ideas can be made in a number of ways but it all comes down to use all

possible sources of information. This can be through research labs, university relations or by compiling good ideas from different internal functions or customers and suppliers. The second challenge is to screen the different project ideas to make sure that resources are focused on the most promising projects that also fit the company's strategic and financial needs. The final challenge is to make sure that chosen projects deliver what is expected (Wheelwright and Clark, 1992).

One method that was introduced to handle at least the last two of the challenges mentioned by Wheelwright and Clark (1992) was the Stage-Gate Model developed by Cooper (2009), see Figure 4. The idea of the Stage-Gate Model is that the project is split into phases or stages and that all stages are separated by gates. At the gates the project status is reviewed and the project can either pass, be eliminated or be sent back to the previous stage to make adjustments. The criteria used at the gates differ from company to company but they also vary depending on where in the process the gate is. In the early stages technical feasibility, intuition and market potential is common while product performance, quality and staying within the project budget are more important in the latter stages (Hart et al, 2003).

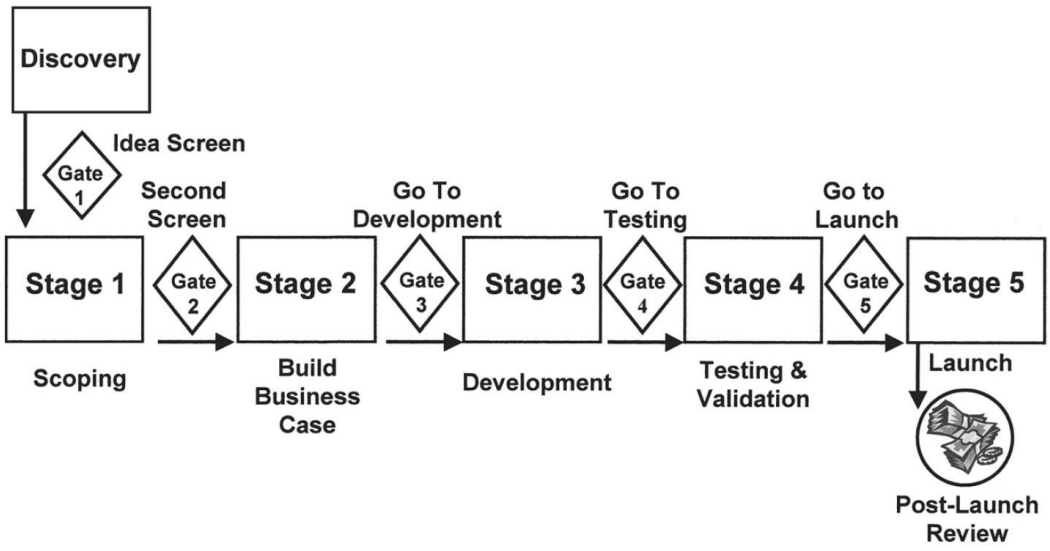

Figure 4 The Stage-Gate Model as proposed by Cooper (2009)

The greatest challenge users face in the Stage-Gate process is to make the gates work. One common issue is that the gates are non-existent or that the gates lack teeth. This makes bad projects go until the amount of money spent on the project makes it impossible to stop. Another issue is that since the information needed at the gate is not clear, the project team tries to make the review bullet-proof by including all available information to the gate meeting. Cooper (2009) instead proposes lean gates with teeth to ensure that bad projects are killed in time and that only the most essential

information is brought to the gate to make life easier for both the project team and the gate keepers.

The composition of the gate committee is another common problem when trying to get the gates work in a good way. Very often there are a lot of senior people that thinks that they should be gate keepers which results in that the committee “is more of a herd than a tightly-defined decision group” (Cooper, 2009, pp. 49). This makes it difficult for them to make distinct go/kill decisions. For major new product projects the gate keepers should instead be a senior group where all the functions with interest in the project should be represented by their heads compared to only marketing or product development which is common today (Cooper, 2009).

3 PROBLEM DISCUSSION

The aim of this chapter is to frame the problem covered in this thesis. The gap of knowledge today is addressed and research questions that will guide the work are developed and presented.

The existing literature within purchasing strategies has covered the increased importance of the purchasing function and how purchasing should be seen as strategic to the business. Much of the focus has been on the buyer-supplier relationship and a central part of this is the involvement of suppliers in the product development process which is comprehensively covered. The involvement of purchasing in the product development process is considered important in literature (Monczka et al, 2009; Van Weele, 2005) but the research on how the purchasing function could be involved in the product development process has been limited. There exists some (Wynstra et al, 2000; Nijssen et al, 2002; Schiele, 2010), but as Nijssen et al (2002, pp. 287) wrote "Although we established some of the antecedents of purchasing´s involvement in NPD [New Product Development], the nature of purchasing´s involvement in NPD, and its effect on NPD success, the object clearly needs more attention". This is supported by Schiele (2010), who state that the role of the purchasing function in product development has largely been ignored in research.

At the case company Alpha there has been previous attempts to involve the purchasing function earlier in the product development process because they believe it would deliver benefits and solve some of the problems they have. These problems regard for example the risk and capability when choosing a supplier. However, no such attempts have led to any lasting results so far but the need for it remains. In order to succeed in the future it will be important to provide a basis with incentives why such a change is important. Such motives for involvement should be two-way; meaning not only benefits for purchasing but also what purchasing can contribute with to the product development should be shown.

The literature about how the involvement should be managed is also lacking. Lakemond et al (2001) calls for an investigation of the specific form of activities and the type of information that is brought in when purchasing is involved in product development. They argue for more research about the timing of this involvement. There is also a need for investigation of appropriate informal and formal mechanisms to enable effective learning across different functions (Van Echtelt et al, 2008).

As pointed out earlier, previous initiatives regarding increased involvement of the purchasing function in the product development process at Alpha has been done. However, there has been some lack in coordination of these initiatives. One can say that

it exist a lot of great ideas in the company but no comprehensive guide to interconnect them.

To illustrate and frame the problem a research model was made, see Figure 5.

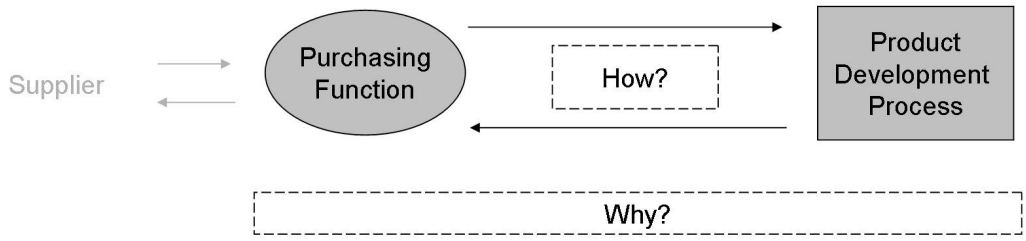

Figure 5 Research model

The model shows the connection between supplier, purchasing function and the product development process, where the purchasing function is the link between the other two. It is though important to note the difference between the three; external company, function and process. The "Why?" represents the underlying incentives for the participation of the purchasing function. The "How?" should clarify what information is exchanged and how the participation can be done.

These questions should guide the clarification of what role the purchasing function should have in the product development process that is the purpose of the thesis. To be able to make the analysis an understanding of the purchasing area is needed. The thesis will therefore start with a review of what is the most recent in purchasing strategies today. It will only be presented as theory and not analysed in more depth. Thus, the theory chapter will open wide to subsequently taper and focus more on relevant theory for the main topic of the thesis; purchasing involvement in the product development process. To concretise what then are going to be analysed two research questions were formalised. Developing research questions is important according to Bryman and Bell (2007) because they focus and guide the research in the right direction. The research questions in this thesis are:

1. *Why should the purchasing function participate in the product development process?*

2. *How can the purchasing function participate in the product development process?*

4 METHODOLOGY

This chapter aims to describe what strategy, design and methods that were used to perform this thesis. It should give the reader a better understanding of why they were chosen and how they will contribute to the purpose.

4.1 Research strategy and design

The purpose of this thesis is to clarify what role the purchasing function should have in the product development process. To succeed with this, two research questions were developed to guide the work. The research questions were chosen to be open-ended in order to have freedom and flexibility in the gathering of empirical data. The disadvantage with open-ended research questions is on the other hand a risk of collection of to much data (Bryman and Bell, 2007). It was therefore important to have good balance in the research questions; they were formulated to not be too narrow and nor too wide.

This study was done with a qualitative research strategy. A qualitative approach emphasises on word rather than quantification in the collection and analysis of data (Bryman and Bell, 2007). A qualitative approach is useful when conducting research within organisations (Jonker and Pennink, 2010). The reason is that it enables the researcher to see through the eyes of the research object and experience their situation.

This thesis was carried out at the company Alpha with a single case study design. Defining a research design is important to get a framework for the research and help to guide the choice of methods (Bryman and Bell, 2007). The choice of a case study design was self-evident because the benefits with such a design suited the purpose and research questions of the thesis very well. A major advantage with a case study is how it enables to deal with the case as a whole and see how many parts affect one another, because the research will deal with different functions and processes within the organisation of Alpha (Denscombe, 2007). This kind of design makes it possible to understand how those functions and processes are interconnected and interrelated. Another advantage is that it allows for a variety of methods depending on circumstances (Denscombe, 2007).

The downside of a case study is the critique given regarding the credibility of generalisation of the research (Denscombe, 2007). This could however be obviated by using multiple sources of data, called triangulation (Bryman and Bell, 2007). This is discussed further in the validity chapter. Another common critique about case studies is that it can be hard to get access. That should not be a problem in this thesis since it was initiated by the researched company Alpha who had an interest in the topic.

4.2 Methods

This section gives a brief description of the research methods that have been used in this thesis. An explanation on how each research method has been used is also given.

4.2.1 Literature study

An extensive literature study has been made in order to make good use of existing theories and identify possible research gaps. The literature study is important "to not reinvent the wheel" and also to identify possible controversies, inconsistencies and unanswered questions in the research field (Bryman and Bell, 2007, pp. 95).

The literature that has been used in this study has been found in textbooks, academic journals and business journals which have been accessed through the Chalmers library. Except from the comprehensive first literature review, complementary searches have been made in order to bridge gaps that have been identified during the research process. The keywords that have been used are *purchasing*, *new product development, involvement, participation* and *integration.*

4.2.2 Interviews

The empirical data used in the study is mainly from qualitative interviews conducted at the case company Alpha. Interview objects have been identified through snowball sampling which means that a small group of people is initially interviewed and they are then used to establish contact with other relevant interview objects. This is a common approach in qualitative research when there are difficulties in defining a proper sampling frame (Bryman and Bell, 2007).

The interviews have been conducted in a semi-structured manner in order to cover the specified field of research but in the same time give the interview object the possibility to develop own ideas and elaborate on specific questions (Denscombe, 2007). This also enables the interviewer to change the order of the questions and, apart from questions covered by the interview guide, pick up on things said by other interview objects (Bryman and Bell, 2007).

An interview guide was constructed with the research questions as basis. After a brainstorming session, the questions where grouped and an interview guide was constructed. After the initial interviews, the interview guide was revised in order to avoid potential misunderstandings, avoid redundancy and create a better logical order. The interview guides which were used as a base for the interviews can be seen in Appendix A and Appendix B.

The interviewees were managers at different levels within the purchasing function, managers within the product development function or persons that in other ways are

related to the process of developing new products. In total twenty-two interviews were made, evenly distributed between the two functions. One issue when conducting interviews with managers at higher levels is the possibility to gain access, meaning to find a mutually convenient time to perform the interview (Bryman and Bell, 2007). This has been avoided by carefully selecting relevant interview objectives and by structuring the interview requests in a way that increases the chance of positive response. The interviews has also been conducted over a long time, in parallel with other activities to handle the sometimes long response times and the problems with finding an appropriate time slot to use for the interview.

4.2.3 Organisational documents

One source of information that is often used within business and management research are company specific, organisational documents. They can be of public kind for example annual reports, mission statements and reports to shareholders or of the not public kind for example organisational charts, newsletters, policy statements and external consultant reports (Bryman and Bell, 2007).

The access to a lot of non public organisational documents has in this study enabled the researchers to get an important background to the problem including design of the current organisation and processes. Documentation of earlier efforts, made by both internal parties as well as external consultants, on purchasing involvement as well as related areas has also been studied. This has increased the understanding of the difficulties associated with collaboration between the purchasing function and people working in the product development process at Alpha.

4.3 Research quality

The quality of research is a way to assess the accuracy of the result and also a way to describe how useful the results are in other settings than in the actual case. There are different ways to measure the quality of research but some often used criteria are validity, reliability and generalisability. These criteria and how they have been handled in this study will be described in this section.

4.3.1 Reliability

The reliability of a study usually answers to the question whether the study is repeatable (Bryman and Bell, 2007). In other words, a reliable study should produce the same result if repeated over and over again (Stenbacka, 2001). But there has been a discussion concerning if this really is relevant for a qualitative research like this (Bryman and Bell, 2007). According to Stenbacka (2001) the reliability as it traditionally is used has no relevance in qualitative research, it can even be misleading. Instead Guba and Lincoln (1994) introduced an alternative to reliability, more suitable for qualitative research

called dependability. This is a criterion of trustworthiness to ensure that the researcher makes it possible for other researchers to see and evaluate their work (Denscombe, 2007). This is primarily how the issue of reliability will be handled in this thesis. All the work will be well documented to make sure that is easy to follow and judge how decisions and other procedures were made. An example of this is that the interview guides are available for the reader. To increase the trustworthiness the interviews made in this thesis were evenly distributed between purchasing and product development personnel to get both views.

Even though efforts were made to handle the problem of repeatability, one must still realise that the problem to some degree still exists. The organisation studied is, as any organisation, all the time changing. The exact conditions as during this study are not possible to re-create and even if they were it is not sure that the outcome would be precisely the same as in this study.

4.3.2 Validity

The validity of qualitative research is to what degree the data can be seen as accurate and appropriate with respect to the chosen research questions (Denscombe, 2007). The three different concepts of validity that must be handled when using a case study design are construct-, internal- and external validity (Cepeda and Martin, 2005).

Construct validity concerns how well the data used is a good measurement of the chosen research topic (Bryman and Bell, 2007). In this study the construct validity is represented by how well the questions in the interview guide reflects what is important to manage purchasing utilisation in the product development process. The construct validity can be tested by using multiple sources of data (Voss et al, 2002) which is also referred to as triangulation (Bryman and Bell, 2007). Triangulation is effective when the interview is of strictly factual nature but information related to emotions or personal experiences can be more difficult to interpret (Denscombe, 2007). Apart from using multiple interview objects, key informants are also used to test the construct validity of the results. The key informants have a good overall knowledge of the company and have a good overview of the area of research. Organisational documents are also used to complement and test the data obtained from the interviews which will further support the construct validity.

The internal validity of a study is a measurement of how well the developed ideas match the observations that the researcher have made (Bryman and Bell, 2007). The internal validity in this study describes how good linkage there is between the result of the study and the observations made in interviews and in the study of documents. When using qualitative interviews the researcher becomes part of the research instrument which makes it unlikely that the result would be the exact same if another researcher

conducted the study (Denscombe, 2007). The internal validity is in this case improved by letting key informants confirm and provide input on developed ideas.

External validity is the same as generalisability and will be handled in the next section.

4.3.3 Generalisability

The generalisability of a research concerns if it can be generalised across settings (Bryman and Bell, 2007). The findings should then be possible to apply to other situations or instances. As with the other criterions for assessing the quality of research the generalisability is most useful for quantitative research. Qualitative findings though are more difficult to generalise since they tend to have more contextual uniqueness and dependency on the particular case being studied (Denscombe, 2007).

To handle the matter of generalisability in this thesis another method proposed by Guba and Lincoln (1994) will be used; transferability. Instead of saying that this research is generalisable, the readers is allowed to use the information about the particular case to judge themselves to what degree it would be possible to apply to other cases (Denscombe, 2007). In order to make this possible this research intends to give the reader as much information as possible about the particular case to do that judgement. That is sometimes called a thick description (Bryman and Bell, 2007).

5 EMPIRICAL STUDY

In this chapter the results from the interviews are presented. First an overview on how the link between the purchasing function and the product development process works today is given. Secondly, to help the reader and also to facilitate the processing of the data the results have been structured in four different areas. They are functional objectives, communication, product development process and purchasing organisation. These areas will be described in more detail. During the interviews the interviewees have been asked to express what benefits that they see possible when integrating the purchasing function and the product development process. These expressed benefits will be presented in the final section.

5.1 Current situation

The search for suppliers in the product development process at Alpha is according to the interviews made ad hoc today. Some of the interviewees state that web search engines are an often used tool to make the first scan for appropriate suppliers. In some cases lists with suppliers are used but the lists are often established by the local organisation and thereby cover only already known and geographically close suppliers. Possible, often local, suppliers are then contacted based on their technical knowledge, directly by people in the product development team. During the discussions with the supplier the specification is developed and it is according to purchasers possible that the supplier can influence the specification in a way that makes it favourable for them. When the specification is finalised and the engineer have a clear picture on what supplier to use, the purchaser is contacted in order to be able to settle the deal and eventually also approve the supplier if it is new to Alpha.

When the purchaser is contacted the specification is already fully developed which, according to the interviewees, gives no purchasing power for Alpha. The engineer has a good idea on what supplier to use but eventually this supplier will not be able to support the production at Alpha in a good way. The supplier needs to have the right capability and the right level of risk to ensure a good delivery and a reasonable price. Without any prior notices the purchaser now need to find a new, more appropriate supplier even though the time frame is at this stage very limited and the specification is very detailed which limits the number of potential suppliers.

A common concern among the product developers is that the support from purchasing is not very effective and purchasing is considered bureaucratic with long handling time. Product development has often limited time frames for their projects and if information on questions or requests then is slow, it is easy to loose patience. This can result in reluctance to contact purchasing the next time.

According to the interviews the situation seems to vary some between different divisions at Alpha. In divisions which are mainly consisting of more autonomous business units the development teams and the local purchaser is often situated quite close to each other, both organisationally and physically. These units are designed to have all needed competences and functions within the organisation. Some argue that the support from purchasers outside the unit is not needed in these cases but some persons state the opposite. In other divisions which are organised by segments the link between different functions are not as close and the development teams need for purchasing support seems in these cases more clear and immediate. The general picture is however that all teams need purchasing support but to different degrees.

5.1.1 Functional objectives

Alpha has traditionally been organised in functions and according to the interviews the culture and the distribution of resources supports a strict line organisation. Current efforts to introduce work in processes and projects to a larger extent, are suffering from the strong culture of working within functions. There is for example limited directives for how projects across functions should be managed resulting in that no one wants to spend their resources on cross-functional projects. Very often the function is only measured on internal metrics anyway. There is a common picture among many of the interviewees that Alpha is not good at working in projects due to the line organisation.

A problem highlighted during the interviews was that when the development is done and it is time for production, the supplier cannot always produce the needed volumes. Another problem at this point is that the price sometimes gets above the target cost. From both product development and purchasing, the inherent conflict between their functional objectives is singled out as the main cause for this. Product development on the one hand has objectives focused on product functionality and performance. Therefore they want a supplier with best possible technical competence and knowledge that can help them meet these criteria. On the other hand, purchasing finds production capacity and cost as more important aspects. One solution is to use standard products, but product development then argues that the product does not become unique enough.

Another contrary objective between the two functions is the time perspective. It has been expressed that purchasing is too focused on cost which makes them short-term in their priorities, these thoughts have come from both product development and purchasing. But in the same way much of the expectation on purchasing from other parts of the organisation is actually lower cost, which creates a difficult situation for the purchasing function.

5.1.2 Communication

The early communication between people working in product development and people working in the purchasing function at Alpha is according to the interviews not optimal today. Alpha has in the past been producing all components in-house and the need for a full-scale purchasing function has therefore been limited. But as the volumes of purchased items have increased the need for such a function has emerged, for example within product development. Even though some people within Alpha have seen the need for this communication there has been no real breakthrough for this type of coordination.

Most of the communication at Alpha is taking place within informal structures and it is vital to know the right people. This makes the communication very dependent on individuals and functions with personnel without a good network of contacts risk to be cut off. The dependence of informal networks is inhibiting the collaboration between the purchasing function and the product development at Alpha. Work across functions is sometimes seen as demanding and time-consuming and the current organisational setup does not give any support when it comes to joint activities shared by several functions.

Another problem is that the product developer has sometimes difficulties knowing which information is crucial for the purchaser. This might lead to that important aspects is forgotten which results in costly loops later on in the process. This can also result in that purchasing does not provide the right information. According to product developers there is also a resistance from purchasing to work with non finished drawings and specifications. This makes it meaningless to contact purchasers at an early stage since they state that they cannot be of support anyway. There is also some obscurity about whom at purchasing to contact when information is needed. No guidelines for who should be contacted exist.

One issue that has been repeated several times during the interviews is the difficulty to access information within Alpha. Due to several acquisitions in the past there is a mixture of different systems in the company that is merged together with additional interface systems. This makes the information flows between different functions and units within Alpha complicated since the access to most systems are restricted. The result is that necessary information for product development from purchasing, and vice versa, is hard to acquire. The systems do not support the cross-functional processes that Alpha intend to work according to.

5.1.3 Product development process

According to the interviews all of the product development teams at Alpha use the same product development process, sometimes with slighter modifications. The process

seems widely spread within Alpha but some argue that the process is not always followed and that vital parts are missing. The process does not clarify how the search for an appropriate supplier should be managed and it does not state when or who in the purchasing function that should be contacted to support with purchasing activities. This often results in the fact that the wrong person is being contacted at the wrong level. This is further complicated by that the contact person at purchasing varies from project to project and sometimes also between different project phases.

If a product development team has own routines for contacting purchasing this contact is usually made with the local purchaser belonging to the factory where the product will be produced. But some of the products developed today are not of the traditional kind and they include knowledge and components from all the different branches within Alpha. These products have not a natural connection to any of the existing factories which means that which local purchaser to establish contact with is not clear. The result is that important purchasing issues falls through the cracks and does not receive any attention until late in the project.

One request presented in the interviews was more support from purchasing when choosing suppliers early in the product development process. It was asked for guidelines on how to choose supplier, but for the sake of it not kill the innovation mentality. It was emphasised from the interviewees to think of both cost and technology when making this selection. One proposition was that purchasing should be more open to non-complete drawings and that these should be open for negotiation.

The phases in the product development process at Alpha are separated by gates. The strictness of the gates varies and the group that attends the gate meetings is decided within each project. According to the interviews it is mainly people from the product development function that acts as gate keepers. The varying strictness of the gates at Alpha is an intentional strategy that should give engineers a lot of freedom and support the innovativeness at Alpha. This can however also lead to that important aspect is disregarded and that projects that should have been stopped slip through. One specific issue that was mentioned during the interviews was that projects often can continue even though they have not fulfilled their cost targets.

5.1.4 Purchasing organisation

The purchasing organisation at Alpha is today split in three different levels; global, regional and local purchasing. The main objectives for the purchasing organisation are to reduce cost and improve quality and delivery. The global level is divided according to commodities and they are responsible for the strategic development of each commodity. The regional level has a more operational responsibility, they establishes and manages agreements with a number of specified suppliers. There is roughly one

regional purchasing office for each continent where Alpha has presence. Each producing unit at Alpha has their own local purchasing organisation. They are responsible for their unit's day to day ordering of material and components. They are also responsible for reporting their purchasing figures to the rest of the organisation.

The global purchasing organisation is today mainly consisting of people responsible for one or a set of commodities. In cases where purchasing has been involved in product development projects, it has been the commodity manager with the most applicable specialisation that has been brought in. This is however not a part of his defined work content and therefore not included in his personal objectives.

Many of the interviews reveal that the technical knowledge within the purchasing function is considered low, at least in certain areas. Some of the interviewees describe the view of the purchasing function as a group with mostly economic skills that has limited technical knowledge and no experience of product development. Adding the outcome of the interviews with the purchasing side it is possible that this view might not be completely correct, this is however very much depending on whom in the purchasing function that is referred to. Something that is confirmed from both the purchasing side and the product development side is that purchasing competence in, for Alpha, new areas are weak. Another view is that purchasing personnel are very good at their specific commodities but when it comes to more generic knowledge and the ability to support product development projects their competence is not good enough. There are also opinions meaning that the general introduction and training of new employees is not sufficient.

5.2 Expressed benefits

Apart from studying the need for involvement of the purchasing function in the product development process, some interviewees were also asked to describe what benefits and drawbacks that they think can come from this involvement. The drawbacks that have been mentioned during the interviews are few. The ones that have been mentioned are that it can be time-consuming and require a lot of effort to collaborate across the functions. Since the resources are scarce this means that other activities need to be reduced. Most of the benefits mentioned are related to cost, better product performance, reduction of development time, improved knowledge, lower risks and a better link to the suppliers. Both the developing side and the purchasing side has been able to identify benefits in all different areas and no trends that can be traced to functional belonging has been found. How these benefits are created will be described below.

Many benefits mentioned are connected to cost savings of different kinds. Some of the reasons for that are that the developers get a better understanding of what influences

the cost, purchasers will support them with cost estimations, the products will be easier to manufacture, it is possible to avoid tooling costs and developers might use standard solutions to a higher extent. With the purchasers present in the project group at an early stage it is possible to avoid cost drivers when changes to the product are still manageable and not too expensive. Also, when purchasers are aware of the coming need from the developers it is possible to do a more extensive supplier investigation and also to design according to existing supplier capacities and capabilities. The influence from purchasing on the choice of supplier also enables consolidation of purchases.

With a higher degree of involvement of purchasers in the development process many interviewees mean that the performance of developed products and the overall company's ability to innovate will be improved. This is because the product developers have support when they choose suppliers, they can get better access to supplier technologies and they also base their choice of supplier on production competence and not only on development competence. Some of the interviewed persons also underline the importance of also looking at new suppliers even if the needed components are known to the company. This is something that the purchasing function can support with.

When purchasing is accessible for the developers they can support with important information that affects the cost and the product performance positively but other benefits related to knowledge and information can also be created. Purchasing can for example share their often very large network of contacts and they can also support with knowledge that the product development is lacking.

Other important benefits that were mentioned during the interviews were related to time and risk. With the support from purchasing already available at an early stage of development the chance of designing it right from the beginning is improved. In this way costly loops in the product development process are avoided which will in turn improve the development time of the product. The involvement of purchasing when choosing the supplier will also result in that a supplier which has the right level of risk and the right capabilities to support the forecasted need of components will be used.

Many interviewed persons see a need for some kind of coordinator that can be a link between the purchasing function and the product development process. With a coordinator some additional benefits are identified. These are for example better quality of initial specification, good linkage to commodity personnel and enhanced awareness of which suppliers that are preferred within the product development team. If the coordinator belongs to the purchasing function the alignment with the overall purchasing strategy will also be improved.

6 ANALYSIS

In this chapter the existing literature in the area of purchasing integration in the product development process is combined with the results from the interviews. Current issues found at Alpha are identified and with support from the literature their effects are discussed. This discussion is structured in the same way as the empirical results. Firstly, an introduction is made where the current situation is analysed. Then the areas used in the empirical study; functional objectives, communication, product development process and purchasing organisation are analysed in more depth. Finally, the benefits from the interviews are analysed with support from existing literature.

6.1 Analysis of current situation

The empirical study identified that the initial supplier selection in the product development process creates problems later on in the process, most commonly concerning cost, capacity or manufacturability. When detected, it is often too late to do any changes, for example on the specification. Purchasing then has to find a new supplier at this late point in the process. This situation with limited time and limited number of suppliers available might force Alpha to use a not preferred supplier. If the supplier then is outside their supply base this is a problem since Alpha has already too many suppliers as it is today. It would rather be preferable to rationalise among the suppliers in order to get the advantages of an optimised supplier base; minimised risk, better supplier relations and consolidation benefits (Monczka et al, 2009). This is however a difficult task since purchasing at strategic level has limited influence of the early supplier selection as it is handled today. An earlier purchasing involvement in the product development process would create a natural link between the product development and the purchasing strategy. The long-term strategic factors could then be considered when making the supplier selection. This is supported by a study made by Lonsdale and Watson (2005), who concluded that it was not until the power shifted somewhat from the divisions to purchasing that steps toward consolidation could be made.

A coherent view from the product developers at Alpha was that they would benefit from more support from purchasing. It was for example requested to get better knowledge of the suppliers and what solutions they could offer. For this purpose, Mol (2003) describes the purchasing function as a good link between product development and external suppliers. The reason is that purchasing knows the market and the suppliers and can work as intermediate to get the developers in contact with the right supplier. Also Birou and Fawcett (1994) recommend the purchaser as a facilitator in the product development process when it comes to supplier connections. By extension, this could lead to enhanced product development collaboration between Alpha and its key

suppliers. This was encouraged from some interviewees since it enables for new technologies and thereby new possibilities. Another mentioned advantage with increased involvement of suppliers was that the company may become less sensitive to recessions if part of the development can be made by others. However, some interviewees argue that this increase the risk because suppliers can turn into competitors. Monczka et al (2009) listed confidentiality as one of the main obstacles with supplier collaboration. To minimise this risk a solution could be, as Gadde and Snehota (2000) propose, to only have a deeper collaboration with a limited number of suppliers. An optimised supply base discussed earlier is a prerequisite for this, in order to only cooperate with trusted suppliers. Purchasing then has an essential role because they know the supply base and which suppliers that are best suited to collaborate with.

To succeed with a tighter link between purchasing and product development top management need to show support for strategic purchasing which should be communicated throughout the organisation (Nijssen et al, 2002). Purchasing must also be given the authorities needed to act cross-functional which have to be understood by all involved parties (Dowlatshahi, 1998). The acceptance for a greater communication between product developers and purchasers among top management is today varying, and it is important that product developments teams with need for a more active purchasing support escalates this so that the need for purchasing support is made visible. In those cases at Alpha where a good collaboration between the product development teams and the purchasing function has taken place, this contact has been initiated on advice from the teams' managers. This indicates that the encouragement from managers is important to make this collaboration happen.

6.1.1 Functional objectives

A conflict between the functional objectives of product development and purchasing was identified at Alpha. It concerned technical supremacy contra cost, capacity and manufacturability. This conflict of interest is not unique for Alpha, Murphy and Heberling (1996) stated this as the main challenge in the cooperation between the two functions. It is not the fact that the functions have different objectives that is the problem for Alpha. What instead is the problem that should raise concern is how the situation is handled. As it is now there is a distinct gap between the two, where both parties have different focus due to their functional objectives. According to Wheelwright and Clark (1992) cross-functional integration, which is crucial to get effective development, require a tight linkage in time and communication between different functions. The focus for Alpha should therefore be to bridge this gap, in order to create opportunities for discussions about how different solutions affect each other and their different objectives. This could for example be regarding the specifications of new products, which could be negotiated until everybody is satisfied.

During the interviews thoughts were expressed that the purchasing function was too short-term in their thinking. Studying the purchasing objectives, one can see that they got more long-term targets as well, but the expectation from the rest of the organisation is still concentrated on short-term cost reductions. Tactical measures, like cost, are according to Cousins and Spekman (2003) a concern because if you are measured tactically, you will behave tactically as well. This means focusing on short-term targets for example. Van Weele (2005) established that performance measurement of the purchasing function is difficult and therefore proposed that different dimensions could be used. One dimension was product/quality which could include "purchasing`s involvement in new product development". In order to succeed with a more cross functional work at Alpha, like involving purchasing in the product development process, the measures probably have to include a dimension as Van Weele (2005) propose.

6.1.2 Communication

The empirical study showed that the emerging need for a more distinct communication between people in the product development process and the purchasing function is clear. However, since this connection is new for many people working at Alpha and since no guidelines for how this should be done exists, the communication between the two is not very efficient resulting in the fact that the purchasing support is perceived slow. Furthermore, much of the communication within Alpha is managed through informal structures and the linkages between purchasers and product developers are still limited. Many product developers are not aware of the structure of the purchasing organisation and who they should contact. The same goes for purchasing that have limited knowledge about the structure of the development organisation. This creates a resistance to contact purchasing since their time is limited and it can be time consuming trying to find out who to talk to. To get the benefits of an integrated purchasing support Alpha must develop this communication so that the product development teams experience the support from purchasing more efficient. The fact that purchasers often are specialised in terms of suppliers producing different products, while developers are specialists within a certain technology makes the interface even more complex (Wynstra et al, 2000). The organisation of the other function might therefore be difficult to understand. Some help for who in the purchasing function to contact should be established to create a purchasing support that is experienced more efficient than the one today.

For product development teams at Alpha it seems difficult to know what information to include when communicating with purchasers. One thing that is usually sent back and forth is drawings of the components that are going to be purchased. At an early stage these drawings are not always complete and purchasers then often explain that they

cannot do very much unless they are. According to purchasers this is due to that they have not enough time to do a lot of loops in the communication with the supplier. Purchasers at Alpha must be capable to handle the unknown environment that developers are facing. The product developers at Alpha have often difficulties knowing what information the purchaser need apart from the drawing. This results in that important data is forgotten in the specifications that are sent to the supplier. According to several interviews some kind of standardisation of the communication between the two would be preferable, and when discussions are getting too technical the purchaser can put the developer and the supplier in direct contact. One proposition was that templates for different product kinds can be established to make the specification process easier and to avoid that important data is missing. But just sending the design in form of a blueprint is not a very good way of solving problems in an integrated way according to Wheelwright and Clark (1992). To be able to capture all relevant and often detailed information needed to solve the problem in an efficient way you also need face-to-face discussion, direct observation, physical prototypes and computer models (Wheelwright and Clark, 1992). As part of the communication it is possible to also use a recommended parts list which is proposed by Burt and Soukup (1985) to facilitate the integration between the purchasing function and the product development process. It is also important that the purchaser feels that the time is sufficient for working iteratively with the communication between product developer and supplier.

Another issue that was mentioned in several interviews was the lack of accessible information from other functions than the own. The current systems have been created with the strict line organisation in mind and together with some new systems that have been introduced due to acquisitions, the systems do not support new process and project efforts that spans over the functional boarders. This is not something that the purchasing organisation or the product development organisation can change on their own but something that need be included in the overall IT-strategy of Alpha. To create an integrated way of working, product developers need to have access to relevant information at purchasing and purchasers should be able to access necessary information within product development.

6.1.3 Product development process

Even though most product developments teams at Alpha use the same product development process the interviews shows that there is limited or no information about how to find an appropriate supplier in the process. Furthermore, information about when in the process or who in the purchasing function that should be contacted does not exist. This is according to the interviews a leftover from when Alpha produced most of the components in-house and the need for a purchasing function was limited. The result is that the supplier selection is made ad hoc and only suppliers known to the

developers are included. But according to some interviews the inclusion of certain tasks in the process does not guarantee that they are dealt with since much of the process is seen as recommended. This means that even if the process is updated with guidelines for how to contact purchasing personnel as well as how to look for suppliers, this still do not ensure that this is made early in the process. To improve the supplier selection Alpha need to update the content of the process but also make sure that the most important activities are actually performed.

The gates in the product development process at Alpha are by many seen as vague. Some persons at Alpha mean that the varying strictness of the gates in the product development process is to not kill the innovation capacity at Alpha. No support for that the strictness of the gates has negative impact on innovation has been found in the literature. The content of the phases or stages should be flexible though. According to Cooper (2009) it is important to differentiate the stages from the gates in the process. He argues that the stages of the process should be flexible, containing a set of tools that the team members can use, but what tools to use should be decided from project to project. This seems to be in line with the needs of Alpha since the need from the different development teams varies depending on which type of products they work with. However, purchasing personnel need to be informed in some way and the search for a supplier must be managed in a structured way. Therefore, the gates of the product development process should be strict, "the gates must have teeth" (Cooper, 2009, pp 49). It is vital that all important aspects are covered and that projects that are not running according to plan are terminated as early in the process as possible, if needed (Cooper, 2009). It is important that the company's resources are focused at the most attractive opportunities (Wheelwright and Clark, 1992). According to the interviews the gates should ensure that a purchaser has been informed and that a proper supplier or a set of proper suppliers has been selected based on both technology as well as production capacity. Applying this to the current situation at Alpha a need for a stricter control of that the supplier aspect has been covered appears. If the project team has not accomplished what is defined in the process regarding supplier selection and purchasing involvement the gate keepers should ensure that this is done.

The gate committee at Alpha is mostly consisting of managers from the product development function, but according to Cooper (2009) a multi-faceted functional view leads to better go/kill decisions than only a single-functional view. In this case the over-representation of product development managers might create a technology focus when deciding what projects that should be assigned new resources. Other perspectives such as manufacturability, cost targets and applicable suppliers risk to be forgotten. The interviews have showed several examples where development teams has run into trouble late in the process since manufacturability and cost issues have not been considered at an early stage. In order to be able to make correct go/kill decisions in

major new product projects the gate keepers should be limited in number and consist of the heads of the functions with an interest in the project (Cooper, 2009). The complete composition of the gate committee at Alpha is not covered by this thesis but for projects expected to have a large impact it is important to also involve the purchasing function to cover the supplier and delivery aspects.

6.1.4 Purchasing organisation

In those cases purchasing are involved in product development projects today, it is often put on the commodity managers tables. The commodity managers must then handle both commodity development and be part of development projects, even though the latter is not their defined work task. This makes the time to participate in development projects limited. If they do it anyway, it becomes a conflict of interest for the commodity managers regarding working with strategic commodity issues or in product development projects. Schiele (2010) highlighted this problem with the dual roles for a strategic purchaser; supporting product development and at the same time manage a certain commodity. He proposed a division of the strategic purchasing function into two. Considering the current situation at Alpha where the commodity managers have a great deal of responsibility but feel limited by the time and objectives, some kind of division seems needed. Because as it is now, the commodity managers are almost exclusively measured on tactical values like cost reduction and price development for their commodity. The result is often that work in product development projects receives low-priority since it is not part of their defined work tasks. In worst case, they have no possibility at all to participate in that kind of projects. A typical example of this is their travel budgets. If they want to visit a supplier connected to a new development project, resources has to be taken from what is supposed to be used to perform their strategic commodity work.

The need for purchasing competence in product development projects is evident according to the interviewees. One team had such a need for it that they had discussed hiring a purchaser, but it was not possible since they did not have enough work for a fulltime position. Today the purchasing involvement is for the most part ad hoc, regardless of the situation. This has led to a series of problems. The main problem is that the particular needs of the different projects are not considered. Therefore some kind of categorisation like Lakemond et al (2001) describe could be used in order to use the limited purchasing resources the best possible way. It was revealed in the empirical study that the need for purchasing involvement varies due to different situations at various parts of Alpha. In the development projects where only improvements on standard products are made, the need of purchasing involvement might be limited. The problems rather occur for projects breaking new ground. They can for example need purchasing support regarding new materials or components from external suppliers. At

Alpha this is especially apparent for the teams working with integration of different technologies.

The development units at Alpha are all organised by product type while the purchasing function are mostly organised by commodities. To enhance the collaboration between the purchasing function and the product development teams it is important that the two are specialised according to the same degree and dimension. This is to have an internal organisation that supports efficient and effective purchasing involvement in product development (Wynstra et al, 2000). Combining this with the situation at Alpha reveals that the organisation orientation is contradictory to what is needed to support purchasing involvement in product development.

The view of the competence within the purchasing organisation at Alpha varies. Many of the interviewees think that knowledge in most areas is good or very good but they also state that improvements must be made within certain fields that are new to Alpha. This is confirmed by people both at purchasing and product development. Alpha has recently expanded the focus, and it is the knowledge within these new areas that are lacking according to the interviewees. In a few cases the purchasing function is viewed as a function with mostly economic skills by product developers, without the technical knowledge needed to support the technical development work. Whether if this view is correct or not is difficult to say, but it is important that purchasers are introduced to product development work, either to promote their technical skills or to improve their technical skills by attending product development meetings. Advanced skills and competence of purchasers is seen as an important facilitator for collaboration between the purchasing function and people from product development (Lakemond et al, 2001). To support the development of the collaboration between the purchasing function and the development teams it is important that the knowledge and competence that purchasers have is made visible. This could correct the erroneous perceptions that the purchasing function consist of economists mainly. In addition it is also important that product developers have an understanding of purchasers' situation (Wynstra et al, 2000). This can be acquired by hiring purchasers with product development background and vice versa. Training and work rotation can also be used to create a better understanding of the challenges in each other's functions (Wynstra et al, 2000).

6.2 Analysis of expressed benefits

The literature is lacking regarding the direct benefits or drawbacks with a more active involvement of the purchasing function in the product development process. Benefits or drawbacks described in the existing literature are mostly from a closer collaboration between product development and suppliers, see section 2.1.4. The purchasing function's role in this is however overlooked (Schiele, 2010). To bridge this gap the interviewees were asked to describe what direct benefits or drawbacks that can come

from a closer collaboration between the purchasing function and the product development process, see section 5.2. These expressed benefits and drawbacks will in this section be evaluated and compared to existing literature.

Many of the expressed benefits are related to cost, innovation ability and reduced development time in different ways. The view from both purchasers and product development is that the manufacturability of the components will be improved when help from purchasing are available. The reason for this is that purchasers know what drives cost, they are aware of standard solutions that might be applicable and they know how it is possible to avoid tooling costs. Purchasing's influence on the supplier selection will according to some interviews also lead to consolidated purchases which will impact the cost reductions positively. Secondly, since the product developers have access to purchasers' knowledge regarding suppliers and new technologies the innovation ability of the product development function will increase according to the interviews. Finally, since the manufacturability and delivery aspects are covered early in the process, costly loops are avoided which in the end will lead to a shorter development cycle. There is no literature to support these direct relationships mentioned above but the same benefits can be found in the literature connected to an earlier involvement of the supplier in the product development process (Birou and Fawcett 1994; Ragatz et al, 1997; Handfield et al, 1999; Hoegl and Wagner, 2005; Van Veele, 2005; Van Echtelt et al, 2008; Johnsen, 2009). Evaluating the results from the interviews with guidance from the literature there is no reason to question the view from the interviewees, that purchasing involvement has a positive impact on cost reduction, innovation ability and shorter development time.

Due to gaps in the literature it is difficult to draw any conclusions about the direct benefits of a more integrated purchasing support in the product development process. It is reasonable to believe that including purchasing early in the product development process will lead to an earlier inclusion of suppliers in the process. This will according to the literature in turn lead to improvements in product quality, reduction in development time, reduction in development and product cost (Birou and Fawcett 1994; Ragatz et al, 1997; Handfield et al, 1999; Hoegl and Wagner, 2005; Van Veele, 2005; Van Echtelt et al, 2008; Johnsen, 2009) as well as improvements in product manufacturability (Monczka et al, 2009). The above mentioned improvements is supported by the interviews conducted at Alpha but further investigation is needed to describe and confirm the exact relationship between purchasing involvement in the product development process and improvements in cost, innovation and knowledge for example.

7 RECOMMENDATIONS FOR ALPHA

The performed study at Alpha shows an emerging need for support with purchasing activities within product development projects, but since this situation is new to many the first efforts has proven to be challenging. Some areas inhibiting collaboration between the two have been found and ways to improve the performance have been discussed. In this chapter recommendations for how Alpha can improve in those areas are given. The recommendations are divided in seven different sections. Each section is introduced by a short opening paragraph that summarises the proposed recommendations. After the opening paragraph the recommendations are explained more deeply.

7.1 Functional objectives

Create a better fit between purchasers' and product developers' main objectives and create guidelines for how projects across functions are financed and managed.

Purchasing is today seen as more short-term than product development. However, in the purchasing function's objectives there are also more long-term, cross-functional initiatives and supplier development projects where the product development function are participating. But there are no targets that concern just exactly purchasing involvement in the product development process since that is not their defined role. Supporting product development projects in a good way, not only by promoting cost reductions but also by supporting valuable innovation, should pay off for involved purchasers. Adding more specific targets concerning the involvement would therefore be preferable to support future collaboration between purchasing and product development. More generally, guidelines for how projects across functions should be managed at Alpha should also be established to avoid conflicts regarding resources.

7.2 Communication

Introduce standardisation of communication between purchasing and product development such as recommended parts lists and/or templates for requests to purchasing.

There is a need for structuring the communication between the purchasing function and the product development projects at an early stage. Apart from drawings, no matter if they are complete or not, it is important that information crucial for the purchasers is included when communicating. One tool to support this could be templates that product developers can use when sending requests to purchasing. Templates can be established for different product types where fields for the most essential data for the specific product can be created; for example volume, schedule for prototypes, start of

production and bill of materials. A recommended parts list is another way to facilitate the communication between the purchasing function and the product development process. In some cases this is not sufficient though and the presence of an experienced purchaser at the product development meetings is important to register all the information needed to do a proper supplier selection. The purchaser can in the project team also contribute with important market information regarding suppliers or the latest technologies.

7.3 Product development process

Complement the product development process with instructions on how to manage a proper supplier selection, including contacting the appropriate purchaser, and re-configure the gates accordingly.

To ensure that suppliers are selected in a structured way and that the correct purchaser is informed, the content of the product development process and also the configuration of the gates and the gate committees should be modified. According to interviews performed at product development as well as purchasing the process should contain guidelines for how a proper supplier selection is managed. The process should also include information on how to reach the right persons within the purchasing function and also when this needs to be made. Finally, the gates should be strict to ensure that important purchasing aspects has been covered which will reduce the risk of costly loops later on in the process. For major product development projects it is also important that one representative from the purchasing function is part of the go/kill decision.

7.4 Competence

Improve and promote the technical knowledge and the supplier knowledge available within the purchasing function. Support experience from both product development and purchasing when recruiting new and educating existing personnel.

Product developers at Alpha are today not aware of what technical knowledge and supplier knowledge that is available within the purchasing function. This knowledge need to be promoted and also extended for areas that are new to Alpha, if their intention is to develop them further. To further enhance the understanding of the other function's situation it is good that purchasers have some product development knowledge and vice versa. This can be improved by recruiting people with experience of both fields, use employee rotation or collocating personnel from the two functions.

7.5 Purchasing organisation

Divide the strategic purchasing organisation into two. One group should focus on the strategic commodity work and the other are involved in product development projects.

As discussed in the analysis there seems to be a need to divide the work at the strategic purchasing organisation at Alpha. The commodity managers would then be unloaded with some work, like participating in projects, and only be responsible for the strategic commodity work. This would allow them to focus more on their commodity area that they are measured on today. A second group would be responsible for the product prior to production and be part of product development projects. This group would be more difficult to implement because it does not really exist anything like it in the organisation today. It would also require different standards on the competences needed in the purchasing function, with more focus on technical competence. Therefore it could take some time to build up. The analysis showed that a product oriented purchasing organisation works as a facilitator for collaboration between purchasing and product development. This new group should therefore have a product orientation rather than a commodity orientation which should support an efficient and effective purchasing support in the product development process.

7.6 Project purchaser

Introduce the role project purchaser who coordinates the purchasing activities in the project development process. He or she becomes a link between product development, purchasing strategies and suppliers.

A new work role, called a project purchaser, enables the division of the strategic purchasing organisation proposed in the previous section. One common request in the interviews was an introduction of a coordinating role of the purchasing activities connected to product development. The main purpose of the project purchaser will be to cover this gap between purchasing and the product development process. At the end of the empirical study a role like the one described was identified at Alpha, this seems however to be a unique case. This person was interviewed and part of what was found out will be used in this description of the possible project purchaser role.

The project purchaser should first of all support the developers in purchasing related questions. To do this successfully the project purchaser need to be available and take part in the day to day activities. It is therefore important that he or she is part of the project team and preferably is physically close to the developers. In the team the project purchaser should support with for example cost estimations and provide input to discussions regarding drawings and specifications from a purchasing point of view. If the project purchaser does not have sufficient knowledge to answer a question, he or she can ask a purchasing specialist or if needed set the developer in contact with the specialist. In this way the project purchaser becomes the requested link between purchasing and product development. In addition to this knowledge transfer, he or she can also make sure purchasing strategies are followed in the early supplier selection.

This ensures that preferred suppliers are used and that the risks with cost targets, capacity and manufacturability are minimised.

The project purchaser could also then be product development's link to the suppliers. It was identified that product development wanted better knowledge of the technologies available at the suppliers. The project purchaser here becomes the contact person who can connect the developer with the right supplier. This facilitates for increased product development collaboration with the suppliers to avoid problems with manufacturability and capacity. To be this coordinator between different parties in the product development process place high demands on the project purchaser. The project purchaser must be able to communicate with all of them, a technical as well as purchasing knowledge is then needed. Preferably would be if he or she had experience of working in both functions. A visualisation of the project purchasers coordinating role in the product development team can be seen in Figure 6.

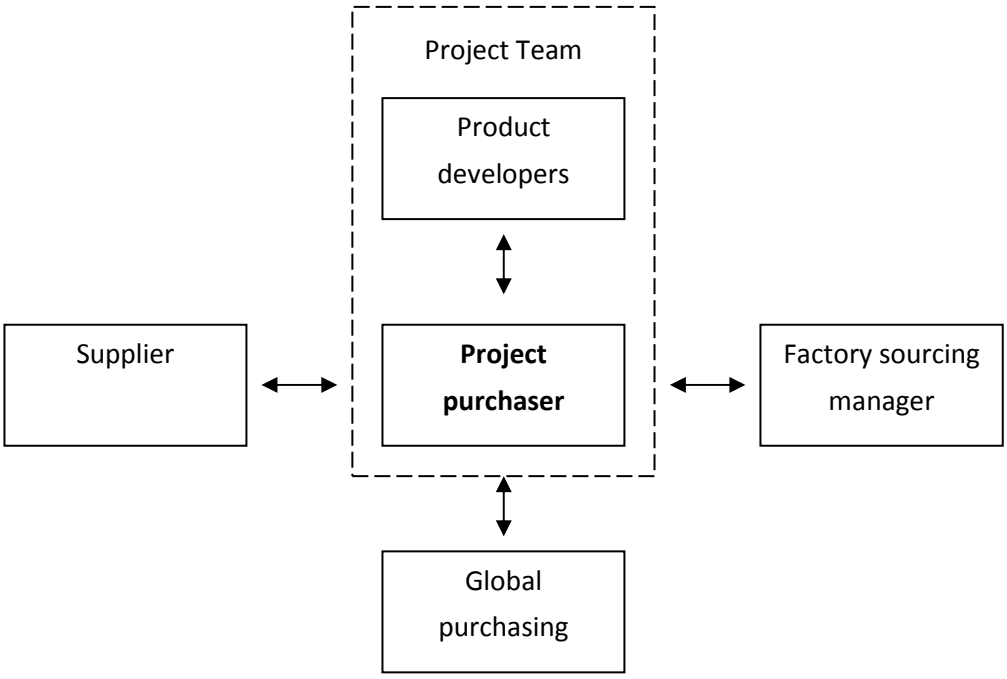

Figure 6 Visualisation of the Project purchaser's coordinating role

7.7 Degree of purchasing involvement

Introduce a decision matrix to support an appropriate degree of purchasing involvement dependent on project size and complexity.

Even though a coordinating project purchaser is established, the situation with different needs in different product development projects remains. In order to able to handle different kind of purchasing involvement dependent on the situation some kind of customisation seems needed. A categorisation of the projects dependent on their needs might then be appropriate in order to match it with the right amount of involvement.

Lakemond et al (2001) discussed project size and complexity as parameters to decide the need, see Figure 3. The size of the project correlates with the amount of involvement from purchasing side needed; the larger project the more dedicated purchaser needed. The complexity then correlates with the need of coordination of the purchasing activities. A proposal of how this categorisation could be done at Alpha is presented in Figure 7.

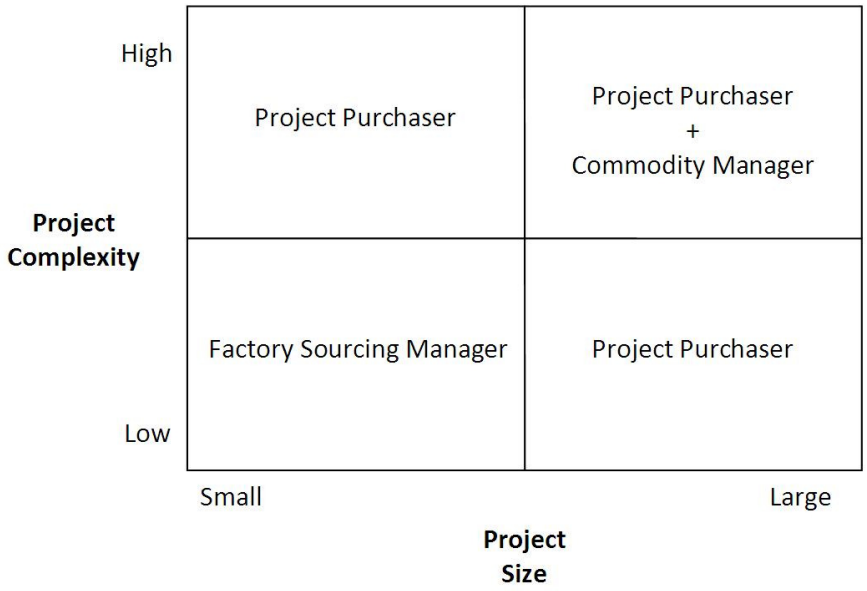

Figure 7 Categorisation of the different degrees of purchasing involvement

In less complex project where no new suppliers are involved only limited purchasing resources are needed. This could example be updates on existing products being made at the factory. Using the local factory sourcing manager will then in most cases be enough. If the project evolves and more resources are needed the project purchaser should be contacted. If the size of the project is more significant the project purchaser should be involved already from the beginning, for example if the project concerns new global suppliers. The project purchaser then got the knowledge of the supply base and the purchasing strategies and can support the product development in the early supplier selection.

If the project is of a more complex kind, for instance new technologies or materials are involved, the project purchaser gets a coordinating role. The prime mission for the project purchaser is then to work as link between the product development team and different purchasing specialists or suppliers. If the project should be of both large size and complexity from the beginning it might be appropriate to involve also the concerned commodity manager at an early point.

8 CONCLUSIONS

In this chapter the main findings made in this thesis are presented. First, the question why the purchasing function should participate in the product development process is answered. Thereafter the issues that arise from not involving purchasing early in the product development process, what effects they result in and how they can be managed are presented.

Several authors have underlined the importance of a strong integration of purchasers and product developers but the exact benefits of such integration have not yet been clarified. To bridge this gap the interviewees of this study where asked to reflect on why an integrated purchasing support in the product development process is important. Our conclusion is that involvement of the purchasing function in the product development process will result in cost savings of different kinds, increased product performance, reduced development time and that risks related to delivery are reduced. The different cost savings that can be drawn from purchasing involvement are both from reduced product cost and reduced development cost. The reasons are for instance that developers get a better understanding of what influences the cost, the use of standard components will increase and the consolidation of purchases will increase. The drawbacks with a more integrated purchasing support that has been mentioned during the interviews are not many and are all related to that this kind of collaboration will demand extra time and resources. These drawbacks must of course be taken into consideration before efforts to increase the purchasing involvement in the product development process are initiated.

The literature review conducted as part of this thesis showed a number of different prerequisites and difficulties connected to purchasing involvement in the product development process, but the number of more practical enablers were however more limited. This thesis has tried to fill this gap by identifying what drives and what inhibits collaboration between purchasers and product developers at the case company Alpha. This result has then been used to find how to succeed with the purchasing integration for a company that earlier have produced most components in-house and have had a limited need for a purchasing function. The result of the performed study can be viewed in Table 1.

Table 1 Summary of found issues and the corresponding solutions at the case company Alpha

Categories	Issues	Effects	Solutions
Functional objectives	▪ Conflicting interests ▪ No support for cross-functional projects	▪ Inhibiting collaboration	▪ Adjusted main objectives ▪ Guidelines for projects across functions
Communication	▪ Purchasing contacted late in the process ▪ Wrong information sent to purchasing ▪ Lack of support from IT-systems	▪ Communication between product development and purchasing is not efficient ▪ Purchasing support perceived slow	▪ Standardisation of communication ▪ Also discuss non-complete drawings ▪ Presence of purchaser at product development meetings ▪ Strive for IT-systems that support the business processes
Product development process	▪ Supplier selection made ad hoc today ▪ Only technology aspect is covered when choosing supplier ▪ Purchasing not informed ▪ The process is not always followed	▪ Important aspects are forgotten when selecting supplier ▪ The best supplier not always chosen ▪ Purchasing cannot work proactively	▪ Include a decision matrix that determines the degree of purchasing support needed ▪ Include proper supplier selection in the process ▪ Include how and when to contact purchasing ▪ Adjust the configuration of the gates
Purchasing organisation	▪ Conflict between commodity development and project work ▪ Difficult to find which purchaser to contact ▪ Product developers experience purchaser competence weak in some areas	▪ Support of product development is not prioritised ▪ Developers are reluctant to contact purchasing	▪ Clearer division between commodity development and project work ▪ Introduce a project purchaser role who coordinates the purchasing support ▪ Develop technical competence in certain areas ▪ Make purchasing competence more visible ▪ Develop product development knowledge at purchasing and vice versa

The different issues that were found in the empirical study have in the report been structured according to the different categories found in the first column in the table above. In the next column the actual issues are listed. To make sure that the right countermeasures are used the effects of found issues have been deeply analysed, the result is shown in the third column above. Finally, to overcome the current issues found in the collaboration between the purchasing function and the product development process a number of solutions is presented in the fourth column.

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Appendix A - Interview guide purchasing

Role

- What is your role at in the purchasing function?

How

- How is purchasing working with product development today?
- When in the product development process are purchasing involved?
    - Who are involved then?
    - How is that working?
    - When in the process should purchasing be involved?
- Have you tried to involve purchasing in the product development process before?
    - What was your experience of that?
    - What did you find positive/negative then? Why?
- How do you experience the view of the purchasing function at Alpha?
    - From top management
    - Does purchasing have the needed authorities?
    - Is the role of purchasing discussed within the company?
- What are your functional goals?
    - How is the purchasing function measured?
- What do you think about the communication and coordination between different units at Alpha?
- Do purchasing managers have the right competencies and capabilities to support product development teams?
    - Product development knowledge

- How could the involvement of purchasing in the product development process be improved?
    - Divide operational and more strategic work

Why

- Benefits/drawbacks purchasing
    - What could purchase benefit from being involved in product development?
    - Why is this important for you/purchasing?
    - What drawbacks do you see with purchasing involvement in product development for purchasing?
- Benefits/drawbacks Product development
    - What could purchasing contribute with in product development?
    - Why is this important for product development?
    - What drawbacks do you see with purchasing involvement in product development for product development?

Appendix B - Interview guide product development

Role

- What is your role in the product development process?

How

- How do you choose what suppliers to use for manufacturing or assembly?
    - When do you decide what supplier that will be used for manufacturing or assembly?
- How is purchasing involved in the product development today?
    - When in the product development process are purchasing involved?
    - Who are involved then?
    - How is that working?
- Have you tried to involve purchasing in the product development process before?
    - Who did you contact?
        - Did the person have the right competence or information?
        - How did you find the person?
    - What was your experience of that?
    - What did you find positive/negative then? Why?
- What are your functional goals?
    - How are the function measured?
    - How are individual projects measured?
- Are you working cross-functional?
    - In what way?
- What data are critical for the different process gates?
- Do you use any kind of roadmaps to plan your future technical development?
- What do you think about the communication and coordination between different units at Alpha?
- How do you experience the view of the purchasing function at Alpha?

- How could the involvement of purchasing be improved?
- What kind of person within purchasing would be helpful for you to contact?
    - Specialist or generalist

Why

- Benefits/drawbacks product development
    - What could purchasing contribute with in product development?
    - Why is this important for product development?
    - What drawbacks do you see with purchasing involvement in product development for product development?
- Benefits/drawbacks purchasing
    - What could purchase benefit from being involved in product development?
    - Why is this important for you/purchasing?
    - What drawbacks do you see with purchasing involvement in product development for purchasing?