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Complexity of Supply Chains

A Case Study of Purchasing Activities and Relationships

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Executive Summary

In the complex world of today with customers as well as suppliers scattered around the world the inevitable outcome is complexity. Going back to the early days of industrialism companies to a large extent owned the whole chain from supplies to sales of the final products. An example is Ford, the company controlled almost the entire chain, they even established their own rubber plantation.

During the last decades companies have switched to a more intense focus on their core competences leaving supporting services, raw material and components to others. Again, the manufacturing industry, using Ford as an example, uses sub-suppliers for components and material. Partly this is because today there is a far broader variety in what is produced according to customer's different demands. Earlier people simply bought a car but today people have varying needs as well as a desire to express themselves by choosing model, color, rims et cetera. Today these companies are to a larger extent characterized as developers-designers-assemblers.

The choice was to investigate FläktWoods Jönköping, a Swedish company, part of FläktWoods Group. The company has been producing climate control equipment since 1918 as is considered as one of the world leaders in its line of business.

Some of this company's customer and product categories have been investigated together with relevant competition and relationships. An investigation regarding some of FläktWoods supplier categories and the related issues competition and relationships has also been performed. This has been done in order to understand how these matters are connected and affect each other as well as develop guidelines to handle these matters. Interviews with different managers in the company have been conducted and the results were compared to related scientific literature.

By studying FläktWoods certain patterns of internal as well as external relationships were found. It became clear that with an increased customer perceived complexity of products sold as well as complexity of components purchased by FläktWoods the importance and complexity of internal as well as external relationships increased. Also, with less competition relationships also increased in importance.

The outcome of these patterns is a framework structured in a number of steps that helps in forming these relationships by considering the nature of the products, components and competition. This can be seen as a tool for FläktWoods and potentially for other manufacturing companies when forming different relationships.

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1 Introduction

This initial chapter discusses the background for the thesis, problem, purpose and expected contributions. Further, a description of the structure of this thesis is presented in order to guide the reader. Finally delimitations and methodology are introduced.

1.1 Supply Chains Yesterday and Today

About a hundred years ago manufacturing companies wanted to control as much as possible of their supply chain. An example of a well known supply chain is Ford; the company owned and controlled almost 100 percent of its supply chain. The company went to the extreme when purchasing land in Brazil in order to produce rubber for car tires. There the company built a factory for processing the rubber as well as living quarters, school and hospital for the benefit of the workers and their families (Barkemeyer & Figge, 2012).

Today companies in general focus more on their core competences, meaning that Ford as well as other manufacturing companies focus on designing and assembling their products. Other supply chain activities such as the manufacturing of different components are outsourced to suppliers and their unique core competence. Again, using the automotive industry as an example, items like engines, seats and fuel systems are outsourced.

As this has occurred there has along supply chains become increasingly important with relationships between suppliers and buyers and related activities like coordination and transportation of components and raw material (Jonsson & Mattsson, 2005). Aside from the rationale of core competence companies today in general tend to outsource the manufacturing of components as well as products to countries with lower labour and/or raw material costs. Thus global sourcing has become more important (Kraljic, 1983). Again, Ford and other car manufacturers follow this trend.

The market of today is also characterized by a broader international scope and increased transparency. As companies' source material and components internationally they also compete in the international arena marketing and selling their products. This has increased the need for coordination of a number of activities; from understanding different markets to developing and producing for a variety of markets and customers, from transporting supplies and products locally to globally.

To make it even more complicated customers have a larger demand for variation in quantity, different options and so on, meaning that the individual customer has more influence. The flexibility required leads to the need for relationships where there is cooperation in order to deliver value to the customer.

1.2 Problem

Moving away from a producer dominated to a relationship oriented supply chain with the customer in focus lead to companies having an increased number of complex business relationships, especially when a supplier delivers a system or a module such as a ventilation system for a building. But complex relationships come with a cost for nurturing the relationship, far more than just buying material. Also, the increased customer demand for flexibility stresses these issues. However there are still material and components that can be described as generic or standard with less need for a close collaborative relationship. The challenge is

to choose the proper relationship in different situations according to the nature of goods purchased. The matter is even more complex since different companies as well as businesses are indeed different as their supply chains are concerned.

1.3 Purpose

The purpose is to investigate if and how manufacturing companies' purchasing activities and relationships reflect today's customer oriented environment and to develop guidelines to facilitate this.

1.4 Expected Contribution

This thesis is meant for academics with an interest regarding issues within purchasing, competition, marketing and networks. It is also considered to be written for purchasing managers within manufacturing industries when choosing and forming supplier relationships.

Since this is a case study the expected outcome can especially be seen as a tool helping managers within FläktWoods when forming supplier relationships. However the results are likely to be applicable within similar lines of business.

Keywords; supply chain, demand chain, classification of purchases,

1.5 Structure

The introduction chapter describes the background, problem, purpose, target group, structure and finally the delimitations of the thesis. Next chapter introduces and discusses theoretical frameworks selected together with a combination of these forming a new framework. The method is discussed in the third chapter and the empirical findings are presented in the fourth. In chapter five the empirical findings are analysed relatively the theoretical frameworks. The discussion chapter introduces a suggested approach when forming supplier relationships and illustrates this with two hypothetical cases. Chapter seven concludes the outcome of the purpose as well as critics. Finally the eighth chapter suggests further research.



Fig 1.1 Structure

1.6 Delimitations

The thesis has the customer's perspective but this is described by different functions within the company FläktWoods and their experiences of different customer situations and needs. No customers have been interviewed.

As this is a case study the results are mainly focused on one company. However this does not exclude the possibility to adapt and apply the results in similar organizations and/or lines of business.

1.7 Methodology

This section describes different aspects of observation of reality and knowledge.

1.7.1 What is Real?

What the world is like when observed is also referred to as ontology. According to Bryman and Bell (2011) the matter is whether social entities can or should be considered objective to an external observer. Jacobsen (2002) takes it a step further and states that it is difficult if not impossible to agree upon and obtain a common view of what the real world is like.

Ontology has two different aspects, objectivism and constructionism. Objectivism is according to Bryman and Bell (2011) the standpoint that, as an example, an organization follows for example certain cultural rules and hierarchical structures. A conclusion might be that these can be described objectively using the correct method. Constructionism is described by Eriksson and Wiedersheim-Paul (2006) who say that the reality is perceived different depending on different viewing points. An interpretation of Bryman and Bell (2011) as well as Jacobsens (2002) opinions; is that it is difficult to determine if constructionism or objectivism is true.

1.7.2 What is Possible to Know?

Epistemology regards how as well as to what degree one can collect specific knowledge. There are two different standpoints about what can be known; positivism and interpretivism.

According to Bryman and Bell (2011) positivism stresses the use of natural science to study the social reality. The positivistic standpoint is that anything can be studied objectively by for example counting, measuring or listening. According to Jacobsen (2002) the most convinced positivists say that people's opinion is of no interest, only objective circumstances matter.

An example of an interpretive approach could be the investigation of an organization, its performance and behaviour. By measuring performance and observing the organization in focus the outcome should according to the positivistic approach be enough. However the interpretive standpoint is that this is not sufficient. According to Bryman and Bell (2011) it is important to understand that social science differs from natural science and requires an epistemology that in addition to measurable physical units describes the different perceptions among people as well as organizations, such as different beliefs, culture and underlying values. The knowledge of these different parts is important in order to be able to understand and interpret the measured and observed results. Further Eriksson and Wiedersheim-Paul (2006) stress the importance of understanding different parts to be able to understand a whole as well as the other way around. This is in line with Carlsson (1991) who states that truth is dependent of context as well as multi-faceted.

1.7.3 The Scientific Philosophy of this Thesis

The authors of this study have chosen a constructivistic and interpretivistic standpoint because the issues investigated are perceived and experienced different by different organizations, departments and individuals. On a higher level a customer company perceives matters different than a supplier company on the lower level a purchaser has perceptions that

differ from say a marketing manager. This is the rationale for the need of different perspectives and perceptions.

2 Connecting Purchases, Market Forces and Networks

This chapter introduces and discusses the theoretical framework used in the analysis chapter.

In general a purchasing company will buy different supplies using different relationship modes; ranging from transactional to more cooperative. When deciding what relationship to use it is important first to understand the nature of the supplies and second the situation in the particular supply market in question.

A common view of supply chains is according to Coyle, Langley Jr., Novack and Gibson (2013) related to purchasing and logistic activities on a company's supply side. The other side regarding outbound activities to customers is often described as the demand side. However the authors of this thesis take the perspective of the supply chain from the customer side, meaning that a company's purchasing activities are part of and affect their customers supply chains. This is supported by Coyle et al. (2013) who include all actors from supplier to customer in a supply chain. Further they state that it is important to integrate across boundaries of all actors involved to satisfy the ultimate customer. This reasoning is further described and implied in 6.1.

Theoretical frameworks discussed in this section are Kraljic's (1983) Matrix for supplier classification and selection, Porter's (1979) Five Forces Framework for market analysis and Anderson, Håkansson and Johanson's (1994) ARA Network Theory for describing the nature of relationships.

When purchasing the first task is according to the authors to understand what is bought, the characteristic of the different products or supplies. This can be done by the use of Kraljic's (1983) Matrix when classifying supplies. Kraljic's framework was chosen since it can be considered robust till this day since it is used by for instance Jonsson and Mattsson (2005) as well as Kotler, Armstrong, Wong and Saunders (2008).

However, it is also according to the authors important to take one step further and understand the nature of the market where these products or supplies are bought. It is important to understand surrounding factors, such as legal and competitive, as well. Porter's Five Forces Framework (1979) does this on an industry level and can be considered quite robust; it has persisted over time and is used in current literature, for example Johnson, Scholes and Whittington (2009) as well as Hollensen (2011).

Finally when purchasing there is also a matter of forming a proper relationship; after all, tight relationships are costly. Therefore the relationships formed should be optimized according to the nature of what is bought as well as the forces in the market. After all, today's complicated and extended supply chains consume resources like never before. To understand the characteristics of a relationship the ARA Network Model (Anderson et al., 1994) is a usable tool to assess the partners, their resources and the nature of the purchasing and selling activities.

Therefore; what is bought is dependent on factors in the market and together these affect the nature of what a relationship should be like. Thus these three frameworks will be combined below (2.4).

2.1 Classification of Purchases

Traditionally the role of purchasers when buying supplies for the manufacturing industry has been to obtain the lowest price possible. Kraljic (1983) began to categorize purchased supply items among two axis; profit impact and supply risk. Kraljic's intention was to categorize supplies in order to build correct relationships; meaning that more valuable and/or risky supplies required more effort than supplies of a more simple nature. For instance, he discussed competitive dynamics on a market as well as technological change; circumstances are different for different supplies. The classification is described in more detail below.

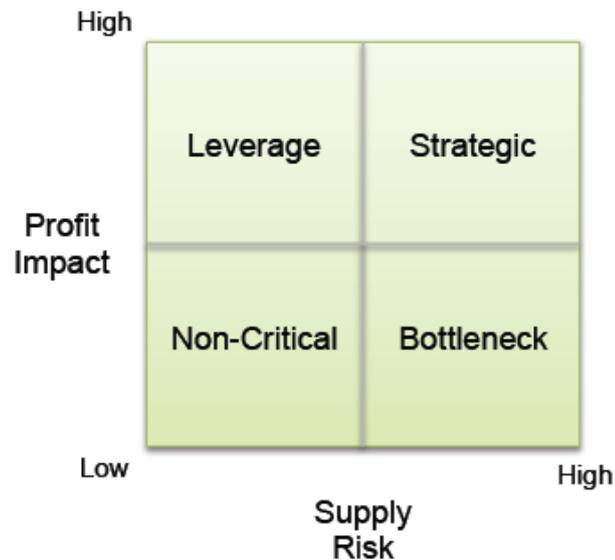


Fig 2.1 Classification of Purchases

Source: Kraljic (1983)

2.1.1 Strategic

These items contribute with great value to the end product and represent a risk since the number of suppliers is very limited. This is the case with for example the engine and transmission for a car. Here it is of importance to develop a strategic relationship (Kraljic, 1983; Coyle et al., 2013) with the supplier in order to reduce risk and also to show mutual commitment and build trust in the long run (Cullen, Johnson & Sakano, 2000). This is important since there will be a mutual dependence between the parties, consequences in the event of a terminated relationship could be devastating. Current trends with increased modular thinking and sub-system deliveries keep stressing the importance of this category.

2.1.2 Bottleneck

Supplies in this category add low value to the end product but carry high risk. Coyle et al. (2013) give examples of these items such as machined parts and electronics. Solutions here can be for example to when possible have more suppliers to choose from, keep a safety stock or have internal production. According to Kraljic (1983) there is importance in knowing the capacity utilization of the suppliers to localize possible bottlenecks. This implies a certain depth as the relationship is concerned.

2.1.3 Leverage

This is often the case with raw material such as sheet metal for the manufacturing industry and simpler supplies, for instance bolts. The point is that volume as well as value is high, there is no customization or unique features and that there are a number of suppliers to choose from thus the risks are low. As Coyle et al. (2013) state the point is to make the suppliers compete and to re-negotiate contracts on a regular basis; it is of importance not to develop the relationships too deep. These suppliers have less power (Cox, 2001) than the strategic ones.

2.1.4 Non Critical

Commodities like office supplies, nuts and bolts represent low value as well as low risk. The relationship commitment regarding for instance investments effort should be kept at a minimum.

2.1.5 Summary of Purchasing Categories

With the increase of outsourcing the workload and cost for relationships grow. Since resources are limited it is more important than ever to commit correct amount of resources to different relationships. Kraljic's (1983) framework is a help to obtain this efficiency. However, this framework is not enough in itself. An example is Porter's (1979) framework, described in 2.3, that discusses other factors affecting these issues, such as bargaining power of suppliers and buyers.

A more recent framework regarding processes that somewhat resembles Kraljic's Framework has been introduced by Kallio, Saarinen, Tinnilä and Vepsäläinen (2000). They use a framework distinguishing between routine, normal and custom processes. It can be described as a continuum beginning with routine processes which are products off the shelf while custom processes are at the upper end, uniquely designed and produced items. Normal processes are located in the middle of this continuum.

2.2 What Factors Affect Competition?

In a specific market there are a number of factors that affect competition. Depending on different issues such as number of suppliers, customers and substitutes, different competitive situations will be the outcome.

In order to be able to create an image of the competitive environment Porter (1979) developed the Five Forces Framework to assess five different competitive forces. These forces are described below.

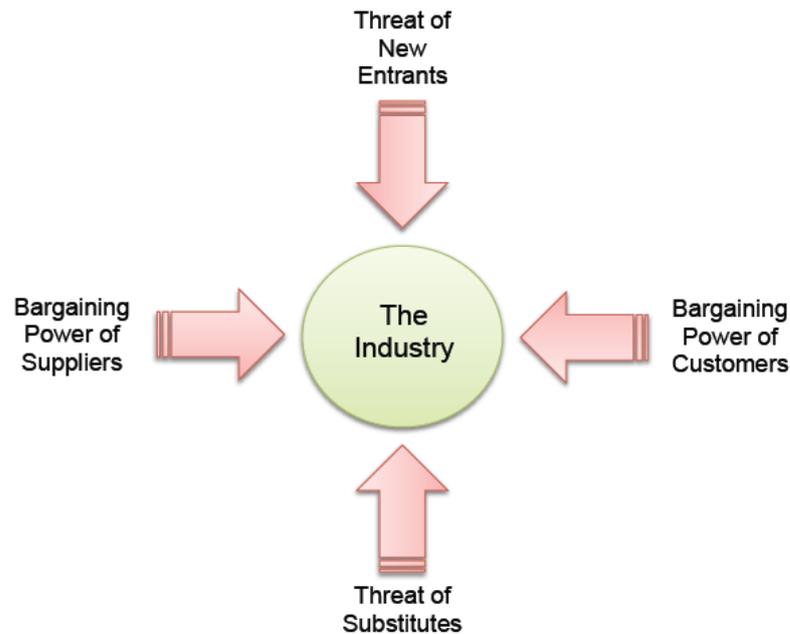


Fig 2.2 Forces Governing Competition in an Industry

Source: Porter (1979)

2.2.1 The Industry

The existing competition within an industry is depending on a number of factors. Porter (1979) identifies a number of factors that determine the level of this competition. Competition is expected to increase when the competitors are many or of equal size and power. An increase can also be expected when the business is mature, meaning that the growth is slow and the service or product is less differentiated. Also, if there is significant investment, for example in very specialized technology, a company is less likely to abandon the market as there would be a switching cost (Porter 1979). This can also lead to increased competition.

2.2.2 Threat of New Entrants

Even in a market with a small number of sellers there could still be a competitive behaviour if excess profit could induce new competitors to enter the market. Porter (1979) identifies six barriers that determine how easy or difficult it is for a new company to enter the industry. The economies of scale among the companies currently operating in the industry is a barrier relative to new entrants since these have to build up a market share. Second, the brand differentiation is also a barrier meaning that the new actor has to invest heavily in market communications in order to create customer awareness which can be difficult since the existing brands are well established. A third barrier exists if there is a need for capital, such as customer credits, inventory, R&D and building facilities. Fourth, disadvantages such as lack of proprietary technology, experience, access to raw material, infrastructure such as harbours, roads, complementary industries will also be barriers to overcome. However the lack of technological knowledge could be omitted when a new invention is made - a technological discontinuity (Anderson & Tushman, 1990). The fifth barrier, lack of distribution channels, is critical especially if current companies are already occupying existing channels. This will mean that the newcomer will have to spend resources building its own channels, which might mean heavy investment in transportation, warehousing, stores et

cetera. Finally, there might be barriers created by governments. Some countries like Sweden have for example regulated the sales of liquor (Swedish Alcohol Act, 1994:1738) with the ambition to improve public health and with the side effect of creating a monopoly.

However these barriers can change rapidly if for example a patent expires, meaning that for example a pharmaceutical drug can be produced by other actors. Another radical change is for example the European Union; it tore down different legal barriers for trade between the member states.

2.2.3 Threat of Substitutes

When a business becomes mature it means that the competition is high and the margins due to this competition decrease. If there is no possibility for further improvements, upgrades or differentiation in order to keep sufficient margins, there will be an opening for substitutes (Porter, 1979). A substitute can be described by for example the replacement of cast iron with aluminium when forging engine blocks or typewriters with computers. Further there will according to Miller (1992) be an uncertainty within an industry regarding unexpected changes in demand for services or products, as the products evolve or new technologies are invented. This can be regarded a kind of technological uncertainty, examples here can be the use of e-mail instead of physical letters or the CD replacing vinyl records. This can also be described as a technological discontinuity (Anderson & Tushman, 1990) a radical service, product or process invention that reshapes an industry.

2.2.4 Bargaining Power of Suppliers

This describes how influential a supplier is (Porter, 1979). A company with a monopoly, patent or unique product might be able to keep prices up since there are no alternatives. Further, a supplier with control and/or ownership of an entire distribution chain will have more power (Cox, 2001). However this might make it more likely for new entrants (2.2.2) or substitutes (2.2.3) to enter the market. According to Porter (1979) this barrier is lowered with the increased number of suppliers and available substitutes. Further, high switching costs for the customer (2.2.1) increase the power of suppliers as well as the other way around. Further, it can be said that the power of suppliers also is affected by the industry, threat of entrants and substitutes (2.2.1-2.2.3).

2.2.5 Bargaining Power of Customers

This describes how influential a customer is (Porter, 1979). Large and/or few customers tend to increase their power since they purchase a larger fraction of a company's production. If the products are less differentiated and/or standardized the customers will have more suppliers to choose from resulting in increased power. Further, if the quality of the end products is highly affected by the quality of a component bought from the supplier, the customer will be less price sensitive resulting in lower power (Cox, 2001).

When selling companies have a common customer group such as competing tire manufacturers selling to a car manufacturer this will according to Achrol and Stern (1988) lead to uncertainty among these manufacturers; who will the customer eventually company buy tires from? This will result in an increased customer power (Cox, 2001).

The discussed switching cost (2.2.1; 2.2.4) affects the power; the higher the cost the lower the buyer power and the other way around. Further, it can be said that the power of customers also is affected by the industry, threat of entrants and substitutes (2.2.1-2.2.3).

2.2.6 Summary of the Forces

Stonehouse and Snowdon (2007) state that Porter's (1979) reasoning regarding forces surrounding companies, these forces are not perceived equally. They state that Porter does not consider that it is more a matter of differences among the companies themselves. Also, Grundy (2006) mentions the need to further develop the framework to make it more comprehensive. Further, Kraljic (1983) when introducing the profit/risk matrix discusses surrounding factors in the market.

2.3 Networks

The network model distinguishes from a traditional market model where organizations involved have a shallow or non-existing relationship. According to the traditional market model it is the product with its attributes, such as price, design, features and performance that determines if there will be a deal, not the relationship of the actors (Hollensen, 2011; Johanson et al., 2002).

Networks are characterized by lateral cooperation, as opposed to more traditional hierarchies where decisions are made by authority from above. Positive experiences from earlier business activities where the parties involved have shared the benefits create bindings as mutual trust is developed (Cullen et al., 2000). Examples of these bindings are for example economical, social, technological or juridical. The entrepreneurial region of Gnosjö, Sweden, can serve as an example of this network phenomenon. Companies lend machinery, employees and production capacity to each other (Wigren 2003). In general, networks are mostly hard to see and can be hard to get access to.

A way of describing networks is introduced by Henneberg, Mouzas and Naudé (2006) who take different perceptions of different actors in a network into consideration. Their paper also reveals the complexity of the network connections and might be used as a tool to assess the risk for consequences of events such as a ruptured network; domino effects (Hertz, 1999).

2.3.1 The ARA Network Model

Anderson et al. (1994) use a framework to describe a network among three dimensions. These are actors involved, the resources they possess and the activities these actors perform using their resources.



Fig 2.3 Interpretation of the ARA Network Model

Source: Anderson et al. (1994)

2.3.1.1 Actors

A supply chain consists of different actors (Anderson et al., 1994). An example might be suppliers, transporters, final producer, other transporters distributing to wholesalers and so on. However reality is more complex than a single supply chain. Suppliers as well as transporters might have connections with competitors as well as complementary businesses. For instance a producer of dairy products can very well serve competing retailers; a transport company can ship complimentary products such as ketchup, mustard and hot dogs to a specific retailer. These different actors are altogether forming a complex web where they are dependent on each other.

When different actors learn to know each other and successful business activities develop social bonds will be the outcome. These bonds will as time goes by become stronger as the trust develops (Cullen et al., 2000; Ford, Gadde, Håkansson & Snehota, 2006). Also, this trust will lead to smoother operations, such as placing an order over the phone rather than discussing and negotiating a contract. But there is also a risk in a sense that it might be harder to switch supplier – you know what you have but not what you get.

2.3.1.2 Resources

A common way to think of resources is as physical assets, such as plants, machines and computers used to generate value. When a supplier builds a facility close to a customer, such as a harbour building a terminal to strengthen ties to local companies in need of sea transportation, a resource tie will be created (Ford et al., 2006). This tie might also be considered as an entry barrier for new actors operating terminals, it requires resources to build

as well as penetrate the market. It can also be an exit barrier for the terminal operator, the monetary investment is high (Porter, 1979).

However, it is important to also include for example knowledge resources (Anderson, Narus & Narayandas, 2009; Ford et al., 2006). Here one can study the automotive industry; when a sub supplier develops, produces and delivers car seats. There will be interdependency among designers at the supplier as well as the car manufacturer. The seats must fit both physically and functionally, requiring a joint design work. Thus the knowledge is shared, creating a resource tie (Ford et al., 2006), but this tie can also be considered an exit barrier. This knowledge can also be used by the supplier when designing and producing for other competing car manufacturers, leading to knowledge leak but this can work the other way around as well.

Further, knowledge can also according Nonaka and Takeuchi (1995) be divided into tacit and explicit knowledge. The former is knowledge that is hard to transfer such as riding a bicycle; it is possible to learn by oneself but it becomes easier if someone is there to help. The latter knowledge is easy to transfer through for example an instruction manual how to perform maintenance on a bicycle.

2.3.1.3 Activities

Actors or companies who perform activities coordinate operations of customers and suppliers to make a supply chain work. Examples of activities can be to produce and distribute a specific component, deliver it on time and other related activities such as design, technical support and billing. This is a way of creating value (Anderson et al., 2009). The more complex an industry is, the more actors are involved and the activities get more complex. For example, the automotive industry is a classic example of high product complexity and a large number of suppliers. Here activities such as just-in-time delivery are critical, neither the supplier nor the customer wants to hold large inventories. Other activities like developing different components together, can according to Ford et al. (2006) be considered an activity link.

An important issue is to find out which processes require activities of a more complex nature and which do not. A relevant example is the automotive industry and its supply of basic items such as bolts relatively the design and supply of an engine which naturally requires tighter interaction as the activities are concerned. To sort out issues like these another tool that can be used is the Kraljic Matrix where purchased goods or services can be categorized among two axis; profit and risk (Kraljic, 1983). The model is described in 2.1. An additional aspect is as in the engine case described above; to consider that there are other suppliers delivering components to the engine manufacturer. To further describe the complexities and other issues regarding the ARA model a deeper discussion follows.

2.3.2 Variety and Complexity in Networks

Using the ARA framework Anderson et al. (1994), Ford et al. (2006) and Jensen (2010) state that the actors involved use their resources to perform specialised activities which in turn lead to a need for more actors performing their individual activities. Jensen (2010) has with different activities in mind identified different roles in a case study regarding car distribution in Norway. These actor roles can be for instance to organize, provide resources or carry risk.

None of these parts; actors, activities or resources can be excluded, they depend on each other but their relative sizes and interdependencies can be different in different contexts and industries (Henneberg et al., 2006; Kallio et al., 2000). Further, it is for example hard to discuss activity links without mentioning actors and resources involved, the issues are indeed complex.

This is in line with Johanson and Vahlne's (1977) reasoning about internationalization processes. They say that commitment in a market results in knowledge, which in turn increases the probability for further commitment in that market which eventually might increase this commitment through activities. This can be seen as a description of how networks develop; in addition this is further stressed by the recent introduction of networks in the framework by Johanson & Vahlne (2009).



Fig 2.4 The Basic Mechanism of Internationalization – State and Change Aspects

Source: Johanson and Vahlne (1977)

2.3.3 Risk and Complexity in Networks

The increase in international trade, such as supply of raw material, outsourcing of manufacturing operations and a global market make the networks among different actors grow (Hollensen, 2011).

However the growth also leads to increased complexity (Henneberg et al., 2006) as well as risk as networks are concerned. Hertz (1999) defines risk as increased possible consequences of a network rupture, so called domino effects. Domino effects are initiated when a radical change occurs in a network, such as change of legal trade barriers, varying demand and supply, change in environmental legislation or public opinion and new radical innovations. The risk for these effects to develop is increased with increased complexity within the network. Domino effects grow as companies try to defend existing business, leading to an increased number of companies searching for new business partners. Dissatisfied actors grab the opportunity of the turbulent market to search for more favourable relationships and finally the increased importance of relationship leads to reduced markets which in turn causes domino effects (Hertz, 1999).

2.3.4 Summary of Networks

To briefly summarize the ARA model it may be said that actors who are part of the network have resources which they use to perform different activities. As the network develops, bonds are created among actors, as resources are shared ties are created and the performed activities create links. Johanson and Vahlne's (1977 & 2009) can be seen as a description of how these networks develop. Different networks require different roles, leading to the fact that networks differ from each other. As the networks grow so does the complexity (Henneberg et al., 2006), with this complexity there will also be larger consequences if the network is ruptured (Hertz, 1999).

2.4 Connections between the Frameworks, Introducing the K5N Framework

Kraljic (1983) began to develop procurement from pure purchase towards a broader concept of portfolio thinking, challenging contemporary pure purchasing attitude. Grundy (2006) wanted to move forward by stating that Porter's (1979) five forces were interdependent as well as dependant on surrounding issues. Anderson et al. (1994) introduced the ARA Network model and Hertz (1999) as well as Henneberg et al. (2006) have contributed further in understanding the properties of and risks regarding networks.

The author's of this thesis claim that these matters are connected; the nature of what you buy is dependant on forces within the market as well as the relationships that emerge when doing business. Similar reasoning is brought forth by Kallio et al. (2000) who combine different activities according to the properties of a specific product.

Therefore the authors introduce the framework below.

2.4.1 K5N Framework

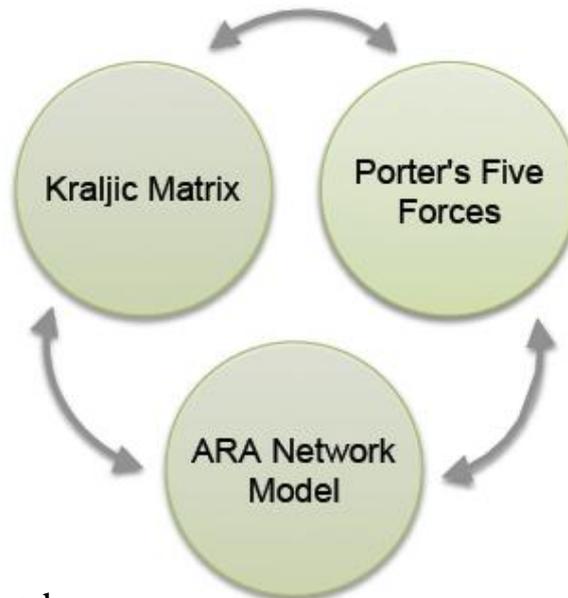


Fig 2.5 K5N Framework

The Kraljic (1983) matrix used when categorizing suppliers can be described as a starting point when classifying a component or material (c/m) that is about to be purchased. However regardless if this c/m is to be considered a non-critical, leverage, bottleneck or strategic consideration need to be taken regarding Porter's (1979) Five Forces Framework. If for example the c/m is considered to be a non-critical there will still be a variation in risk depending on supplier or buyer power which in turn is dependent on issues like threat of new entrants, substitutes available and existing competitors in the industry. With more options the risk will be reduced and the other way around. When a c/m is strategic and according to the matrix is characterized with high risk the risk could be reduced if in line with the reasoning above the number of suppliers or substitutes available is higher. A newly developed c/m that initially is considered strategic might over time develop into a non-critical with an increasing number of suppliers and/or substitutes available.

As relationships are concerned it can be said that the higher value and/or risk of the c/m according to the Kraljic matrix (1983), the more important it is to have closer relationships with suppliers. It is also important to consider that closer relationships mean stronger actor bonds (Ford et al., 2006). These bonds are more distinct when c/ms have an increased amount of risk and/or value. This is the case when for instance two companies make a mutual investment, such as joint product development followed by a mutual commitment by building a production facility.

Further, an increased number of c/ms from a number of suppliers/customers add complexity to the network. This increases the network complexity (Henneberg et al., 2006) resulting in increased risk for, as well as consequences of, domino effects (Hertz, 1999). Kraljic (1983) says that when a customer company is considered less important from the supplier's point of view the customer should look for substitutes and/or other suppliers. From a network point of view, however, to save resources invested in a relationship an option could be to obtain a deeper relationship to tie the supplier closer, or at least consider relationship costs already invested.

Depending on the variation of the different competitive forces, different levels of relationships between actors as well as the networks will be affected. With a number of suppliers available there will be a possibility to change supplier if the relationship does not function. Further, a new substitute emerging or an entrant appearing in the market could also create an opportunity to switch suppliers. These are considered to lower the supplier power resulting in weaker actor bonds, which in turn could cause a network rupture and developed domino effects.

As the number of customers might vary as well, this will affect the bargaining power of customers. When a company is dependent on a single customer buying a large portion of the production this customer will have large bargaining power resulting in stronger bonds and the other way around, as is the case with water pipes and electrical wires connected to buildings. With strong competition within an industry it is important to have good relationships; strong actor bonds, smooth running activities and shared resources, with customers or you might lose your sales to a competitor. This duality and conflicting interests are thoroughly discussed by Cox (2001).

2.5 Research Questions

Starting with the purpose: "The purpose is to investigate if and how manufacturing companies' purchasing activities and relationships reflect today's customer oriented environment and to develop guidelines to facilitate this" (1.3), and by studying literature in the fields of purchase, competition and networks the following questions regarding the first part of the purpose have emerged:

1. How do different customers perceive a producing company's products?
2. How does a producing company's perceive different raw material and components?
3. How are the market forces regarding these perceptions (Q1 & Q2)?
4. What relationship choices regarding these perceptions have been taken into consideration?

The second part of the purpose regarding guidelines will be built on the results of the research questions.

3 How the Investigation was Executed

This chapter introduces and discusses the method used to collect data. The different sections begin with a theoretical description followed by a motivation of the chosen alternative.

3.1 Deductive or Inductive

A deductive approach stands for the most common view of the nature of the connection between theory and existing knowledge (Bryman & Bell, 2011). The first objective is to develop the theoretical framework from existing observations and theories and second to collect and compare empirical data to the framework. There is a historic account to this approach. A scientific tradition going back to Aristotle was dominating science for long time. This tradition stated that logic conclusions of established truths should create knowledge. But in the 16th century new technology such as telescopes gave scientists new possibilities to study the universe which lead to suggestions that there might be other explanations that challenged the established truths (Jacobsen, 2002; Eriksson & Wiedersheim-Paul, 2006). A well known example of these contradictions is Galilei who came to the conclusion that the earth orbits the sun and not the other way around.

Jacobsen (2002); Eriksson and Wiedersheim-Paul (2006) say that an inductive approach requires the researcher to collect empirical data without previous theoretical thinking influencing and constraining the process. Thus the data should describe the reality correctly. Galilei's approach can be described as inductive in a sense that his observations resulted in new theory which has over the years been found robust to put it gently. Bryman and Bell (2011) describe this as follows; induction is observation leading to theory and deduction the other way around.

3.1.1 Selection of Approach

This study consists of a deductive as well as an inductive part. The first and more extensive part of the purpose is fulfilled by developing a framework out of existing knowledge and analyzing it relative collected data, a deductive part. There is also a less extensive inductive part, meaning that the outcome of the analysis will be to develop a framework to guide companies when developing different relationships. The combination of deductive and inductive approach could also be described as abductive (Davidson & Patel, 2003).

3.2 Research Interest

The existing knowledge within a research area to some extent determines the choice of study. Existing knowledge is practical when it comes to formulating the problem as well as the research interest. Various forms of research interest can be the foundation of an investigation (Jacobsen, 2002; Rosengren & Arvidson, 2002) as described below.

When there is limited existing knowledge available within a specific research area an exploratory study is appropriate. Jacobsen (2002), states that it is crucial to have an open mind and be prepared for unexpected results and unexpected connections. An example could be how a company spends resources on say marketing research, development, production and service and how this affects the total cost of operations.

A descriptive study is the choice when there exists a basic understanding of the area investigated. According to Rosengren and Arvidson, (2002) this is the case when finding out how different factors are related to and interact with each other, such as the results of marketing research affects the development resources spent and the quality outcome of production operations affects costs for service.

Explanatory studies are appropriate when research has provided considerable knowledge and understanding of a specific area. The point is to acquire a deeper and more profound understanding (Rosengren & Arvidson, 2002). To continue the reasoning above this could mean that high service costs depend on low production quality, but on a deeper level the problem might originate from problems with the production equipment itself; meaning a more profound and deeper understanding.

3.2.1 Selection of Research Interest

Since there already exists an understanding within the targeted research area, networks surrounding organizations, competition and procurement, a descriptive approach will be used. It is also to be considered explanatory since a part of the outcome will be a framework designed to help companies to choose suppliers, by the means of understanding how different issues affect each other on a deeper level.

3.3 Quantitative or Qualitative Method

A quantitative method requires the collection of data from numerous sources (Jacobsen, 2002) in order to find issues that can be applied in larger groups. A common way is to use surveys, since these are easy to duplicate and distribute to numerous respondents. Further, the data collected is possible to quantify and process statistically (Eriksson & Wiedersheim-Paul, 2006; Bryman & Bell, 2011). Nevertheless a major drawback is that there is no possibility to ask complementary questions.

The quantitative approach is the opposite of qualitative with regards to the number of respondents, meaning that the former focuses on a larger number of respondents while the latter focuses on a smaller number with more depth regarding questions asked (Jacobsen, 2002) as well as a deeper understanding of the individuals perspective of reality (Backman, 1998). While the quantitative method often uses surveys the qualitative more often uses observation and interview. Qualitative method like interview also has the advantage of asking complimentary question as the conversation proceeds, thus there is an opportunity to obtain a more profound understanding (Stukát, 2005). Complementary questions can also contribute to get a more diverse understanding of different respondent's perceptions (Eriksson & Wiedersheim-Paul, 2006). Qualitative method is also suitable when investigating complex causes in order to understand different people's behaviour.

3.3.1 Selection of Method

Quantitative studies focus on a high number of respondents and numerical results while qualitative provide verbal information. The underlying investigation has however a qualitative approach since the understanding of a company's supply chain and its network and related issues are indeed complex and require a deep understanding rather than superficial statistics. Also, these issues are perceived different depending on different organizations, departments and people. Thus in-depth verbal information is of importance.

3.4 Case Study

To focus on a particular unit like a specific organization or process is known as a case study (Jacobsen, 2002; Bryman & Bell, 2011). A characteristic of a case study is its focus on a larger number of variables in one or a few study objects. Opposed to this is when a smaller number of variables among a larger number of units are studied (Eriksson and Wiedersheim-Paul, 2006). However this should not be mixed up with the definition of quantitative and qualitative method since a case study of for instance a process can be performed by a quantitative survey among actors within this process.

According to the reasoning above (3.1.1) this is a deductive study with an inductive part. Since it also is of qualitative nature with a constructivistic point of view it is appropriate to use a case study. This because the issues regarding the characteristics of companies relationships tend to vary among different organizations as well as lines of business. Further a case study provides the opportunity to use a qualitative approach which in turn will help in gaining a deeper and more profound understanding.

3.5 Organization Selection

Here the selection of units to study and respondents are presented. Bryman and Bell (2011) mention two ways of selecting samples, probability and non probability. The former is to give every possible unit an equal chance to be selected the latter is to select a specific unit of interest. A variation of non probability sampling is convenience, meaning that for instance the access to a unit determines if it is selected.

3.5.1 Selection of Company

An over all criteria were to investigate a manufacturing company with a complex supply chain, meaning a variety of supplies and a flexible production process providing customers with a broad range of products. Three different manufacturing companies fulfilling these criteria were contacted individually. It was decided to choose whatever of these companies able to give the opportunity to a number of interviews of employees from different departments. The selected company; FläktWoods showed interest, was willing to spend time and provide access to different departments. This combined with the company's diverse complex products with at complex supply chain were the selection criteria. This selection of company is according to Bryman and Bell (2011) a non probability as well as convenience sampling since the company selected was willing and able to contribute.

An important requisite is to have access to information about the organization. To acquire this information it is crucial to be able to interview employees with knowledge of suppliers, customers and the company's different internal processes such as production and marketing. Thus it is important to gain knowledge from different departments to obtain a broader and more comprehensive picture which will be described in the next section.

3.5.2 Choice of Respondents

Carlsson (1991) states that reality is multi-faceted, context dependant and that people have to accept this. When performing qualitative investigation with a constructivistic approach this fact has to be accepted. Triangulation is mentioned by Carlsson (1991) as a tool to handle this by for example using two or more interviewers or observers to obtain a broader

perspective. This can also be described as a strategic choice (Trost, 2012) and non probability sampling (Bryman & Bell, 2011).

With limited time available to interview company employees it was decided to limit the number of respondents to four, but still representing seven different company functions. The respondents were Roger Eriksson, Lennart Hed, Christina Nordin and Dick Ugglå.

Roger Eriksson's current position is as a manager for customer order design and preparation. Previously he has been managing the purchasing department and he has a long history with the company beginning with a position in the workshop and has during almost 30 years had a number of different positions in the company. Lennart Hed's position is as a transport manager, he has held this position for roughly ten years. Before that he has approximately ten years of experience within the logistics industry. Christina Nordin is the company's quality manager, a position she has held for 2.5 years. She has previously worked in different industries for 20 years, with quality issues. Dick Ugglå has worked in the company for a long time and also has experience from quality as well as production. Since the respondents represent specific areas of interest this choice is to be considered non probability (Bryman & Bell, 2011).

Table 3.1 Interviews

Respondent	Position	Interview Method & Time	Interviewers
Roger Eriksson	Design Manager Preparation Manager Ex Purchasing Manager	Personal 2013-04-10 1h	Magnus & Emil
Lennart Hed	Transport Manager	Personal 2013-04-02 40min +Mail	Magnus & Emil
Christina Nordin	Quality Manager	Personal/Mail 2013-04-04 40min +Mail	Magnus & Emil
Dick Ugglå	Marketing Manager Technical Support Manager	Personal 2013-04-08 45	Magnus & Emil

3.5.3 Choice of Customer and Supply Categories

Different kinds of customer/product categories were chosen from the Kraljic (1983) Matrix in combination with the respondents/company's experience and perception of these categories. This is also the case regarding the supply side of raw material and components.

The objective was to relate to Kraljic's Matrix since the framework is well known and can be considered robust. This choice is to be considered non probability (Bryman & Bell, 2007).

3.6 Data Collection

When data is collected from own work it is called primary data. This can be collected using for instance questionnaires, interviews or focus groups. Secondary data is basically everything else previously collected by other researchers such as websites, statistics and literature. However it is important to be aware of the fact that secondary data was originally collected for another purpose meaning that the external validity or possibility to use in other areas of interest is low (Jacobsen, 2002; Bryman & Bell, 2011).

Information regarding FläktWoods was collected from the company's website as well as by interviewing the respondents. Thus the data can be described as a combination of secondary and primary data (Jacobsen, 2002; Bryman & Bell, 2011).

3.6.1 Constructing the Theoretical Framework

To review literature is to discuss the subject using literature within the research field. Here it is an opportunity to compare different researcher's opinions, perspectives and different conclusions. In this work well known established theories have been analyzed and combined to build a new framework.

The authors have used literature in the fields of logistics, supply chain management, network theory, marketing, purchasing and method. First the literature was selected out of the authors own knowledge and experience. Secondly, it was chosen from references and quotations within and thirdly scientific articles were searched for in different databases, such as ABI/INFORM, Emerald and JSTOR using key words such as logistics, networks, supply chain, Porter's five forces and Kraljic Matrix. After this articles were selected for further evaluation from originality and then number of quotations. The summaries of the articles were read to evaluate whether they were relevant for further reading. Some articles generated other articles as well through snowballing sample which is a kind of convenience sampling (Bryman & Bell, 2011). The material used in the literature review is secondary data (Jacobsen, 2002; Bryman & Bell, 2011).

3.6.2 Interview

Interviews are the most widely used method for qualitative studies (Bryman & Bell, 2011) and can be characterized by different degrees of structure; they can be structured, semi-structured or unstructured along a continuum. Structured interviews have a rigid design with specific questions and no flexibility. Semi structured interviews are designed around specific areas with the intention to give the respondent a freedom to formulate answers. Unstructured interviews are more like a normal conversation with little or no attempt to affect the respondent (Jacobsen, 2002; Bryman & Bell, 2011). The interviews were conducted in Swedish since it is the native tongue of interviewers as well as respondents. To translate the empirical material to English was not considered to be a problem since the authors have good knowledge of English.

An interview face to face gives the advantage to be able to create a positive atmosphere and build a relationship with the respondent which might lead to making the interview more

informal. The informality gained can be an advantage especially in order to make the respondent develop his or her own thoughts in open ended questions. This situation also makes it possible to observe facial expressions as well as body language to determine whether the respondent is comfortable with the situation or questions. Thus the interviewer will be more flexible and adapt the proceeding of the interview (Bryman & Bell, 2011) to for example a changing atmosphere, which is hard over the phone (Eriksson & Wiedersheim-Paul, 2006). Drawbacks are that personal interviews take time and it might be hard to gain access to respondent's time as well.

Aside from a personal interview this provides the possibility for the respondent to feel more anonymous and possibly more willing to answer uncomfortable questions but a possible drawback is that the interviewer is unable to observe the respondents body language (Bryman & Bell, 2011). Further the respondent not being able to perceive the interviewer's face expression and body language might be an advantage since respondents can have a tendency to give answers to satisfy the interviewer, also known as the interviewer effect (Jacobsen, 2002; Eriksson & Wiedersheim-Paul, 2006). Further an obvious advantage is that telephone interviews are considered cheaper (Bryman & Bell, 2011).

3.6.2.1 The Interview Selection

The authors have elected to use semi structured interviews in order to provide a basic structure to ensure coverage of the areas of interest and at the same time give the respondents an opportunity to further develop their own thoughts and reasoning as well as the interviewer's possibility to ask additional more clarifying questions (Trost, 2012). This is in line with Stukat's (2005) reasoning that this is better than questionnaires or interviews with rigid questions.

The selection in this investigation was primarily to use face to face interviews to create an informal atmosphere, a relationship with, and to show the respondents due respect. It might be assumed that this can contribute to the qualitative approach as well. Further and complementary questions were asked by mail when the relationship was already established. The data collected is to be considered primary data (Jacobsen, 2002; Bryman & Bell, 2011).

When conducting the interviews face to face data was collected by recording on two recording units and simultaneously making notes of record time and bullet points when specifically interesting matters were discussed. On the same day the data was transcribed while fresh in mind. The interviews lasted until desired information had been obtained..

3.7 Data Analysis

Jacobsen (2002) describes three steps to analyze qualitative data as follows.

The empirical data gathered ought to be described meticulously in order to ensure that no data is lost. This first step is also defined as a thick description (Jacobsen, 2002).

The thick description of empirical data is often saturated with excess information. The excess information is then reduced and the core of information is processed, systematised and categorised to find out what is relevant and what is not. This process results in a better overview of the data (Jacobsen, 2002). An approach can be to organize interview data according to for example topic, chronology as well as make it readable.

Finally Jacobsen (2002) mentions combination which is to interpret the empirical data and enhance the structure. When combining interview data this might mean structuring contrasting as well as similar data from different respondents. After this step the collected empirical data is analyzed using the theoretical framework.

To begin with the recordings were transcribed resulting in a thick description. After this relevant information was systematized and categorized according to topics who in turn relate to the main interview questions. These topics reflected the theoretical frameworks. Since semi structured interviews were used answers to different topics tended to arise when answering other questions. These answers were subsequently moved to the correct topic. When this was accomplished the data was combined by comparing relatively the different respondent answers. The original material such as recordings and transcriptions are available from the authors.

3.8 Validity and Reliability

Jacobsen (2002) says that investigations should be performed in a way that minimizes problems with validity and reliability, and that qualitative investigations should be subject to this as well as quantitative. However, some researchers are of the opinion that the terms validity and reliability should be reserved for quantitative investigations only and replaced as qualitative investigations are concerned. For instance, Lincoln and Guba (1985) propose the use of a terminology specifically for qualitative investigations by the use of the term trustworthiness, in turn divided in four criteria, replacing validity and reliability. But as stated by Jacobsen (2002); to evaluate validity and reliability does not necessarily mean to use a quantitative logic by using the terms validity and reliability. The relevant questions are the same; has the desired information been obtained - internal validity. Can this information be used in other contexts as well - external validity. Can the collected information be trusted - reliability.

3.8.1 Internal Validity

Internal validity is the ability of a measuring tool to actually measure what it is intended to (Eriksson & Wiedersheim-Paul, 2006; Bryman & Bell, 2011). The validity is according to Eriksson and Wiedersheim-Paul (2006) the most important requirement of an investigation. If it is low the result will have a low quality even if the collection of data has been performed thoroughly. A way of ensuring this is to develop interview questions parallel to the theoretical framework. These questions should also according to Bryman and Bell (2011) be evaluated by individuals with knowledge of the research field to ensure face validity. Another important issue is to find and have access to relevant respondents in possession of adequate knowledge willing to contribute (Jacobsen, 2002). When investigating for instance an organization it is of importance to find respondents in possession of relevant information.

First, as the internal validity is concerned, the interviewing questions were designed and arranged to mirror the theoretical framework and purpose. These questions were later revised by PhD Anna Nyberg who is a researcher within the Supply Chain Management field. Since reality is multi-faceted (Carlsson, 1991) the respondents were selected in order to get a broader perspective (3.5.2) as well as perceptions from relevant positions within the organization.

3.8.2 External Validity

External validity regards if research results obtained can be applied in other contexts as well (Jacobsen, 2002; Eriksson & Wiedersheim-Paul, 2006). However the result of a qualitative is not intended to be used elsewhere (Jacobsen, 2002). But the result from a specific investigation might be applicable within a similar context meaning some kind of external validity.

Whether the results have external validity is not a big issue since a case study is unique. However, this does not exclude the possibility to apply the results within similar contexts, such as same line of business.

3.8.3 Internal Reliability

Internal reliability means that to what extent multiple observers perceive for instance observations and interview answers different or similar (Bryman & Bell, 2011). Within qualitative research reliability can also be described as trustworthiness (Eriksson & Wiedersheim-Paul, 2006).

As regarding the internal reliability there were two interviewers present at every interview, double recorders were used (3.6.2.1) and the interviewers had the same perception of the answers given.

3.8.4 External Reliability

External reliability describes to what extent a tool for measuring produces results that are stable, reliable and possible to replicate in a correct way (Bryman & Bell, 2011). The question is; would another researcher using the same questions in another context obtain comparable results?

There is some external reliability since the design of the questions followed specific topics and the specific choice of respondents. If in the future a similar investigation is carried out following the same structure there should be at least some external reliability.

3.9 Limitations

First this investigation had limited amount of time and economic resources.

The company investigated, FläktWoods, had limited possibility to offer interview opportunities regarding individuals as well as their time. With an increased number of companies as well as respondents from different customers, validity as well as reliability could have been improved. Further a broader selection of customers and supplies could have added value as well.

If the group had a member with significant experience in supply chain management the investigation could have been improved. This empirical knowledge could have created a stronger combination with the author's theoretical knowledge.

4 FläktWoods

This chapter introduces the collected empirical findings. These are presented according to topics that are related to the open ended questions used when interviewing. Subsequent FläktWoods will be used when mentioning FläktWoods Jönköping.

Ventilation. Climate control. Energy recycling. These matters are often not a concern to people in general. It is simply assumed that the air people breathe is clean and odour free as well as has the correct temperature and humidity regardless of being in say a hospital, on a cruise vessel or in their homes. It matters only when the climate equipment fails to operate properly.

There are a number of companies working with these issues by developing, producing and selling climate equipment. FläktWoods, located in Jönköping is considered one of the leading companies in the air movement and treatment industry (Eriksson).

4.1 The Company

Almost 100 years ago in 1918 the engineers Sven Söderberg and Robert Sundström started a company named Svenska Fläktfabriken Söderberg & Co. The production was started in a mill located at Dunkehallaån in Jönköping, Sweden (FläktWoods Group, 2013).

Over the years FläktWoods has grown and can be said to have its roots in a number of old Swedish companies such as Svenska Fläktfabriken, Bahco, Stratos, Ventilation Produkt and Fläkt Veloduct AB. The company has experienced a number of ownership changes, for instance in 1927 when AB Kreuger & Toll acquired the stock majority and in 1988 when Fläkt was acquired by ABB (FläktWoods Group, 2013).

In 2001 Fläkt was acquired by Global Air Movement SARL and in 2002 the new owner merged Fläkt and Woods Air Movement, two of the world's leading names in the air movement and treatment industry and formed the FläktWoods Group (FläktWoods Group, 2013).

FläktWoods in Jönköping is now a global actor within the industry. The products the company manufactures are used in a variety of applications; ranging from offshore and marine applications such as oil/gas rigs and cruise ships, pharmaceutical industries, hotels, trains, tunnels as well as mainstream manufacturing industries. The company is especially known for its flexible product line and uniquely tailored solutions (FläktWoods Group, 2013).

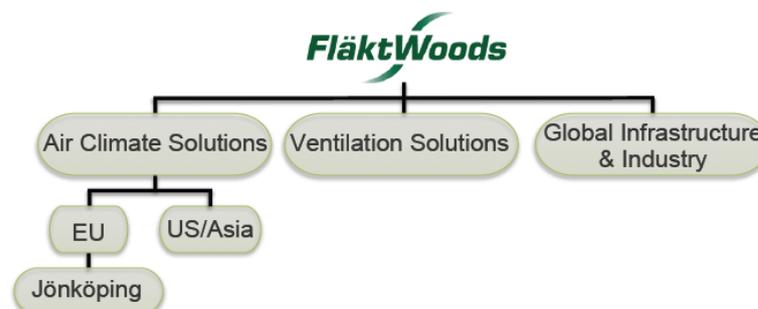


Fig 4.1 The FläktWoods Jönköping Organization

Source: FläktWoods Group (2013)

4.2 Assortment

FläktWoods sells solutions for ventilation and climate control. These solutions are tailored for different environments, ranging from offshore to pharmaceutical industry; from hospitals to ordinary manufacturing industries. The Jönköping plant is focused on larger, tailored and flexible solutions. The major components in these solutions are introduced below (FläktWoods Group, 2013).

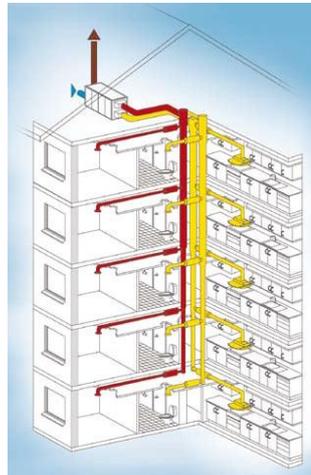


Fig 4.2 Installation Example

Source: FläktWoods Group (2013)

4.2.1 Air Handling Unit

These units may contain components for heat exchange, cooling, recycling of energy, filtering and ventilation according to different customer's specific requirements. There are for instance fan assemblies, air filters, control units, dampers, heat exchangers, sensors for pressure, temperature and humidity (FläktWoods Group, 2013).



Fig 4.3 Air Handling Unit

Source: FläktWoods Group (2013)

4.2.2 Chilled Beams

These are located at the end of the air supply into a compartment, blowing air into it. In addition to ordinary air diffusers there is water circulating in order to cool the air. In addition chilled beams can contain sensors for fire detection, sprinkler heads as well as lighting of various kinds (FläktWoods Group, 2013).



Fig 4.4 Chilled Beams

Source: FläktWoods Group (2013)

4.3 Customer Side

Different customers have different perceptions of a supplier's products. They might be perceived as different as complexity is concerned as well as the importance of the contribution to the end product. There will also be a variety in the relationships with different customers, for example more or less interaction in development and design. The supplier's products also differ according to the amount of existing competition among the suppliers.

4.3.1 The Market

According to all respondents FläktWoods is a company that takes pride in being flexible and adapting their products to different customers varying needs. This flexibility is accomplished in two ways; products can be totally unique from scratch or unique by choosing from an assortment of standardized modules. The latter is done by the use of FläktWoods unique on-line design tool where parameters such as temperature, humidity and desired air cleanliness are entered and the system produces a design of climate equipment using mentioned standardized modules. Eriksson describes that the dimensioning data entered into the system automatically is processed into CAD drawings and then sheet metal processing machines are programmed automatically. Thus the sheet metal components are produced automatically (Eriksson).

In general the Swedish market is handled by sales employees responsible for different districts and service partners. Foreign countries are more commonly handled by agents and other representatives. In either case FläktWoods uses partners to handle end customer issues; for example a ventilation firm or a construction site manager.

This is as the respondents say a way of competing and standing out or differentiate in a market that is characterized by its maturity and competition intensity. The competition in the business is according to Nordin mainly based upon price but a company also needs to have a good quality reputation in the market, but quality is according to the respondents, especially Nordin, more of a qualifying factor. Uggla and Eriksson state that the more complex product the less competition. A marketing tool Uggla and Eriksson emphasize is

how FläktWoods uses the factory's production and test facilities to show the muscles, how effective this is relative to appear on a fair, where anyone can make a presentation (Uggla). The company also arranges instruction courses as well as information meetings where improved products are introduced. Hed also states that some customers request to come and visit.

The development of new products within this industry is relatively slow and mostly consists of continuous improvements of energy efficiency and recycling, increased general performance as well as the use of fewer components and reduced production time. However, according to Eriksson there has been significant development regarding specific components such as more energy efficient electric motors and cheaper as well as more precise control systems. To reach these improvements continuous feedback is required from customers, laboratory testing, production and design (respondents). As Nordin states FläktWoods also organizes meetings with its own service units from Europe to obtain feedback regarding failures occurred and possible improvements.

However the competition in the market is according to all respondents different depending on the product. The more complex in nature, such as a banana transportation boat or an oil/gas rig discussed below, the less competition. At the other end are products produced on a more regular and standardized basis.

4.3.2 Customers Perceptions of Their Purchases

Examples of the above mentioned flexibility when designing unique climate solutions are according to the respondents the design and building from scratch of climate control equipment for banana transportation boats, cruise vessels, oil/gas rigs as well as a ski-slope in Dubai. A slightly different opinion is that Eriksson considers a banana transportation boat and ski-slope relatively simple technologically but still unique solutions. This kind of projects are very complex by nature and require an early and continuous participation of most of the company's functions, such as design, purchase, laboratory, production and quality departments. There is also a tight cooperation with the end customers. This is exemplified by Uggla who describes for instance the testing procedure for banana transportation boats. FläktWoods constructed a compartment in their laboratory that was almost a copy of the real cargo bay of a banana boat. Then the climate equipment was tested to verify that the design met the criteria; if not, adjustments were made. The whole test procedure engaged a number of departments as well as representatives from the shipbuilder as well as the shipper. The test ran for a period equivalent to the shipping time using real bananas, not only measuring the environment (Uggla). To the end customer, in this case the shipper, more than any factor. Customer groups that stands out here is the marine and off-shore industries. These industries are also characterized by tough legal and safety requirements (Eriksson) as well as higher quality (Nordin).

There are other products that are complex by nature but represent a lower investment and operation cost to the customer. This is according to the respondents thanks to a higher grade of standardization of components as well as less interaction with different departments and end customers. As stated by the respondents examples in this category might be facilities like an operating theatre and a pharmaceutical production facility. These are indeed complex and must stand up to high standards of for example air purity, humidity and temperature. These facilities resemble a banana boat in a respect that they are equally crucial to the outcome of the activity processes; bananas will definitely be destroyed if there is a temperature deviation, pharmaceuticals produced might be destroyed due to for example

dirty air. But the value destroyed for the banana shipper might be the whole shipment while the pharmacy producer can re-produce. Customers that stand out here are for instance hotels, hospitals, schools and pharmacy producers.

Products sold to for instance the ordinary manufacturing industry are according to the respondents mainly built of components that are standardized. These products can be specified by a sales person, agent or a skilled customer, using the on-line design tool to specify parameters such as external climate, desired temperature, humidity and air flow. After this is done the tool returns a solution, eliminating the need for human interaction (4.2.1). Another characteristic of these products is according to Uggla that it is relatively easy to modify the equipment built afterwards, thus there is no need for costly and time consuming testing and evaluation. Further, FläktWoods experience in building this kind of relatively standardized equipment has been integrated into the on-line tool which is considered reliable (Uggla & Eriksson). These products are simply built and then distributed to the customer. Customers in this category are for example ordinary mechanical manufacturing industries.

According to the respondents FläktWoods primarily uses climate equipment installation and service firms to handle the contact with end customers. These firms know-how of the products thanks to experience of this kind of equipment combined with the knowledge of their customers unique problems make them according to Uggla more fit to communicate with FläktWoods, this also reduces the number of customer contacts for FläktWoods. To these companies FläktWoods's products are perceived as quite ordinary items, while the end customers tend to consider them complex. End customers buying larger quantities such as construction companies have good knowledge of these products and consider them quite simple and might specify and install these by themselves as well.

4.3.3 Other Activities

When the end customers lack appropriate knowledge resources to handle the start up of equipment purchased, Uggla states that FläktWoods prefer to sell this service to the end customer, along with the equipment, to be performed by a service partner. Climate equipment is after all rather complex and requires specific knowledge. According to Uggla it is too costly for the company to have a higher fixed cost in form of a larger service/support department. In order to bridge this potential knowledge gap FläktWoods has for example 12 service partners in Sweden, this guarantees the end customer's access to knowledge and reduces the required end customer relationships on FläktWoods behalf considerably (Uggla).

Further the local service partner is more able to have specific knowledge of the end customer's different situations, unique technical climate solutions as well as being more responsive (Uggla & Eriksson). These are also more suitable for performing continuous maintenance such as preventive as well as acute trouble-shooting and repair. However in more complex and unique settings the company is able to send its own service personnel.

4.4 Purchasing Side

FläktWoods buy raw material such as sheet metal of different qualities as well as a broad variety of components ranging from nuts and bolts to sensors, fans, electrical motors, heat exchangers and control systems. These components have a large variety regarding how val-

uable, complex and crucial they are to the end product. There are also differences as the competition of these suppliers is concerned.

4.4.1 Supply Market

When FläktWoods purchase raw material and components for their manufacturing, they can be said to be in the same situation as their customers. Like their customers purchase climate equipment as a component of for example a building, FläktWoods buy components and raw material as part of climate equipment. In order to be able to create the above (4.3.1) described variety of climate equipment the company purchases from a number of suppliers. Components and raw material bought from these suppliers are very different; there is according to the respondents a variation along a continuum ranging from relatively simple/cheap to complex/expensive. According to the respondents, especially Uggla and (Eriksson), it is costly to have a large purchasing department. Such a department will cost regardless of current production volumes. Further a large variety of components could also according to Uggla be costly. This supply market is characterized by its maturity and competition intensity. The competition is mainly based upon price but the suppliers also need to qualify by delivering a sufficient quality and be known as reliable suppliers (Nordin & Eriksson). However, according to Eriksson there has been significant development regarding the energy efficiency of electrical motors and fans plus increased possibilities to configure and program control systems. He further mentions that for example motor controls nowadays can be purchased built in the motor casing itself eliminating a supplier. It can be said that this development is more prevalent on the supply side than the customer side discussed in 4.3.1.

4.4.2 The Company's Perception of the Supplies

Components that FläktWoods consider complex and expensive require according to the respondents tighter supplier relationships as well as awareness of technical development. It is also important to have relationships that last over time, since resources invested must pay off by being divided on a large number of components. When the purchase of new more complex components is initiated, for example the quality and production departments participate in the process (Nordin & Eriksson). It also happen that end customers with very specific requirements participate as well. A rule of thumb is according to the respondents that the higher complexity and/or value the more participants are taking part in the purchasing process. However, once relationships are established and agreements are made the relationships are handled on a more operational level day-to-day by the purchasing department (Eriksson & Nordin). These complex and/or expensive components are due to their unique and complex nature subject to less competition, in the market a smaller number of manufacturers possess the know-how and capacity required, than more standardized components (Eriksson & Uggla). Examples of purchased goods in this category are fan assemblies and heating/cooling batteries.

Eriksson stresses that components like sensors and dampers represent relatively small value but are nevertheless crucial to the outcome. He states that FläktWoods very flexible production has significant effect to the purchase processes of these components. These are purchased more or less individually by purchasers on a day-to-day basis using a framework agreement with one supplier. These agreements are evaluated on a regular basis.

Sheet metal is according to the respondents a relatively simple and easily standardized kind of raw material that may be purchased from a number of suppliers around the world. Ac-

According to Eriksson for example electrical motors of different brands are built to the same standards and are exchangeable and like sheet metal available from a number of suppliers around the world. These supplies are purchased in larger quantities and are according to the respondents due to the high total purchasing value subject to quite extensive market research, negotiations and contracting.

According to the respondent basic items like nuts, bolts and paint are simple products that require little attention. Given that the quality is sufficient, price is the main concern since competition is significant. However, to obtain discounts it is common with some kind of contract ensuring the supplier to sell a minimum quantity (Eriksson & Ugglå). They further stress the importance that even if there is a price focus, it is of importance to make an agreement that is beneficial to both parties in order to have a sustainable business relationship.

5 How Reality is Reflected in the K5N Framework

The analysis in this chapter was performed by comparing the empirical data relatively the theoretical framework. The intention was to present the different paragraphs in a way allowing them to be read independently, which lead to some repetition.

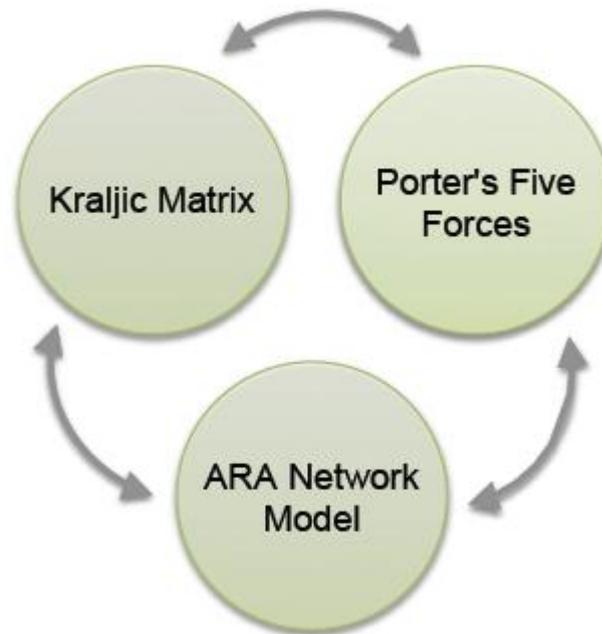


Fig 5.1 K5N Framework

The discussion in this section relates to the first part of the purpose (1.3).

In the theoretical chapter there was a discussion suggesting that Kraljic's Matrix, Porter's Five Forces Framework and the ARA Network Model are interdependent. This was the conclusion of the analysis as well.

5.1 Customer Side

This part is structured according to different FläktWood customers. The different kinds are represented by typical customer examples in different categories according to the Kraljic (1983) Matrix. Examples were chosen that were familiar to all respondents and their perception of how the customers perceive what they purchase from FläktWoods.

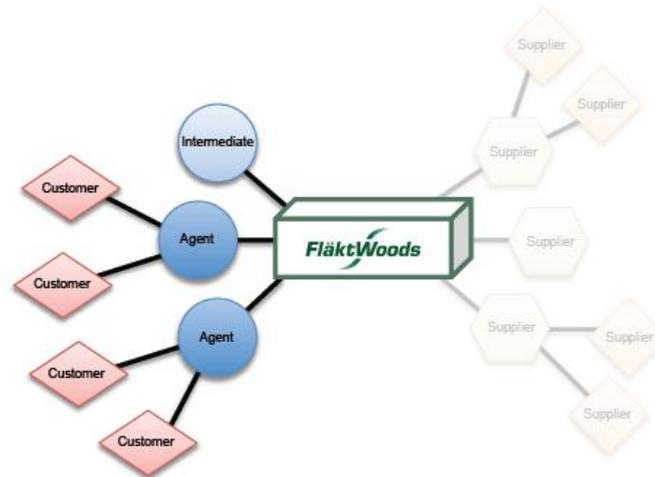


Fig 5.2 Customer Side

5.1.1 Strategic - Marine and Off-Shore

Products which are unique, complex and crucial to the outcome of a customer's operations such as the climate equipment for an oil/gas rig or a cruise vessel can according to Kraljic's Matrix be categorized as strategic since they represent high value and are essential for the outcome of the operations. As stated by Eriksson equipment for facilities such as the skyscraper in Dubai and the banana boat these are relatively simple but according to Kraljic's Matrix they are still to be considered strategic due to the high value they represent and the fact that they are essential in these facilities.

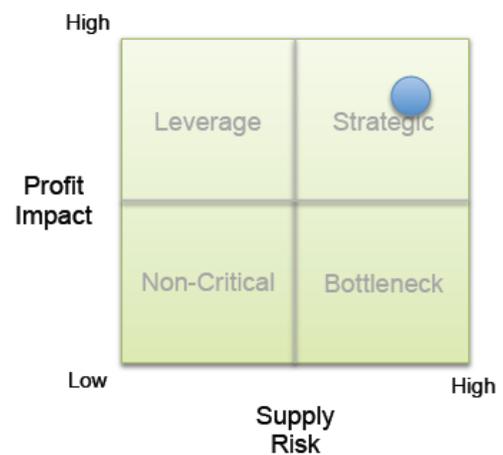


Fig 5.3 Strategic Customers

This market is according to the respondents mature but due to the complex nature of these uniquely designed climate solutions there are few producers who have this capability. Therefore according to Porter's Five Forces the competition within the industry is relatively low which leads to lower bargaining power of buyers. This connection is further strengthened by what Eriksson describes as FläktWoods unique customer design tool and the ability to automatically transform data into machine programs. On top of this, the strict legal requirements for equip-

ment like this (Eriksson) can be considered an entry barrier reducing the threat of new entrants.

There is a consensus among the respondents that these complex and often very unique solutions require the participation of a large number of actors (Anderson et al., 1994), internal as well as external, along the entire supply and demand chain ranging from the end customer to FläktWoods suppliers. As network pictures (Henneberg et al., 2006) are concerned the complexity and interdependencies grow, increasing the risk for what Hertz (1999) labels domino effects if the network is ruptured. But as Nordin and Eriksson have mentioned; as time goes by and the relationships develop and trust builds the risk for a network rupture is reduced thanks to what Anderson et al. (1994) refer to as actor bonds.

As resources (Anderson et al., 1994) are concerned there will mainly be a shared knowledge creating resource ties which in turn will reduce the risk for a network rupture thanks to the mutual commitment. Further FläktWoods internal resources such as development, laboratory and marketing, as well as the customers corresponding functions will according to the respondents experience extended cooperation creating similar resource ties.

This combination of actors and resources contribute in performing these complex activities when designing and building this kind of unique climate solutions. As said by the respondents, as trust is built the amount of lateral cooperation and decision making is increased resulting in smoother running processes or improved activity links (Anderson et al., 1994).

5.1.2 Strategic/Bottleneck - Hospitals and Pharmacy Industry

Products that are equally crucial to the outcome of operations like an oil/gas rig but affect value less are according to the respondents found in for example the pharmaceutical industry. When comparing these to the Kraljic (1983) Matrix these score high on risk but tend to be a combination of strategic and bottleneck. This conclusion is motivated since the pharmaceutical producer can re-produce once the climate equipment has been repaired but the banana transporter might lose the whole shipment and consequentially a larger monetary value. Added to this is the lead time of new bananas, weeks, instead of hours or a day for re-producing drugs.

Since the market is mature and these solutions are slightly less complex and regulations are less strict it may be said that Porter's (1979) threat of new entrants is somewhat increased, meaning potentially increased number of options for the buyer. There are also more companies active providing this segment with solutions leading to a higher competition in the industry and consequentially the bargaining power of buyers is higher. However FläktWoods unique flexibility and efficient customer design process somewhat increases FläktWoods ability to attract customers.

These solutions are considered rather complex by the respondents but are to a high extent made of standardized solutions with little or no actual development. This keeps the number of actors (Anderson et al., 1994) along the supply and demand chain relatively low, resulting in a less complex network picture (Henneberg et al., 2006).

The relatively low number of actors (Anderson et al., 1994) will mean a smaller number and size of resources committed, meaning less significant resource ties, since there is less need for activities such as testing and specific development. Further, when these activities are needed they tend to be more standardized; according to the respondents the company has built for instance quite a few school rooms. These might need testing but this is quite standardized. Thus it can be said that the resource ties (Anderson et al., 1994) are fewer as well as weaker. The downside of this might be that there is an increased risk for a network rupture and subsequent domino effects (Hertz, 1999). However, thanks to a lower number of actors and resources involved, a less complicated network picture (Henneberg et al., 2006), might mean less severe domino effects.

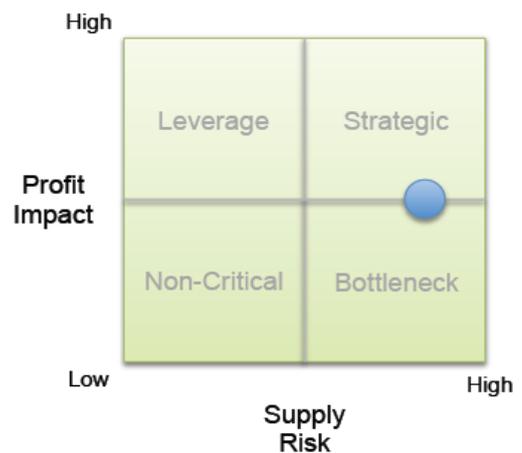


Fig 5.4 Strategic/Bottleneck Customers

5.1.3 Bottleneck - Ordinary Industries

When selling climate equipment intended for use in the ordinary manufacturing industry or apartment buildings Uggla's reasoning is that it is relatively easy to change design flaws afterwards when installed. Unlike oil/gas rigs or banana boats for that matter, less customer value is lost in the event of a failure due to a design flaw or an ordinary equipment breakdown. When applying Kraljic's Matrix to these products for the ordinary manufacturing industry the risk in the event of a failure is considerable but the value lost is relatively low, thus can be considered a bottleneck.

This mature market differs from above mainly because here are more suppliers to choose from, increasing the competition in the industry leading to an increase in bargaining power of customer. In addition here is also further less regulation, leading to significant increase in threat of new entrants, potentially leading to more options for the customer.

This kind of equipment is according to the respondents built of standardized components using Fläktwoods on-line design tool and handled by agents as well as other partners. This indicates that the number of actors (Anderson et al., 1994) is low; meaning that the customer only has to interact with a salesperson. The other actors are mainly within FläktWoods and perform simplified and standardized activities.

As this equipment is concerned the on-line design tool resource (Anderson et al., 1994) is central. According to Eriksson and Uggla FläktWood's experience has been built into this tool, making it easy to use as well as reliable. This can be described as what Anderson et al. (1994) refers to as a resource as well as a supporter of activities when designing a specific solution.

Since the on-line tool uses standardized configurations of pre-designed components there is a minimum of specific design activities. Altogether it may be said that these customers perceive a network picture (Henneberg et al., 2006) of a relatively low complexity. Since there is practically no interaction regarding for instance mutual development and subsequent no shared knowledge there will be practically no resource ties (Anderson et al., 1994). If there is a network rupture, the domino effects (Hertz, 1999) will be less significant due to less complexity in the network.

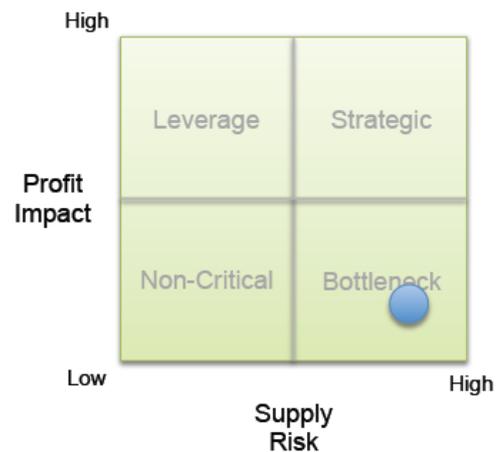


Fig 5.5 Bottleneck Customers

5.1.4 Leverage

End customers

Some end customers like certain construction firms who buy larger volumes and have according to the respondents substantial equipment knowledge are able to specify as well as install climate equipment by themselves. In this case it can be said that the equipment will represent high customer value thanks to the large volumes and less risk thanks to the construction firms own knowledge resulting in the characteristics of a leverage product according to Kraljic (1983).

What stands out here is the fact that these end customers buy larger quantities. This in itself together with high equipment knowledge increases the bargaining power of customers (Porter, 1979). But depending on the very nature of the equipment, whether it is intended for marine/offshore or basic production industry, the former having less competition and the latter more, the bargaining power of customers (Porter, 1979) will vary according to this.

As stated by the respondents these end customers have high equipment knowledge which with Anderson et al. (1994) reasoning can be considered an important resource. As these have this knowledge they are less dependent on a specific supplier meaning that the actor bonds will be weaker. However depending on the competitive situation within the industry in question, as seen above, there will in specific industries be fewer suppliers to choose from which in turn will lead to a kind of stronger actor bonds.

When these skilled customers place orders the amount of work or activities (Anderson et al., 1994), are according to the respondents considerably less.

The variety in competitive situations will also lead to a difference as the complexity of the actor bonds (Anderson et al., 1994) or network pictures (Henneberg et al., 2006) are concerned. This also goes for the domino effects (Hertz, 1999) that develop in the event of a network rupture.

Intermediate Specialist Customers

Since FläktWoods according to the respondents prefer to use specialist firms as intermediates relatively their end customers these specialists are familiar with FläktWoods products in general as well as the different end customers. From the specialists point of view these products therefore have less risk since they represent a larger number of customers and a higher value due to larger volumes since this equipment can be considered their basis for operations leading to what Kraljic's

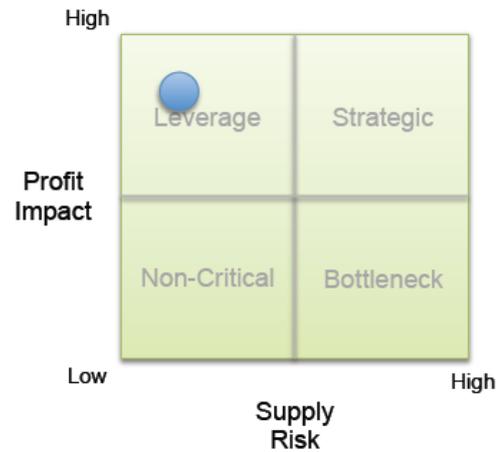


Fig 5.6 Leverage Customers

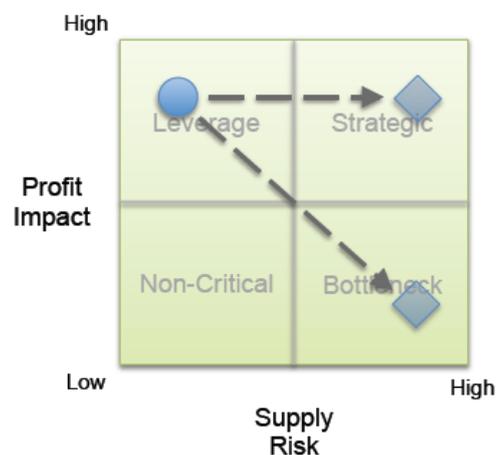


Fig 5.7 Intermediate Customers

(1983) Matrix labels leverage. But it might be said that these firms reduced risk might be omitted due to the fact that they serve different customers, ranging from say ordinary construction companies to the offshore industry.

These specialist firms can on the one hand be said to have increased bargaining power of customers (Porter, 1979) since the sheer volume as well as their specific knowledge about the purchased equipment is high. But on the other hand, depending on whether the end customer is say an oil rig builder or the builder of an ordinary apartment house from this specialist's perspective there will be a variation in the bargaining power of customers (Porter, 1979), but still more balanced than what is the case when the end customer buys directly from FläktWoods, thanks to volumes as well as knowledge.

The network picture (Henneberg et al., 2006) is essentially the same for actors such as the end customer whether buying from a specialist firm or FläktWoods directly. But there is a gain in the resource ties created by the local specialist; the unique end customer knowledge and ability to respond quickly by performing activities (Anderson et al., 1994) more quickly.

When studying these local FläktWoods specialist intermediate firms they can be seen as actors that are closer to the end customers and therefore more able to according to the respondents for instance respond more swiftly meaning that the activities run smoother. Further these local actors have a better understanding and knowledge about the end customers which in itself can be considered a resource that also creates a resource tie to FläktWoods as well as the end customers. Another point is that there are actor bonds created between FläktWoods, the specialist firms and their end customers.

It might be assumed that the risk for a network rupture with subsequent domino effects (Hertz, 1999) is essentially the same as discussed in 5.1.4. But the consequences will be more severe if the network is ruptured by the intermediary; both FläktWoods and the end customer will lose resources as well as access to the intermediate firms combined knowledge of both parties.

5.2 Purchasing Side

This part of the analysis is structured according to Kraljic's (1983) Matrix. Supplies used as examples are those that came up when interviewing the respondents.

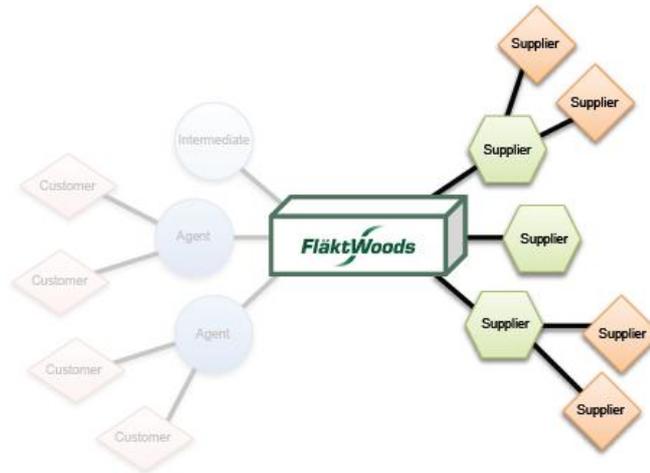


Fig 5.8 Purchasing Side

5.2.1 Strategic

Components that FläktWoods consider crucial to the products produced as well as representing significant value are according to Eriksson and Ugglå for example fan assemblies and cooling/heating batteries. These components require for instance substantial cooperation with suppliers regarding development. Altogether these components are to be described as strategic according to Kraljic's Matrix (1983).

According to Eriksson and Ugglå the competition in the supplier industry decreases as components get more complicated, resulting in what Porter (1979) describes as decreased bargaining power of customers. Due to this complexity there is also a lower threat of new entrants (Porter, 1979) resulting in less competition in the particular supplier industry.

Here matters get complicated; as suppliers are concerned, there are fewer actors to choose from but still as said by Eriksson and Ugglå there are a larger number of actors (Anderson et al., 1994) involved, ranging from end customer to FläktWoods suppliers. There are also a larger number of internal actors present. As said by Nordin for instance specific cross-functional/organizational meetings are required to ensure that the quality desired is obtained, a complicated activity that ideally results in sustainable activity links (Anderson et al., 1994).

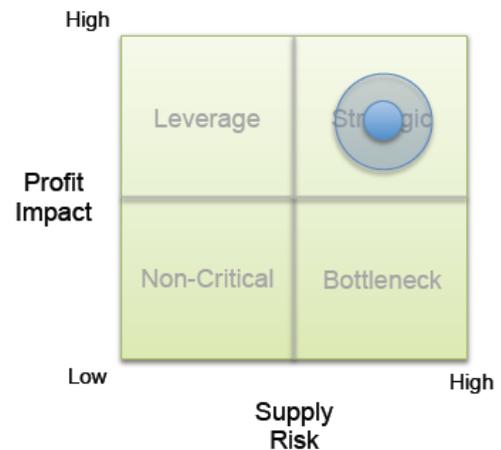


Fig 5.9 Strategic Purchases

The complex nature of these supplies often results in knowledge spanning the different organizations (Respondents). This can be seen as shared resources that create ties (Anderson et al., 1994), a mutual interdependency is created, resources spent, must be divided in a larger number of components to pay off.

Thus an actor bond (Anderson et al., 1994) is created, once the parties are involved it is hard to break the relationship without monetary and knowledge losses. On the one hand this actor bond makes the risk for a network rupture less due to the committed resources but on the other hand the domino effects (Hertz, 1999) if this happens are considerable, because the network picture (Henneberg et al., 2006) is complicated due to a large number of actors involved.

5.2.2 Bottleneck

Components that according to Eriksson represent a relatively low value but still are critical to the production outcome and according to Kraljic's Matrix are to be considered bottlenecks are for instance different sensors and dampers. The risk factor is increased due to the fact that these components are different with every produced unit.

This category of components is subject to some competition in respective industry. But due to the components specific and unique nature and as stated by Eriksson are bought individually on a day-to-day basis leads to what Porter (1979) describes as lower bargaining power of customers.

There is however a difference regarding the competition within the industries meaning that dampers are produced and sold by fewer suppliers and therefore reduces the bargaining power of customers differing them from sensors. Thus sensors can be said to have more of a non-critical characteristic than dampers.

Since these components according to Eriksson are standardized there are no activities (Anderson et al., 1994) such as joint development to consider. Thus no specific resources are shared and no ties are developed, even though dampers would require more commitment than sensors. The activities are limited to daily purchases to match the large variety of units produced. No actors such as end customers, intermediates or other internal functions than purchasing and production are involved. As the actors involved are concerned, there is a framework agreement (Eriksson), actor bond (Anderson et al., 1994), ensuring the benefit of a discount thanks to making that specific commitment.

Thanks to the few actors involved; purchaser, supplier and production, the network picture (Henneberg et al., 2006) is characterized by its simplicity. This will in turn reduce the possible domino effects (Hertz, 1999) should a network rupture occur.



Fig 5.10 Bottleneck Purchases

5.2.3 Leverage

Kraljic (1983) describes leverage products as representing high value and a low risk. As said by the respondents sheet metal is a raw material that is purchased in large volumes but less risk is associated thanks to its simple and standardized nature and availability from a number of suppliers. Another component that also falls into the leverage category is according to Eriksson electric motors; these are built according to industry standards regarding size, power and dimensions and are like sheet metal available from numerous suppliers.

This supply market is to be considered mature and according to the respondents the standardized nature of the items contributes to substantial competition in the industry and a relatively high bargaining power of customers (Porter, 1979).

As stated by Eriksson the significant development that has occurred regarding for example electric motors has increased the possibility for a technological leader to reduce the competition in the industry and lowering the bargaining power of customers. Therefore electric motors might be of a more strategic nature than anticipated.

Since price according to the respondents is the main concern regarding sheet metal the activity in question is mainly to negotiate with a price focus. But the electrical motors require another approach since a specific supplier according to Eriksson might have a technological advantage.

The actors involved, FläktWoods and their sheet metal and motor suppliers, are predominantly subject to long time oriented contractual agreements, what Anderson et al. (1994) describe as actor bonds are created. Since as the respondents say there is more value involved than bottleneck (Kraljic, 1983) supplies it is even more important to have long term contracts, to obtain discounts. It is also according to Eriksson of importance to acknowledge that suppliers commit resources by for instance investing upon sales prognosis. Therefore FläktWoods needs to perform activities such as purchasing prognosis. From a network point of view it might be stated that the suppliers commit resources that in turn tie them to a certain kind of production, whereas FläktWoods does not.

The actor bonds created by long term agreements add some to the complexity of the network picture (Henneberg et al., 2006) but as the potential domino effects (Hertz, 1999) are concerned these are less widespread since there are a number of suppliers to choose from and the suppliers themselves can sell these standardized supplies to other customers.

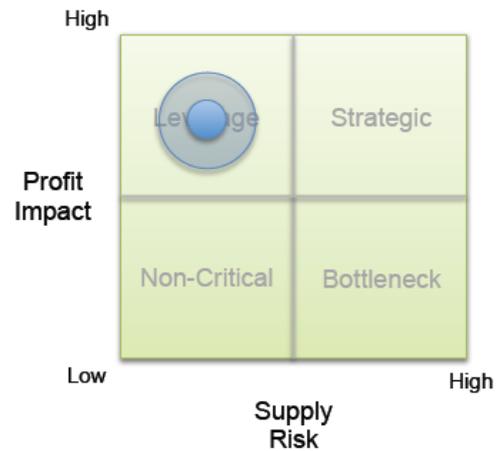


Fig 5.11 Leverage Purchases

5.2.4 Non-Critical

When purchasing what Kraljic refers to as non-critical items such as; nuts, bolts and paint price is the main focus and not to spend too much resources. However according to Eriksson and Uggla it is important to have some kind of contractual agreement that ensures the supplier to sell a minimum quantity in order to get a discount. These agreements span a relatively long timeframe, this is in line with Kraljic's (1983) reasoning about not spending too much resources.

In this category of supplies competition is fierce; there are lots of suppliers to choose from. As stated by Eriksson and Uggla supplies in this category are items such as nuts, bolts, putty and paint. The bargaining power of customers is high, so is the threat of new entrants (Porter, 1979) due to the simple nature of these supplies. However, this can be discussed since the fierce existing competition in the market could be a barrier to new entrants. Anyway, the bottom line is that the customer has an advantage of high bargaining power.

It is according to Eriksson and Uggla important to make some kind of agreement in order to obtain discounts, since this kind of supplies already is subject to fierce competition, mainly on price. As network theory (Anderson et al., 1994) goes, the actors need to create an actor bond in form of an agreement. This is necessary in order to be able to reduce the costly activities when ordering supplies at the operational level.

The contractual agreements create actor bonds (Anderson et al., 1994) that add some complexity to the network picture (Henneberg et al., 2006). However, the potential domino effects (Hertz, 1999) are relatively diminutive since this kind of supplies can be bought from a large variety of suppliers and the suppliers can sell to a number of customers as well.

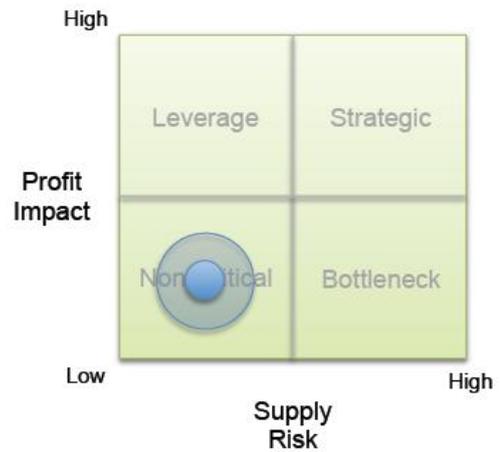


Fig 5.12 Non-Critical Purchases

5.3 K5N Analysis

In chapter two a framework was developed that combines Kraljic's (1983) Matrix, Porter's (1979) Five Forces Framework and finally The ARA Network Model by Anderson et al., (1994). Throughout the analysis (5.1-5.2) it has become clear that there are connections between these frameworks.

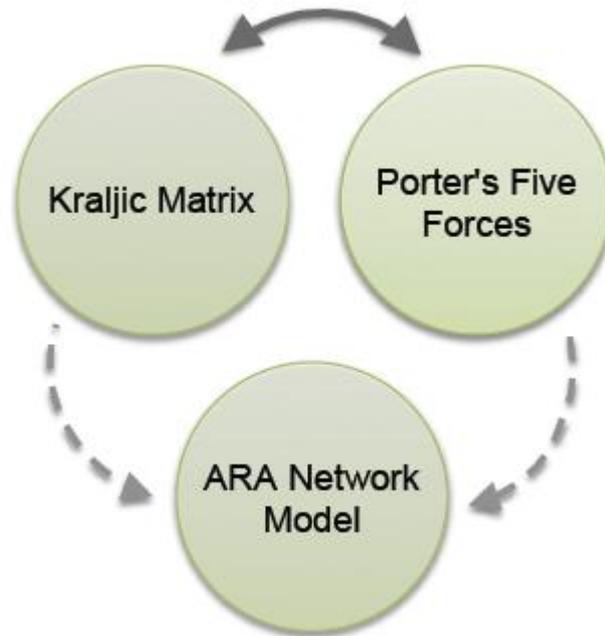


Fig 5.13 K5N

The most distinguishing example of the connections or overlap between the frameworks is when a customer within for instance the offshore industry purchases a unique climate solution. To begin with the equipment ordered is to be considered strategic according to Kraljic's (1983) Matrix. The strategic (Kraljic, 1983) nature of the equipment requires in itself a lot of cooperation activities internally at the customer, internally within FläktWoods and intercompany activities as well. In addition to this the situation with few potential suppliers in the market reduces the bargaining power of customer (Porter, 1979) which creates a unilateral dependency. The many intra and extra organizational activities create links as well as bonds (Anderson et al., 1994).

When moving upstream in the supply chain and exemplify by the purchase of a component that is strategic (Kraljic, 1983) to FläktWoods, there will be an augmented complexity regarding the relationship, its activities, bonds et cetera with the supplier that resembles what is described above.

The most extreme is when a customer purchases a climate solution that is considered strategic and there are components in this climate solution that FläktWoods consider strategic (Kraljic, 1983) as well. Then the network becomes very complex. On the other end of the scale is when components and climate solutions are more oriented towards the non-critical corner of Kraljic's Matrix (1983).

Thus it can be said that there are connections and interdependencies between the three theories and that these connections become more profound the more strategic (Kraljic, 1983) the end product and/or supplies are.

6 Relationships a Structured Approach

This discussion chapter introduces a framework which FläktWoods can use when forming customer and supplier relationships and discusses it with two hypothetical cases.

6.1 Approach

The discussion in this section relates to the second part of the purpose (1.3) and this framework is to be used as follows:

Assess:

1 characteristics of the climate solution from a customer perspective. The product tends to be more strategic in say the offshore industry and different among other customers, such as intermediates perceiving the products as leverage.

2 existing forces in the product market for the climate solution in question. The more complex or strategic the less competition in the market and the other way around. But the amount of experience among for example intermediates or end customers could cause a shift in the nature of the product.

3 network requirements internally as well as externally. The more complicated the solution the more actors need to connect and perform activities such as design and testing together. This goes for the different internal departments as well as different parts of the customer's organization.

4 characteristics of the supplies from FläktWoods perspective. Strategic items like fan assemblies and control systems differ from say sheet metal that is to be considered a leverage supply.

5 existing forces in the supply market. As for the customer perspective, the more strategic the lower forces and vice versa. However, when certain supplies were studied it showed that the competitive environment could cause a change or shift of the nature of the supply.

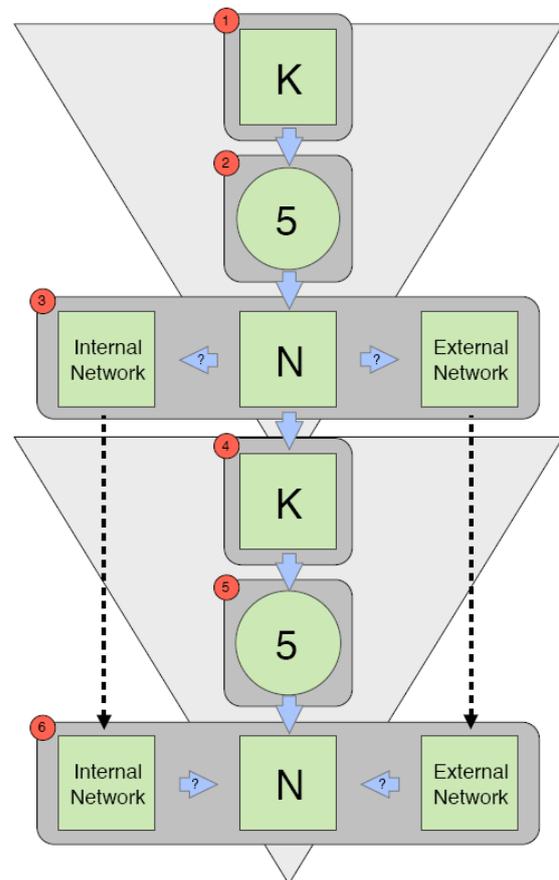


Fig 6.1 Approach

6 network requirements as the supplies are concerned, adding requirements discovered at the third step. This clarifies that at certain occasions as when customers want to take part in the development and/or purchase of supplies with very specific requirements the network becomes notably larger. This would also be the case when a supplier lacks specific knowledge of the context where the supplies finally will be used.

Implement!

6.2 Hypothetical Case within the Manufacturing Industry

To discuss this framework further within say the automotive industry, a well known example as manufacturing industries are concerned, the potential reasoning could be as follows.

1 The product, in this case a car, will be perceived different depending on the buyer. When ordinary persons buy a car it is relatively non-critical but when say more technically complicated cars such as ambulances or police cars are developed it becomes more complicated/strategic.

2 To continue this reasoning the forces in the market will vary as well, meaning that it is reasonable to state that fewer suppliers develop and sell ambulances or police cars which in turn lead to a tougher situation for the customer.

3 So, the conclusion is; when developing and selling these more complicated products there is a need for more and tighter cooperation among and between different departments at the buyer as well as the producer.

4 When moving towards supplies these are perceived different by the producer depending on their nature. There is a huge difference when developing and buying engines compared to items such as nuts and bolts.

5 As with any supplies the nature varies. In the ambulance and police car situation there will also be a number of supplies that are unique and subject to fewer choices for the manufacturer.

6 As the supplies become more unique as well as strategic there will be an increased need for cooperation with the customers when designing and purchasing them. Examples could be that ambulance crews need to take part in the design, test and evaluation of specific equipment before it is eventually purchased and built into the vehicle. But there will also be standardized simple supplies that require fewer activities.

6.3 Hypothetical Case within the Service Industry

Discussing this framework further by introducing an example within the service industry, using a municipality's supply of basic school education for children, the potential reasoning could be the following.

1 The education will be perceived different depending on the student in question; is it a matter of basic, straight forward compulsory school or does the student have specific needs, say a physical or cognitive disability? The more specific needs the more strategic is the nature of the specific needs. Now, education is to be considered strategic for anyone, but for the hypothetical reasoning.

2 To continue this reasoning the forces in the “market” will vary, meaning that it is reasonable to assume that there are fewer organizations that possess adequate resources to satisfy more complicated education needs.

3 In a more complicated situation, such as a child with a disability, involving more actors the conclusion would be; when developing and performing this uniquely adapted education a tighter and more frequent cooperation within the school among its staff is required. This is also the case externally meaning parents and others such as hospital staff involved in the therapy.

4 Now, when discussing different supplies such as designated course literature and proper education and training of teachers, these could, continuing with the reasoning regarding a disability, be considered more strategic than ordinary “main stream” literature and teachers.

5 As with any kind of supplies the nature varies, it is probably not far-fetched to assume that the breadth in the “market” is less when it comes to education of teachers for children with different disabilities and appropriate course literature, meaning less power for the municipality when obtaining these “supplies” to provide unique and specific education.

6 When these issues are really complicated there will be a need for interaction all the way; ranging from say parents via teachers to therapeutic specialists. But there will still be basic standardized needs like say lunch and school buses.

7 Conclusions and Critics

This chapter describes the outcome of the purpose and critical issues regarding the investigation.

7.1 Conclusions

The purpose was to investigate if and how manufacturing companies' purchasing activities and relationships reflect today's customer oriented environment and to develop guidelines to facilitate this (1.3).

The first part of the purpose was fulfilled in chapter 5, where the nature of the relationships between FläktWoods, its customers and suppliers were analyzed. Certain patterns were found; with an increase in how strategic customers perceived a product and/or how strategic FläktWoods perceived certain supplies, the three frameworks became increasingly connected relatively each other. This affected the company's relationships with networks standing out as especially important. The following discussion uses the research questions to answer the first part of the purpose.

- How do different customers perceive a producing company's products?

Customers within say the offshore industry perceived FläktWoods products more strategic than say intermediaries like construction firms who bought larger volumes and had more product knowledge, resulted in less risk.

- How does a producing company perceive different raw material and components?

As different FläktWoods customers had different perceptions of the products, so did FläktWoods when their supplies were discussed. The more complex in nature like a fan assembly, the more strategic the product was perceived. This went the other way around as well, meaning that simple supplies like nuts and bolts were perceived non-critical.

- How are the market forces regarding these perceptions (Q1 & Q2)?

To some extent it could be stated that the more strategic a customer product, as well as a FläktWoods supply was perceived, the less competition existed in the business. This resulted in less power for the buyer. However, as was analyzed in (5.2.3), supplies with characteristics like electric motors and sensors tended to change characteristics due to forces in the market. This was also the case when discussing intermediaries, serving different end customers (5.1.4)

- What relationship choices regarding these perceptions have been taken into consideration?

It can be said that the more strategic the nature of the customer product or FläktWoods supply were, the tighter relationships were required. Further, less competition in an industry implied relationships and dependencies on certain suppliers, there were fewer to choose from.

There was also an issue when customers had certain requirements regarding specific components. Then the network grew, and different departments among the customer,

FläktWoods and their supplier had to cooperate. This was the case when for example developing unique and/or new components.

It can be said that the relationships varied from transactional to very complicated. The second part of the purpose is discussed below.

The second part of the purpose was fulfilled in chapter 6 where a framework was introduced. This framework gives a structured approach regarding how to perform purchasing activities of supplies with the end customer in mind.

The framework begins with an assessment of the nature of the climate solution from the customer's point of view followed by the assessment of the nature of that particular market. Then the relationship requirements are to be assessed.

This procedure is to be repeated when assessing FläktWoods supplies. Finally, when shaping the relationship the customer requirements are to be included when needed, such as specific and/or new components.

7.2 Critics

This case study's main constraint is that only one company in a specific line of business has been investigated. Further the number of customer types as well as supplies studied is very narrow. The method could also be improved; a larger number of respondents including different customer types could have been interviewed to get a broader picture. The fact that the company targets a relatively narrow segment of the climate control industry is another constraint. The analysis would also have been more interesting by including the entire FläktWoods Group to obtain insight in more types of products as well as customers.

When starting this work the authors had no idea how complex these matters were. To some extent there was some awareness but not the entire picture. Just imagine; other companies, other businesses and other countries. The authors have accomplished but scratching on the surface, even as the company studied, FläktWoods is concerned. There is still work to be done, such as other customers, other supplies and the entire FläktWoods group as well.

8 What is Left to Do?

Here suggestions for further research are presented.

Since this investigation has been performed as a case study the result is specific for FläktWoods. Because of this there are a number of ideas regarding what issues could be investigated; here are mentioned but a few.

- First a number of climate equipment companies should be studied in order to see whether the observations are possible to apply among other companies within the same industry.
- Yet another matter might be to investigate and compare different kinds of businesses; such as electronics, wood, process industry and so on.
- It would also be interesting to compare companies from an investment perspective; what are the differences between say FläktWoods and an ordinary family owned mechanical manufacturing company.
- Another possible approach could be to investigate a range from knowledge intense pure service companies to heavy mechanical industries.
- It could also be rewarding to compare national, regional and global companies.
- Also, to investigate the differences between companies with a very flexible production such as car manufacturers relative companies with less variety such as dairy products.

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Appendix

Interview Questionnaire

- Tell us a bit about yourself and what you do.
- Tell us about FläktWoods.

The examples mentioned in the questions below are not meant to lead the respondent but rather to talk about what we are asking for: to seek products with certain characteristics that match the theories. The examples are taken from the company website.

- You have supplied the climate control system, for example, a Saudi slope. It could be perceived as extremely complex/critical from the perspective of the customer. Could you tell us about another delivered solution with similar, by the customer perceived, characteristics the idea development, construction, services, etc. Which actors are involved in these projects, external and internally; any what type of collaboration / communication is there?
- With the former in mind, are there products complex in them self but with fewer external/internal relationships? Can one imagine such an advanced heat recovery ventilation, or air conditioning that is advanced yet standardized? Example?
- To continue are there products that are less complex but still important to the customer? Examples include air handling units to villas / industries. Important and perhaps critical in the customers eyes?
- Finally, if we go back to the Saudi example products is the exact opposite; inexpensive, simple?

Based on the previous questions, how do the markets where you sell appear?

- Are there alternatives / competition?
- What type of technical development has / is going on? Occurs innovation in leaps and / or continuous?
- This technological development, what are internally and externally with you among competitors? (Understand that this may be internal secrets that you do not want to tell).

As customers experience the initial product samples different, FläktWoods experience it similarly regarding each component on the purchasing side. Both complex and simple product line includes complicated and less complicated components in themselves and in terms of internal / external relationships.

- Complex/Critical, like the Saudi example perceived by the customer.
- Again with the customer perception of their purchases in mind, are there any components that FläktWoods perceive less complex/critical but still require tight /complex internal and external relationships.
- Standardized and large volume / value.

- Finally, if we go back to solutions like the Saudi example: products that are straight to the contrary; inexpensive, simple?

Above but viewed from these department perspectives:

- Market
- Quality
- Service
- Preparation / Production
- Design
- Transport
- Purchasing