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Identifying the risks and opportunities for development projects with suppliers

Master's thesis in Quality & Operations Management

Siros Jahanfar

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Siros Jahanfar

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Department of Technology Management and Economics

Division of Operations management

Chalmers University of Technology

SE-412 96 Göteborg

Sweden

Telephone + 46 (0)31-772 1000

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Abstract

The purpose of this Master thesis is to define how to manage the commercial risk of single development/sourcing, but also to define in what situations single development/sourcing is more beneficial than dual development/sourcing. Scania, which is the company where this thesis was performed, has a preferred strategy which is multiple sourcing and where the purchasers/buyers always aim to have two or more suppliers. However, there might be business opportunities, both commercially, but also as customer value with the usage of single sourcing. This could be because of improved relationships or trust with the supplier, or gaining market advantages and increasing the customer value with first movers in the market.

Previous literature have discussed the differences between these different strategies, but there doesn't seem to exist much on how to make that choice for different scenarios and also how to work long term with suppliers.

This thesis will aim to suggest different suitable choices for the different sourcing methods in different scenarios, but also how to work with these methods in a long term perspective to reduce the risks involved in sourcing.

One of the main findings in this report was that there are no quick-fixes for these situations and the best way to approach them is to assess each sourcing as a new and individual case. The best thing to know as a supplier is to have a good knowledge of the market situation of the suppliers and have a good knowledge on its alternatives and the time involved in using each of the alternatives.

The other thing that was found in this report was that the biggest key for success is that there exists some form of competition. Either by using multiple-sourcing, or if there exists a known possibility for the change of supplier. This is relevant for both single and multiple sourcing.

Keywords: Single-sourcing, Dual-sourcing, Parallel-sourcing, Multiple-sourcing, Development-projects, Outsourcing, Suppliers.

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1. Introduction

This part of the report consists of Background, Purpose, Research Questions and Limitations, and aims to act as an introduction to the report.

1.1 Background

In purchasing, there has for a long time been divided opinions on whether single or multiple sourcing is the most beneficial solution. The purchasing managers and buyers at Scania always pursue to create business opportunities involving multiple suppliers. This can be to either purchase a technical solution from multiple suppliers (two or more) which can be used in all applications involved in the production (they do not need to be identical). Thus not needing to plan about which sequence the products are entered into the production. This is called dual (two suppliers) or multiple (three or more) sourcing. Another alternative is to source very similar products from different sources. All chosen suppliers have the competence to manufacture all products but they are divided between the suppliers. For example, supplier 1 gets product B, supplier 2 gets product C and supplier 3 gets product A. If Scania would like to choose to move any of the products to another supplier, they would know that all of them have the competence to manufacture it, but the switch would not be instant. There would still be some testing required. This is called parallel sourcing.

However, the strategy of single sourcing and especially single development could provide benefits such as customer value from first mover advantage or increased trust and improved relationships with suppliers. This in turn could create increased business potential.

There are also situations where the choice of dual sourcing is not beneficial or even possible. This could be when the chosen application is only available at one source, or regulations prohibit Scania from using other suppliers. Other times, the volume of the item that is purchased is so low that it is not justifiable to divide that volume on more than one supplier. There are also times where the cost of the tooling for a product is too high to justify multiple suppliers.

In these cases, Scania is pursuing to gain the knowledge to be certain to take the best choices in order to reduce risks that the sourcing decision involves. Previous literature has discussed these areas and which sourcing method to choose, but the how to, and what to consider has not been discussed much. Also, most of the literature misses the discussion on how to work long term with suppliers, after the first contract. There is no clear suggestion about when to approach the renegotiations and how to change a supplier. This thesis will try to suggest the most suitable choices of sourcing methods for different scenarios, but also how to work with the chosen method in order to reduce the risk in a long-term perspective.

1.2 Purpose

The purpose of the thesis is to define how to manage the commercial risk of single development/sourcing, but also to define in what situations single development/sourcing is more beneficial than dual development/sourcing. This is done in order to maximize the business potential and also to create a decision model that can be implemented to Scania's Purchasing department.

1.3 Research Questions

The research questions are made up by three main questions, which will be answered in the analysis, conclusions and recommendations. They are presented below:

- **How is Scania currently working with single/dual sourcing/development?**
This question investigates the current situation regarding the sourcing situation that Scania has currently.
- **What possibilities and commercial opportunities (and risks) does Scania have when working with the different sourcing strategies?**
This question highlights the possibilities Scania has but also which risks that Scania faces when working with the different methods.
- **How could Scania handle the work with the different sourcing strategies?**
When answering this question, the author will be given the opportunity to present a model which Scania can use as decision method for sourcing/development decisions.

1.4 Limitations

Geographically: The thesis will have a general focus on the operations in Södertälje, but since Scania has global suppliers, the supplier perspective is global.

Focus: The main focus of this thesis will be on the commercial aspect of sourcing and only on supplier developed components (both joint development with Scania but also completely independent).

2. Theory

This part of the report aims to present the different literature and theory that has been found in the Literature Review (see Method) and has been deemed to be relevant for outsourcing, sourcing strategies, risk management, strategy implementation, development process and competition. Theory that was found in these fields, but couldn't be related to the field of sourcing is not discussed in this report.

2.1 Outsourcing

During the past three decades there has been a desire to lower costs and gain competitiveness by outsourcing, but there have been a growing understanding that there can be other potential benefits aside from lowering costs (Leavy, 2004). Zeng (2000) supports this by stating that aside from cost improvements that most people associate with sourcing, it could also be used to improve quality, the scheduling of the process and gaining flexibility in the workforce. Outsourcing has also become a way for the sourcing company to use the R&D department at the outsourced company to track new technology developed elsewhere on the market (Ramsay & Wilson, 1990).

Leavy (2004) presents four reasons for outsourcing that people might not consider when considering to outsource or not. These are focus, scaling without mass, disruptive innovation and strategic repositioning. *Focus* – is described as hiring “best in class” companies that will work with their key activities, so the outsourcing company can focus on its own key activities where they can have the greatest impact felt by their customers. *Scaling without mass* – is a method for companies to get more market presence without an equal amount of expansion in the internal organization. This could for example be helpful when companies are growing at a rapid rate. *Disruptive innovation* – is described as the effort to use outsourcing to create a new segment that is much cheaper than current actors. Examples of this are IKEA, CANON and Ryanair. *Strategic repositioning* – is as it sounds, the effort of moving focus of the company towards a new strategy. An example of this is IBM who changed focus from technology to services (such as consultancy) in the 1990s.

Mats Winroth (2014) suggests that the decision logic for outsourcing should be performed with questions such as in Figure 1. This decision logic is important to bear in mind when considering to outsource, since outsourcing activities that have a Yes-answer below could lead to the loss of important competence and market position.

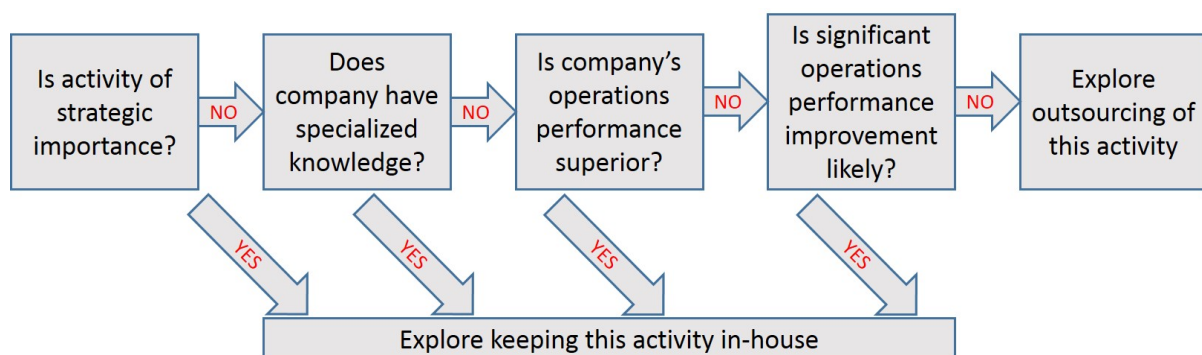


Figure 1. Decision logic adapted from model from Mats Winroth (2014).

2.2 Sourcing strategy

The comparison between single and dual sourcing made for a considerable volume of the research, in both marketing and purchasing theory, during the 1980s (Ramsay and Wilson, 1990). In their research, Ramsay & Wilson suggest that the literature showed two typical ways of sourcing, that they identify as:

Western – Multiple sources/short term Contracts/adversarial relationships
Eastern – Single source/long term contracts/co-operative relationships.

(Ramsay & Wilson, 1990)

While other research does not necessarily identify these categories in the same way, they discuss the same counter poles; Single to multiple sourcing, short term to long term contracts, close to adversarial relationships and high/low risk (commercial, delivery and quality) (Zeng, 2006; Yu et al, 2009; Quayle, 1998; Quayle, 2002; Lyon, 2006).

2.2.1 Definitions

There are many different definitions regarding the different sourcing methods. Quayle (1998 & 2002) for example defines them as following:

- Single sourcing: Possibility to buy from one source only
- Sole sourcing: The result of being forced to buy from one supplier only (could be the result of location, design rights, customer specification etc.).
- Multiple sourcing: Possibility to buy from more than one source
- Parallel sourcing: combination of both single and multiple sourcing

Ramsay & Wilson (1990) have similar definitions, however they fail to discuss the concept of parallel sourcing. The same applies to Berger & Zeng (2006). Sundhäll and Wadee (2013) define it similar to Quayle, however more extensive (Figure 2).

- Sole sourcing: it exist only one supplier, which means that the company must buy the certain article from that supplier
- Single sourcing: The company has chosen to buy the certain article from one supplier.
- Dual sourcing: The volume of a certain article is separated (50/50) or not equally (e.g. 70/30) on two suppliers and the company can change supplier if problems occur.
- Parallel sourcing: Two or more supplier with similar capabilities are concurrently single source suppliers for very similar components and/or single source is used for a specific item at one manufactory while another source is used for the same specific item at another manufactory.
- Multiple sourcing: Separating the volume of a certain article among three or more suppliers.

Figure 2. Different sourcing methods as suggested by Sundhäll and Wadee (2013).

In this research the definitions of these sourcing strategies will be a combination of the previous definitions. They will be as follows:

- Single sourcing: 100 % of the volume of one part to one chosen supplier
- Sole sourcing: 100 % of the volume of one part to one **forced** supplier
- Dual sourcing: The volume of one part is divided to two suppliers
- Parallel sourcing: Similar parts are **single sourced** on two or more suppliers

Since using three sources or more when sourcing one part (like dual sourcing but with more suppliers) provides no relevant difference in this thesis compared to dual sourcing, they will not be treated separately, and can therefore be considered a version of dual sourcing where three or more suppliers are used for the sourcing of one part. Multiple sourcing will be the collective name of dual and parallel sourcing.

2.2.2 Single sourcing

Some authors claim that the trend of single sourcing emerged through the eastern (Japanese) method of long term relationships with few suppliers, often using single sourcing strategy (Ramsay & Wilson 1990; Zeng 2000; Quayle 1998). Zeng (2000) states that the evolution of single sourcing comes from the just-in-time (JIT) methodology used in Japanese companies. There simply is no need to introduce another supplier since that would be considered waste.

Other than long term commitment all authors define economy of scale as the biggest advantage in single sourcing. Single sourcing provides the benefit of reducing the costs by allocating 100 % of the volume to one supplier. Other advantages are improved communication (Ramsay & Wilson, 1990; Zeng, 2000), reduced tooling costs (Ramsay & Wilson, 1990; Sundhäll & Wadee, 2013) reduced operational costs (Ramsay & Wilson, 1990; Sundhäll & Wadee, 2013) and Quality and design improvements (Ramsay & Wilson, 1990; Sundhäll & Wadee, 2013; Zeng, 2000). Ramsay & Wilson (1990, p 23) also add *“With the lifting of the threat of potential business loss, if not permanently, then at least for long stretches of time, suppliers are likely to become much more willing to adapt their behaviour and operations to suit the needs of the buyer.”*

The disadvantages discussed in the articles are mainly the problem of increased risks regarding delivery, price escalation and decrease of bargaining power (Ramsay & Wilson, 1990; Sundhäll & Wadee, 2013; Zeng, 2000; Lyon, 2006; Yu et.al, 2009). Other aspects that are discussed are the loss of bargaining power and risk of price escalation due to the lack of competition (Ramsay & Wilson, 1990; Sundhäll & Wadee, 2013; Zeng, 2000; Yu et.al, 2009), reduced market intelligence (Ramsay & Wilson, 1990; Sundhäll & Wadee, 2013) and loss of interest from other suppliers (Ramsay & Wilson, 1990; Sundhäll & Wadee, 2013). Faes & Mathyssen (2009, p246) goes on to suggest *that “it may lead to higher switching costs (as suppliers will want to create captive customers)”* and Ramsay & Wilson (1990) warn for laziness from the supplier, if there is no fear of loss of business in the long term perspective.

2.2.3 Dual sourcing

Many authors provide a linear explanation to the advantages and disadvantages of single and dual sourcing. Most of them describe the biggest disadvantage of single sourcing, as the biggest advantage of dual sourcing. They act in many senses as each other’s counter pole. Therefore, many authors rank the decreased risk regarding delivery, price escalation and increase of bargaining power to be the biggest advantage of dual sourcing (Ramsay & Wilson, 1990; Sundhäll & Wadee, 2013; Zeng, 2000). Other advantages are that the competition improves quality, delivery and negotiations (Ramsay & Wilson, 1990; Sundhäll & Wadee, 2013; Yu et.al, 2009) and the possibility for better market intelligence and supplier benchmarking (Ramsay & Wilson, 1990; Sundhäll & Wadee, 2013).

The disadvantages are much like the advantages a counter pole of single sourcing. Where single sourcing provides long-term relationships and stability dual sourcing provide a tense and short term environment for the suppliers (Ramsay & Wilson, 1990; Sundhäll & Wadee, 2013; Yu et.al, 2009).

There also is higher operational cost for the purchasing department as well as R&D and tooling and loss of economies of scale (Ramsay & Wilson, 1990; Sundhäll & Wadee, 2013; Zeng, 2000).

2.2.4 Summary of advantages and disadvantages

To summarize, Table 1 shows some of the advantages and disadvantages that was found in the theory.

Single sourcing advantages	Single sourcing disadvantages	Dual sourcing advantages	Dual sourcing disadvantages
<ul style="list-style-type: none"> • Improved relationships between supplier and purchaser • Reduced operational costs for purchaser • Increased bargaining power due to larger volumes • Closer collaboration with supplier could lead to quality and design improvements • Reduced tooling costs 	<ul style="list-style-type: none"> • Supply vulnerability • Reduced market intelligence • Increased dependancy • Less competitive pressure on supplier • Price escalation after first contract • Lack of competition leads to decreased bargaining power • Loss of interest from other suppliers 	<ul style="list-style-type: none"> • Improved supply continuity • Improved market intelligence • More comparative data between suppliers (Benchmarking) • Decreased dependancy • Increased bargaining power due to competition • Competition could lead to improved innovation and development of products 	<ul style="list-style-type: none"> • Increased workload for purchaser • Increased cost in tooling • Higher costs for R&D • Loss of bargaining power in the long-term • Loss of economies of scale • Less commitment from supplier due to fear of loss of business

Table 1. Summary of advantages and disadvantages

2.2.5 Parallel Sourcing

Parallel sourcing is not discussed as extensively as the previous two strategies in the literature. Richardson (1993) however dedicates much of his article to parallel sourcing. He suggests that *“parallel sourcing is equivalent to multiple sourcing terms of buyers’ ability to influence supplier performance with a threat to switch suppliers. It is superior to multiple sourcing for maximizing the incentive effect of product performance and sales result on supplier performance. And it retains benefits of reduced transaction costs attributed to sole sourcing.”* (Richardson, 1993, p 342). To clarify, Richardson means single sourcing when he speaks of sole sourcing. Quayle (1998) suggests that by using parallel sourcing one can provide performance comparisons and competitive bidders for next model cycle, while still having most of the advantages that single sourcing provides.

Considering that parallel sourcing is a combination between single and dual sourcing, more emphasis will be put on the previous strategies.

2.2.6 Comparison between the different strategies

The literature is divided in what strategy that is superior. Sundhäll & Wadee (2013) suggest that a strategy for each segment of a company might be more suitable, rather than a company strategy. Another author suggests *“although the preceding analysis suggests that it is impossible to make a choice between single- and multisourcing strategies on objective grounds, it is possible to say that an ideal sourcing strategy would, by definition, seek simultaneously to maximise the benefits and*

minimise the costs of both." (Ramsay & Wilson, 1993, p 24). Quayle (1998) goes on to question whether it is necessary that companies should choose a specific sourcing policy. He argues that a specific policy does not allow flexibility and the decision should be the buyers, who can take all aspects in consideration at the time purchasing of the parts occur (Quayle, 2002). He argues that neither strategy is superior to the other. For example, lower prices can be obtained by playing supplier against each other (dual sourcing) or using one supplier and finding ways of cutting costs by economies of scale, mutual development etc. (Quayle, 2002).

The literature presented this far in this comparison suggests that there is no superior strategy for all situations, but there are examples of literature suggesting the superior strategy. Faes & Matthyssens (2009) present a comparison where different authors suggest different superior strategies. *"There is contradictory evidence as to the effectiveness of both parallel and dual sourcing as compared to single sourcing."* (Faes & Matthyssens, 2009, p 246).

2.2.7 Contracting

Something that is not much discussed in the literature about single and dual sourcing strategy is the contracting type of the sourcing chosen. An extensive part of Ramsay and Wilson's article (1990) is dedicated to this area. They compare the differences between short term and long term contracts and how the different formats might influence the purchasing.

They suggest that short-term contracts might be useful when the purchaser wishes to punish the supplier, the final demand is inconsistent, the purchased product is subject to many changes, the products have an unknown life expectancy, or they are dealing with an unknown supplier.

For long-term contract they suggest that they might be useful when purchaser wishes to reward the supplier, the market and final demand is stable, the product is subject to few changes and the life expectancy is known, working with known suppliers or when the volume is too low to attract the desired price. Another reason could be to insure against future price escalations. They summarize their findings in Figure 3.

Contracting strategy			
Sourcing strategy	Short term	Medium term	Long term
Single-source	Punishment Run-in/out Limited liability strategy	NA	Low purchasing power Strategy
Multi-source	Punishment Run-in/out Limited liability strategy	Probationary strategy	Reward Growth Low power strategy

Figure 3. Contracting strategy model adapted from Ramsay and Wilson (1990).

2.3 Risk management

While this thesis is focusing mainly on the commercial aspect of sourcing, one of the biggest reasons for multiple sourcing is the risk of supply chain disruption (Yu et.al, 2008). Yu et.al (2008) describe of different issues companies faced because of suppliers who has failed to deliver as planned. Among these were Toyotas single supplier who had a big fire, The Taiwan earthquake in September 1999 and a fire at Ericsson's and Nokia's supplier. Nokia found out early and managed to get through the adversity by using one of the other suppliers used for those microchips, but Ericsson who used them as their only source for these types of microchips ended up losing almost 400 million dollars because of a small fire.

This example is the basis for the entire study made by Norrman & Jansson (2004) where they study Ericsson's change of risk management after this fire. They start off with defining Risk = Probability (of the event) * Business impact (severity) of event. They suggest that this can be described in a risk map, see Figure 4.

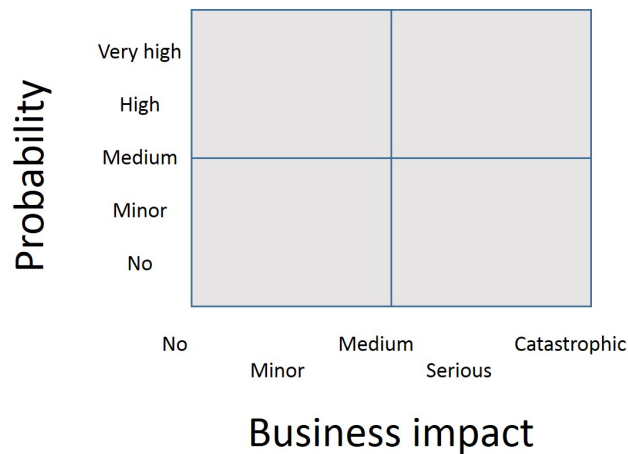


Figure 4. Adapted model from Norrman & Jansson (2004) showing their definition of risk.

They present the changes Ericsson has made to their processes and establish that it is possible to “expand the risk management focus from the companies’ own sites to suppliers and sub-suppliers” (Norrman & Jansson, 2004, p 454). This raises the question to, how deep in the supply chain do you have to work in order to minimize the risk for supply chain disruption?

2.4 Strategy implementation

Beer & Eisenstadt (2000) conduct a study on the problems when implementing a strategy. They identify six silent killers, which acted as barriers when implementing a new strategy.

These were:

- Top-down or laissez-faire senior management style
- Unclear strategy and conflicting priorities
- An ineffective senior management team
- Poor vertical communication
- Poor coordination across functions, businesses or borders
- Inadequate down-the-line leadership skills and development

They go on to explain six principles for engaging and changing the silent killers for a company, see figure 5.

The Silent Killers	Principles for engaging and changing the silent killers
Top-down or laissez-faire senior management style	With the top team and lower levels, the CEO/general manager creates a partnership built around the development of a compelling business direction, the creation of an enabling organizational context and the delegation of authority to clearly accountable individuals and teams.
Unclear strategy and conflicting priorities	The top team as a group develops a statement of strategy, and priorities are developed which member as willing to stand behind.
An ineffective senior management team	The top team, as a group, is involved in all steps in the change process so that its effectiveness is tested and developed.
Poor vertical communication	An honest, fact-based dialogue is established with lower levels about the new strategy and the barriers to implementing it.
Poor coordination across functions, business or borders	A set of business-wide initiatives and new organizational roles and responsibilities are defined that require “the right people to work together on the right things in the right way” to implement the strategy.
Inadequate down-the-line leadership skills and development	Lower-level managers develop skills through newly created opportunities to lead change and to drive key business initiatives. They are supported with just-in-time coaching, training and targeted recruitment. Those who still are not able to make the grade must be replaced.

Figure 5. Principles for engaging and changing the silent killers adapted from Beer & Eisenstadt (2000).

2.5 Development process

The Development funnel is a model presented by Wheelwright and Clark (1992), which shows the different stages of a development process, and how an organization should work. It suggests that at the earliest stages, as many ideas and possible outcomes should exist, while at the later stages, one should “narrow the neck” and have as few as possible (see figure 6). The challenges presented for the development funnel are Widening the mouth of the funnel, Narrowing the neck of the funnel and managing the selected projects.

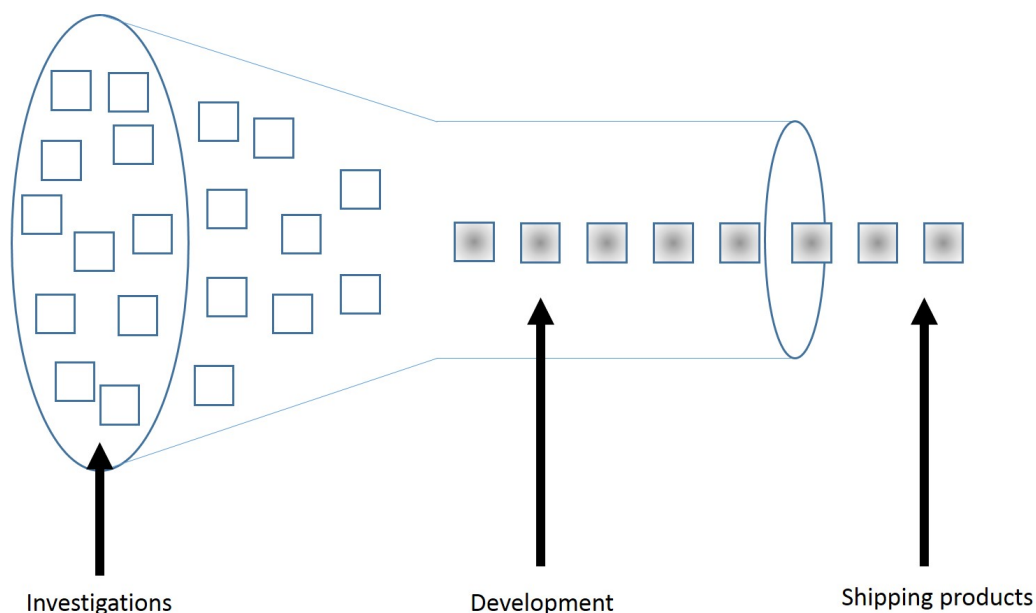


Figure 6. An adaptation model from Wheelwright and Clarks (1992) Development funnel.

Another thing to that Wheelwright & Clark (1992) discuss regarding development projects is the ability to influence that management has in the different stages of a project. Figure 7 shows how the ability decreases over time, while the actual activity from management tends to be in the later

stages. Both figure 6 and figure 7 shows the importance of involvement early, and the difficulty to make changes in the late stages of a project.

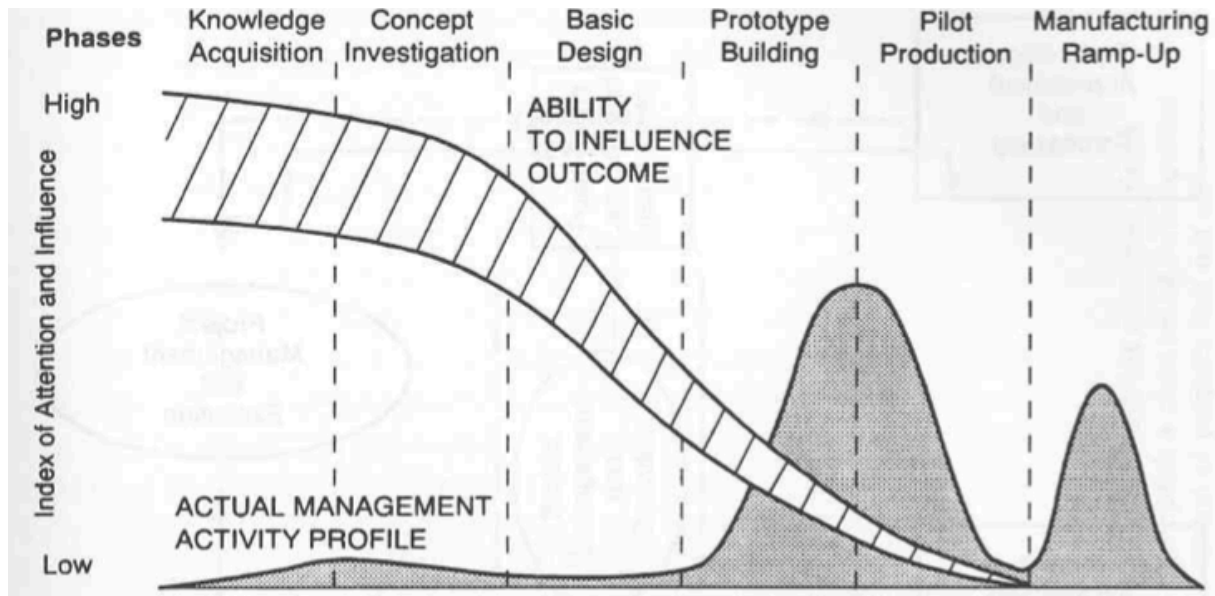


Figure 7. Model from Wheelwright and Clark (1992) showing ability to influence over time, in development projects.

2.6 Competition

Utterback & Suarez (1993) discuss the competition that exists on different markets and how the number of firms in different industries changes. This is something that is vital for a purchasing organization to be aware of, since it is stated in previously presented theory, competition among the suppliers is one of the most important factors for success. Utterback & Suarez (1993) present a number of different industries (see figure 8) and how many firms in each industry that are working simultaneously over the time of its lifetime.

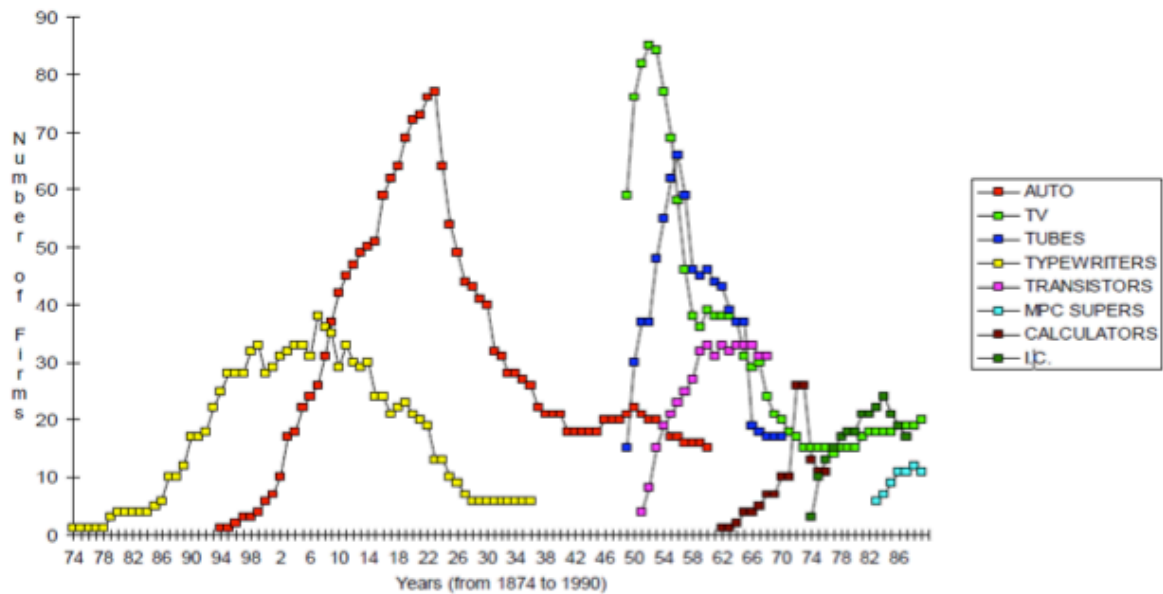


Figure 8. Model showing trend of number of firms in different industries over time, created by Utterback & Suarez (1993).

What can be seen here is the trend of different industries, where it starts with very few firms, and rockets shortly after the pioneers to a maximum, and then it evens out to a much smaller number of firms. During this stage it usually is a few large firms who supply most of the demand.

Trygg (2013) defines three different types of firms regarding market entry. These are First movers, Early followers and Late entrants. The First movers are pioneers, and the first to present a new product or service to the market. The Early followers are as the title says, early followers in to a new market. The Late entrants usually wait until a market is mature and the product is well established. Trygg (2013) goes on to state that the market often believes that the First movers have the advantage, because of a misconception of who the First movers were. He suggests this with the help of figure 9.

Product	First Mover	Notable followers(s)	The Winner
8 mm video camera	Kodak	Sony	Follower
Disposable diaper	Chux	Pampers Kimberly Clark	Follower
Float glass	Pilkington	Corning	First mover
Groupware	Lotus	AT&T	First mover
Instant camera	Polaroid	Kodak	First mover
Microprocessors	Inter	AMD Cyrix	First mover
Microwave	Raytheon	Samsung	Follower
Personal Computer	MITS (Altair)	Apple IBM	Followers
Personal computer operating system	Digital Research	Microsoft (MS-DOS)	Follower
Spreadsheet software	VisiCalc	Microsoft (Excel) Lotus	Followers
VCR	Ampex/Sony	Matsushita	Follower
Video game console	Magnavox	Atari Nintendo	Followers
Web browser	NCSA Mosaic	Netscape Microsoft (Internet Explorer)	Followers
Workstation	Xerox Alto	Sun Microsystems Hewlett-Packard	Followers

Figure 9. Adaptation from a table from Trygg (2013), showing different First movers and Followers.

This shows that the pioneers are not always the most successful firms in a market.

3. Method

This part of the report aims to present and explain the methods that were used in the different stages of this report.

3.1 Literature review

According to Baumeister (2013), there are two different forms of conducting literature reviews. These two are Narrative and Meta-analytic. He uses an example where a study will be made about the gender differences in domestic violence. If you would want to use the combined result of many studies regarding this question, Meta-analytic review would be appropriate since the word gender has the same definition in most scenarios, and there is a standardized way of measuring it. On the other hand, if you would be “*combining quite different kinds of evidence to formulate a broad theoretical formulation*” (Baumeister, 2013) a narrative review is more appropriate. He adds that “*if the goal of your review is to formulate a new theory that will link together diverse strands of work, then you may favor a narrative method instead.*” Therefore, a narrative approach is best suited for this thesis since the previous work is somewhat diverse. The definitions about the different sourcing methods vary and the spectrum of literature that will be used in this thesis is very wide and range from internationalization and cross-cultural issues to sourcing strategies. Baumeister (2013) also suggests to start with articles from recent years, as they are likely to reference to the important older works. When reading the articles, he suggests that the abstract is sufficient to read in order to determine if the article is relevant for the study.

3.2 Qualitative interview

Turner (2010) discusses different formats of interview designs when it comes to Qualitative interview design. These are *Informal conversational interview*, *General interview guide approach* and *Standardized open-ended interview*. He compares the *Informal conversation interview* with his interest of other religions and cultures, where he suggests to “*ask questions in order to learn more about these social settings without having a predetermined set of structured questions*” (Turner, 2010). He further declares that the researcher uses the interaction with the participants and constructs the questions as the interview proceeds. The benefits are the flexibility that the interview will gain, but however the interview form will be inconsistent and if more than one interview will be held, the data gained from the interviews will be hard to interpret. *General interview guide approach* is similar to the previous form, however more structured. With this format you use structured questions but with the possibility to adapt them and follow up the interviewee and explore their answers more thoroughly. Then there is the *Standardized open-ended interview* format which is a structured interview format. The questions are asked identically but they are asked in a way so the answers are open-ended. While the format is preferable in researches it limits the interviewees answers and also the interviewer’s possibility to ask follow-up-questions. Smaller follow-ups are allowed but the interview should not drift away from the original plan. For the interviews that will be conducted during this thesis, the interviews will be conducted in two parts. One of which will be using the *Standardized open-ended interview* where a number of predefined questions will be asked and compared with other interviews (Such as the Benchmarking study which will be explained further). The other part of the interviews will be *General interview guide approach* where the interview will be adapted to the interviewee and the answers that are provided during current and previous step (such as the interviews with the purchasing managers at Scania).

3.3 Benchmarking theory

Benchmarking has been performed in a long time by companies and is almost obligatory for any company that wishes to improve its product, services or processes (Camp 2004). Camp (2004) describes three things an organisation must do in order to energise and motivate its people. These are:

- Believe there is a need for change
- Determine what it wants to change
- Present a picture of how it wants to look after the change

All of these are achieved with benchmarking and benchmarking allows the companies to understand at what state the market and the competitors are. Also, no one is best at everything they do and there is always a need to find better practices, in order to stay competitive (Camp, 2004).

Mann et. al (2010, p 8) concluded in their survey that the biggest benefits of using benchmarking is *“improved performance of processes, learning what other organizations are doing, and major strategic issues addressed”* while the most important factors for successful benchmarking were *“support of top management, understanding of own processes, clear project objectives, and linking of project objectives to strategic objectives”*. Among the most popular methods for benchmarking were visits/meetings, which made up for 51 % of the cases. This is also the method that will be used in this thesis.

3.4 Self-completion questionnaire (Survey)

Hague et. al (2004) describe how often we come in contact with self-completion questionnaires, and ask the interesting question of often we fill them out, or more importantly how often they are ignored? They then go on to describe the potential benefits of a self-completion questionnaire as they can be filled out at the preferred time of the respondents but also the fact that they provide more anonymity for the respondents, compared to other methods. They can be distributed to a large amount of people, during a very short amount of time. Bryman & Bell (2011) add absence of interviewer effect, no interviewer variability and convenience for respondents as other benefits.

The biggest disadvantage according to Hague et. al (2004) is the low rate of response, which could tend to be as low as 10 %. Other disadvantages are that the respondents can not ask questions if questions are unclear, and interviewer can not ask follow-ups if answers are unclear. Therefore, it is important to have as few open-ended questions as possible. They also cannot be long or boring, since respondents can tend to just answer randomly or stop answering they feel complacent. There is also the problem that you do not know if the person who is intended to answer the questionnaire is answering (Hague et. al, 2004; Bryman & Bell, 2011).

Hague et. al (2004) suggests to keep questionnaire short, provide anonymity, alert in advance about the questionnaire and provide reminders in order to generate a high response rate as possible.

4. Company information

Scania is a manufacturer of trucks, engines and buses, who was founded in Sweden in 1891. Today, they have approximately 41 000 employees in over 100 countries. The head office is at Södertälje where approximately 5 400 work. The central purchasing is also based in Södertälje, with local offices in Latin America, the United States, India, Russia and China. Scania is a part of the Volkswagen Group together with for example Audi, Seat and MAN trucks and Volkswagen group currently has the largest market share for motor vehicles in Europe. (Annual report Scania, 2013)

Scania has three core values which are Customer first, Respect for the individual and Quality. At every step of its operations, the customer is at the center of every aspect and by *“Understanding our customers’ business leads to solutions that enhance customer profitability by means of high earning capacity and low operating cost, while promoting sustainability”* (Annual report Scania, 2013, p 11). Respect for the individual means that from every employee to the drivers of vehicles everyone is involved in continuous improvement. Quality is to always deliver high-quality products and knowledge of the customers needs (Annual report Scania, 2013).

Key Figures:

Turnover: 86,9 billion SEK

Operating margin: 9,7 %

41 000 employees in 100 countries

Market share is about 14 % in Europe

4.1 Scania Purchasing

Scania purchasing has as described earlier its head office in Södertälje. The local purchasing offices in other countries and the purchasing department in South America will not be discussed further since they will not be a part of this thesis.

The purchasing activities for supplier-developed components are divided on two different types of purchasers, project and commodity. The project purchasers work closely with the supplier during the development projects, whereas the commodity purchaser has the main responsibility when the components are in production. In order to maintain a good relationship and understanding of the supplier perspective, project and commodity suppliers continuously meet together with a project member from Supplier Quality Assurance (SQA) and together, these three project members create something called 3-ring. This 3-ring has the responsibility for a product during its whole life cycle.

The contracts with the suppliers are setup with so called Long-term agreements (LTA). These are usually three years long, and contain price reductions of 3-5 % every year. At the end of an LTA the contracts are usually renegotiated, and prolonged for another three years or as long as the product is expected to be in production. The goals for the purchasers are usually get 3 % price reductions from their supplier base every year.

Suppliers are measured on mainly three aspects: Quality, Delivery and Cost (QDC). The preferred strategy at Scania to ensure a high level on all three aspects has been to use multiple sourcing. This in order to create a competition between the suppliers, but also to have as much market intelligence

and input from as many R&D units as possible. In some situations, where multiple sourcing is not applicable, single (or sole) sourcing is used, but the fear of failure in any of QDC is the main reason why this is rarely pursued.

The purchasing department works closely with R&D at Scania in order to create the best and fastest solutions regarding supplier-developed components, however since the resources are limited at both purchasing an R&D, changes of components or even suppliers that could benefit QDC are dependent on when bottlenecks in the organization can deal with them.

5. Results

This part of the report aims to present the results that were found in this study and also connect them to the first of the three Research questions. The survey that was conducted will also be presented here.

5.1 How is Scania currently working with single/dual sourcing/development?

This was the first research question and is considered to be answered with the help of the previous chapter (company information) and the interviews that were conducted with the purchasing managers at Scania.

5.1.2 Interviews with purchasers at Scania

Short interviews were held with three purchasers at Scania where they shared scenarios in which could be of use to this thesis. These could be successful single sourcing scenarios, or situations on how they have resolved problems they have faced by changing supplier.

5.1.2.1 Interview 1

The first interview was with a project-purchasing manager about different three scenarios where they have had different problems or solutions, which could be useful for the thesis.

The first scenario was a supplier-developed product where the specifications regarding electrical and dimensional requirements were hard to meet from current supplier. The part was not a key component and the part was scheduled to be removed from production after three years. Two suppliers were approached in order to be able to compare results and pricing to each other, to optimize price and quality. One of the suppliers, who struggled much with the specifications from Scania, failed ultimately to meet those specifications and Scania was left with one supplier. The previous relationship with this supplier was not great and a lot of work was done to improve that relationship. There was also the risk of supply chain disruption considering they were left with a single sourcing option. However, considering it was not a key component and the component was scheduled to be removed from production, the decision was made that the risk was acceptable. The poor relationship could be worked on and improved and the risk for price escalation was a non-factor since the component was scheduled to be removed, and the contract could be written for this three-year period. What was left was the risk of supply chain disruption, considering only one source was used, but considering that it was not a key component, the risk of not having the product in stock in the event of a catastrophe was acceptable.

The second scenario was when a supplier approached Scania with a very innovative solution to one of the products Scania currently outsourced to another supplier. This was a joint-development project between Scania and the innovative supplier. However, the supplier wished to own full ownership of the IP, even if much of Scania's time, resources and competence were allocated to the development. The solution was that Scania got exclusivity on the product a few years.

The third scenario was about a part, which was outsourced to a single supplier for many years. This company had however been having problems with Quality, Delivery and Price all this time, and a change was needed to be made. An agreement was reached with R&D that the supplier for the new part would be one that agreed that Scania would own all design and IP rights. This proved to be quite challenging, however one supplier agreed with these terms. The supplier required 100 000 euros and

100 % of Scania's volume to give up the design and IP rights to Scania. This was later negotiated to 70 % of the volume with the same initial cost. This gave Scania the opportunity to start with this company as a single source, but to approach another company with up to 30 % of the volume at any given time. Also, at any time during the current contract period, any other supplier could be brought in since Scania owned full ownership of design and IP rights.

5.1.2.2 Interview 2

The second interview was with a purchasing manager who described a scenario where the two sources that was used by Scania for a certain part had reached what they claimed to be the lowest possible prices that they could deliver. These suppliers were also used by MAN, who like Scania is a part of the Volkswagen group. These two companies approached these suppliers jointly and negotiated with their combined volume instead of separately. This method proved to be successful as both companies received price reductions. This was something the purchasing manager said was the biggest reason, why he believed single sourcing would be more and more common, since the economies of scale that a larger volume brings, is hard to ignore.

5.1.2.3 Interview 3

The third interview was with another purchasing manager about another example where single sourcing had been chosen. This product family was currently being outsourced to a single supplier where Scania felt the pricing was too high. The strategy was to introduce another supplier to have a dual sourcing solution. However, the volume of the most expensive product had gone down, so it was hard to justify a dual sourcing situation. The solution became that a new single source was chosen, who offered a recovery plan at another production facility if the current production facility would face an unscheduled stop in production.

5.2 What possibilities and commercial opportunities (and risks) does Scania have when working with the different sourcing strategies?

This was the second research question and will be answered with the help of the Benchmarking and Survey. It will also be revisited in later chapters.

5.2.1 Benchmarking

A benchmarking was made between four companies outside of Scania. These were Volvo Cars, IKEA, Volkswagen and a fourth company (Company A) who is in the boating industry in USA. They were asked a range of questions (see Appendix A) regarding the company information, policies regarding purchasing, delivery and their own experience.

5.2.1.1 Volvo Cars

Company information

Interviewed: Purchasing manager at Electronic department

Revenue Volvo: 122 billion SEK

Revenue purchasing electronic department: 9,5 billion SEK

Percentage of purchased parts: 70-80 % of electric department

Market share: Sweden 20 %, EU, 2 %

Policy

Ratio of supplier's business: There is no spoken strategy regarding the suppliers' business. The suppliers might have some policy, but there is nothing from Volvo. It is not important how much business Volvo stands for, but rather to have good relationships. For example, even if Volvo was not a big customer for many suppliers during the events after the tsunami in Japan, many of the suppliers made sure to help out Volvo earlier than their other customers.

Sourcing strategy: There is no general sourcing strategy regarding how many suppliers you have per part, but each segment might have something that they feel is more suitable for their business.

Contracts: If it is a part that is prone to a lot of changes, the contract is very short, or flexibility agreements are written into the contract. Standardized parts (off the shelf) are maybe three years long. Software products that are not prone to change for a long time (such as the software for adjusting the seat or parts customers do not see and do not affect the customer), maybe up to seven years long. But all contracts can be cancelled in advance if needed to. The contracts usually have price reduction every year during the contract period. If nothing has been agreed before a set date, there will be an automatic renewal until next year.

Sourcing development is used when the activity is not core business for Volvo. They often use dual development but usually it ends in single sourcing, especially if there is a lot of competition among suppliers in that technical solution.

Delivery

Anything that is assembled in sequence in production (customer customization) must be available nearby, as close to four hours away from the plant. Anything else is kept in stock.

No classification is done for "sensitive parts".

The lead time for a change of supplier is usually between one to three years. However, if there is some kind of catastrophe (fire, hurricane) changes are made much faster. A special project team (tiger team) will be put together with supplier in order to get through catastrophe. This is done sometimes in collaboration with old and new supplier if they are needed.

Experience of purchaser

Single sourcing is usually used when the price is prioritized. The importance here is that the technical solution is of such nature that many suppliers potentially could deliver that solution (competition exists on the market). In that way the commercial risk is low since suppliers know that someone else could take over the business.

Dual sourcing is usually used when there is a lack of competition on the market. When there are not many suppliers available that are able to deliver that technical solution. Then two suppliers will be used and these will compete against each other. They will be aware of the fact that if any of them are unreasonable they might risk losing their business to the other.

He shared an example where they used to have a single source for batteries but now have two suppliers that can deliver the same application (both fit in all cars. No need to sequence). Since there is a big volume (together with ford and land rover) for the batteries, each supplier delivers to different regions. This makes them single sourced for each region, but if needed, they could deliver to the other region as well.

In case of a monopoly situation (only one supplier available), they work closely with R&D to bring a better (and more detailed) specification, which hopefully will bring out more suppliers. Otherwise they must await more suppliers on the market.

The testing that is most important for Volvo in order to approve a supplier is the testing where the supplied part is tested integrated in the car.

5.2.1.2 IKEA

Company information

Interviewed: Purchasing manager

Turnover: 270 billion SEK

Turnover purchasing: 150 billion SEK

Turnover IKEA component purchasing: 6 Billion SEK

151,000 co-workers

Packaging centres: Malacky (Slovakia) and China

Approximately 50 distribution centres

90 % of products are purchased (remaining 10 % is a supplier they recently purchased. IKEA Industries)

Market share is about 10%

Policy

Ratio of supplier's business: There is no spoken policy on this matter, but considering the high volumes IKEA has, 30-40 % of the suppliers only work with IKEA, and another 30-40 have IKEA as their largest customer.

Sourcing strategy: Again, considering the high volumes, multiple sourcing is automatically used. Not many (Almost none) can deliver all that volume for IKEA. Some of the screws that are purchased are ordered to a quantity of 1 billion pieces per year.

A topic that was discussed was regarding dual sourcing and whether it is reasonable to divide an extremely cheap product, which has a fairly high price on tooling. However, Ikea Sourcing makes a 10 million (SEK) loss per week if a small plastic product for 0,01 SEK is not available. Or the "IKEA nyckel" would cause 100 million SEK loss per week.

Something that all suppliers must be able to is to “ramp up” 30% if needed. This is if IKEA needs to increase the volume suddenly.

Contracts are mostly on “until further notice”, but some are based on volume. If IKEA were to leave a supplier, they make sure to clean up and close the door on good terms. Perhaps cover their investments done on this matter. The focus is on long term relationships and IKEA pursues to always take care of their suppliers.

Almost none of the development is done outside (almost everything is in-house).

Delivery

IKEA classify the parts depending how much they would like to stock them, transport lead time, if it is a commodity (standardized part such as M6), and how long time it would take to start up at a new supplier (8-12 weeks if they already are approved to be an IKEA supplier). They also investigate how many IKEA components that are dependent on this part, but also how much the value of the sales is (Part-price*volume).

Most components have a stock of 10-60 days while other have a stock of 1-30 weeks. However, some of the biggest suppliers deliver directly to warehouse.

Lead time for introducing a new supplier (get it approved by IKEA) is 6-12 months. This is mostly due to the extensive requirements on sustainability (environment, human rights etc.) that IKEA have on all partners. If the supplier is already approved by IKEA, it takes 8-12 weeks.

Experience of purchaser

If a machine can manufacture 64 pcs per minute, it is a lot better than a machine that manufactures 32. But it is extremely fragile (a great solution until something happens, commercially & risk). In these cases, it might be suitable to dual source, and definitely if two tools are required. Also, something else that came up in the discussions were whether if one component of the end product is single sourced, is not the whole product single sourced?

The criteria when choosing sourcing are usually price, price, and price. If the price is right they educate supplier on Quality and Delivery. Biggest problem for supplier is to live up to IKEA standards and values.

5.2.1.3 Company A

Company information

Interviewed: Sourcing manager

Turnover: 1,5 billion SEK (approximately)

Turnover Purchasing department: 300 MSEK (approximately)

Percentage of purchased parts: 75 % (approximately)

Market share: 15 %

Policy

Ratio of supplier's business: There is no policy regarding this. Aware of the fact that the parent company may have policies like these, but Company A do not have anything about this.

Sourcing strategy: The volumes are (usually) so low that no strategy has been put up. Automatically they must have single sourcing. Mostly single sourcing at Company A. In the area of casting they are considering to dual source since the castings themselves are so difficult to make several of them, so it might be necessary. More than one tool might go to different suppliers (takes too much time to create for one supplier, or divide risk).

Contracts: Practically no contracts (as you go). Some specific parts have a specific contract (time specific) where when there is one year prior to the termination of the contract, it is written that renegotiation begins. Regarding catastrophe plans, it is always in the contracts that suppliers specify a plan if something happens. There is always a section in there about their contingency plans, which is a part of our evaluation. Any new supplier that wants to enter the system must fill out a supplier evaluation. The supplier quality group reviews that and they decide if they should be issued a passing grade. There are a lot of stopping parameters in these contracts.

Supplier development: Supplier development is used on major programs. During these programs there is a lot of development done together with the supplier.

Delivery

Delivery to customer: Is very sensitive. 10 days from receipt of order, they must deliver to customer.

Delivery to production: Not as sensitive. Currently, there is no system to measure the delivery performance from suppliers. During the daily production meeting planners can update purchaser on who is way behind on what. However, there is no system to measure and document delivery performance. The suppliers are told that they can be received 2 days early and zero days late.

Sensitive parts: Suppliers from other countries are suggested to have a stock in the country so that parts can be drawn from them and reduce the lead time. But that is not specified that it must take place. Volume is too low currently to make such claims. Maybe in the future when the company becomes more integrated in the rest of the group's business.

Lead time for new supplier: 8 weeks to just have a supplier into the system. To have a supplier approved and qualified to deliver a specified part 16 weeks to 6 months and if the part is more complex it could take up to 2 years.

Catastrophe change: Depends on what is being outsourced, but you do whatever is needed to get through the problems.

Experience of the purchaser

Single sourcing: 100% of the purchasing managers' parts are single sourced and he had always been working with single sourcing. However, the tools can be picked up and moved to another supplier at any time. Company A owns the IP and tools. There might be some costs in the switch of suppliers (if the tools are adapted to previous supplier but you will not pay full price). This depends however on the parts, of course.

Single sourcing is a beneficial method when your volumes are low. It also depends on the amount of capacity that you are using at the supplier. It is also beneficial that you are not spending as much on tooling. Another positive aspect is that when engineering (R&D) makes a revision change, you only have one supplier that the change only needs to be done at one supplier. If you have two suppliers the change must be done at both suppliers and possibly also on both sets of tools.

Single sourcing is not a beneficial method: If your current supplier is very near full capacity. If tooling is cutting edge, or the complexity of the part makes it hard for the supplier to run it successfully, it might be a good idea to find more suppliers.

In a monopoly situation, when the supplier is the only one with the possibility to deliver the product (innovation, no competitors, government etc.), you must have a supplier agreement. You need to make sure that they are following all the rules in order for both parties to be successful. That is not the way it is done every time, but that is the preferred way to do business.

To be able to move away from single sourcing, R&D more often needs to pursue to make more generic specifications, so there is not only one possible supplier so that more suppliers are given the opportunity to meet the demands for the part.

5.2.1.4 Volkswagen Group

Company information

Interviewed: Purchasing manager

Turnover: 1800 billion SEK

Turnover purchasing department: 1325 billion SEK

Percentage of purchased parts: 67-75 % (approximately)

Market share Europe: 25,1 %

Policy

Ratio of supplier's business: Different segments might have a monopoly or oligopoly situation at the suppliers. Then there is usually not much to do about the ratio of the suppliers' business. VW usually thinks that when you introduce a supplier, you should spend a reasonable amount of money, since you almost must spend equal amount of time for each supplier. So the more suppliers you have the more time spent for the same "outcome". Also, volume determines price, so it can not be too small. But try not to be more than 30-40 %. Because if you have more, as you struggle, your suppliers will struggle also, while competitors (since they will not be using the same supplier probably, you own most of suppliers' business) have suppliers that might not struggle as much. Not a good situation for competition. If there are other stakeholders in the mix, the risk and need to stabilize the supplier can be divided on to your competitors as well.

Sourcing strategy: No general rule, but there are defined critical segments. Perhaps when it takes up to a year to make a new tool, or a critical component that is used in many other parts and if it is not available in the production there is a big chance that production stops, then maybe you should pursue dual sourcing. However, that number should be pursued to keep at a minimum considering

volumes means price reductions, and since VW has extremely high volumes, any “unnecessary” dual sourcing that is used, is a lot of lost money.

Critical points to consider when choosing method (other than commercial aspect): Security of delivery. Not only about how critical the component is, but also how long time does it take to replace the tools, how easy is it to “claim” the tools in a bankruptcy. If there is a big risk identified in the security of delivery, then you should go for dual sourcing, but in general, VW prefer single sourcing. Dual is used only when it is necessary.

However, there might be other reasons to use another supplier. You might want to give 20 % of volume to develop a supplier, when there is for example an oligopoly. Because if there are only a few suppliers on the market, and they are always the same “big ones”, it is hard to find price breakers. Then it might be good to develop another supplier together with R&D to introduce more competitors to the supplier market. This could result in a loss at this state, but hopefully it creates business opportunities for the future. Another thing is to create competition with in-house production that is not core-competence. Because otherwise it is hard to know if you are currently at the perfect level of price without competition and benchmark.

To summarize, the main reasons to choose dual sourcing could be: Security for critical parts, Commercial leverage in the future, Geographical dual sourcing (if you for example have multiple production sites), develop new suppliers for competition among suppliers and finally to balance out and benchmark in-house production.

However, it is easy to be fooled to think that you have dual sourcing, but during the events of the tsunami in Japan, there was a belief that the back camera, that was multiple sourced from three suppliers, was in no harm’s way for delivery to production, for almost a week. The truth however was that all suppliers bought the lens from the same sub-supplier, in Japan. The problem is, how “deep” should this analysis be done? How many man hours should be used to evaluate it? It is suggested that suppliers investigate the situations a couple of levels down in the supply chain, but not a demand.

It is also hard to differentiate the “soft facts” sometimes. The political situation, or rules and regulations in place in the events of a bankruptcy vary a lot between different countries. For example, depending on where the supplier is located, the possibility to claim the tools from a bankrupted supplier varies. So even if you legally have the right to take the tools and move them to another supplier, the procedure is so long that it is not possible to switch suppliers fast.

Contracts: There are some general policies. The suppliers get an estimated volume, but no volume is promised. VW might call off to that limit, or maybe none. The supplier know of course that VW have invested in for example the tools, so VW will call off a substantial amount. Another policy is to never promise 100 % of the volume in the contract. The supplier never gets more than 80% of the volume, even for a single source. In reality they could get 100 % but legally, you always have the possibility to introduce another supplier.

Regarding supplier development, VW works frequently with supplier development. Try to work frequently with as many as possible, because if you only work with one, the other supplier might be

reluctant to invest time, R&D etc. when approached. It is always needed to have up to date suppliers and the bigger the supplier base, the better.

Delivery

Delivery to production: When the production line stops for one hour, it costs millions. The tricky thing here is that you want to reduce the storages, but not jeopardise the production. Parts that are not sequenced or Just-in-time, you have parts worth for up to three days in storage. Just-in-time or sequenced parts are delivered directly to the plant. They need to be available to the production within 50 km.

Sensitive parts: Sensitive parts are identified by a cross-functional team between R&D, Quality and Production units and to some extent involving the purchaser. They are prioritised and set up in lists.

Lead time for introducing a new supplier: The final decision for supplier must be done minimum 12 months before start of production. So the whole complete process will probably take around 18 months.

Catastrophe: Changing a supplier, there could be an interim approval for quality where you do not look at the complete process but instead only if the part can be used (“can we build it in”). Is the required quality met? If the emergency requires, some documentations or procedures can be skipped. A crisis committee decides what is best and how to solve it. (example with camera lens and the presents that was sent home to the people who had ordered it)

Experience of purchaser

Sole sourcing: This is something that every purchaser is trying to avoid. You have competition, no security, no leverage. The first thing to do here is to look to develop another alternative. You have to create a business case for a second source to compete. But sometimes you can not avoid a sole sourcing situation, when for example a big supplier has something that is cutting edge. Then you have to “eat that bitter fruit” and simultaneously develop another supplier. Usually, it does not take much too long before competitors enter the market, one an innovative product has hit the market. If, for some reason, indicates that this supplier will be alone with this solution for a long time, it might be wise to pay a bit more for exclusivity during the contract time. Also, many times, these sole sources have many production sites, so regarding security, the risk might be as low as with dual sourcing.

Single sourcing: When tooling is expensive, or development is expensive, single sourcing is a beneficial way to go. If the tooling is for example 2,000,000 Euros, is it necessary to pay two tooling costs. How many cars must be sold to get payback for that extra tooling cost. If you have 30,000 parts, you should think very well for which parts that need to be dual sourced, since the costs will be very high. However, for all critical parts, parts that are not easily replaced or when you need to localise, that is a cost that is necessary. Single sourcing is used for mainly one thing, Economies of scale.

Other than the reasons described above, another reason to dual source could be when demand is uneven, and you have in-house production of a product. Then you can use a supplier to even out the peaks in demand that arises, and in that way you have a stable in-house production. This is not

traditional dual sourcing, with two suppliers, but instead one supplier complementing the in-house production. The result is still that you get the product from two sources.

One of the reasons Scania tries to have dual sourcing while VW tries to have single sourcing is that Scania is a premium brand and has higher margins, so it is probably worth the extra investment, since Scania believes that their customers should not wait one day if problems occur. The car manufacturing market has much smaller margins.

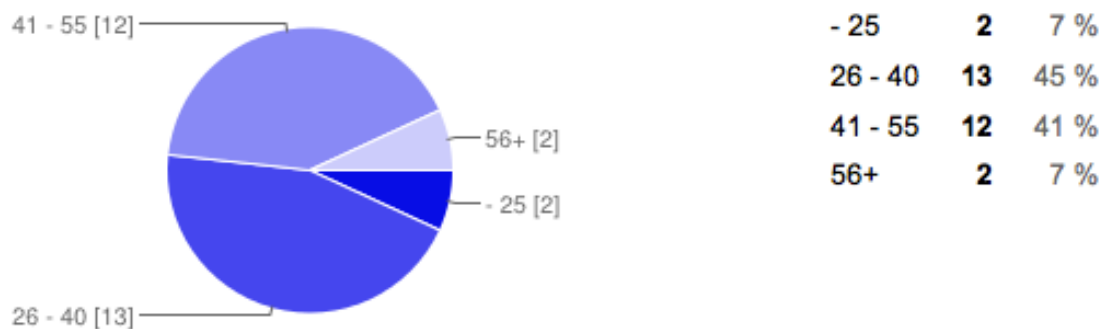
5.3 Survey

A short survey was conducted about what challenges the purchasers face in their work. This was done with four purchasing departments at Scania who buy supplier developed components and the purchasers worked both with project and commodity. An example of the surveys that were sent out can be seen in its fullest extent in Appendix B.

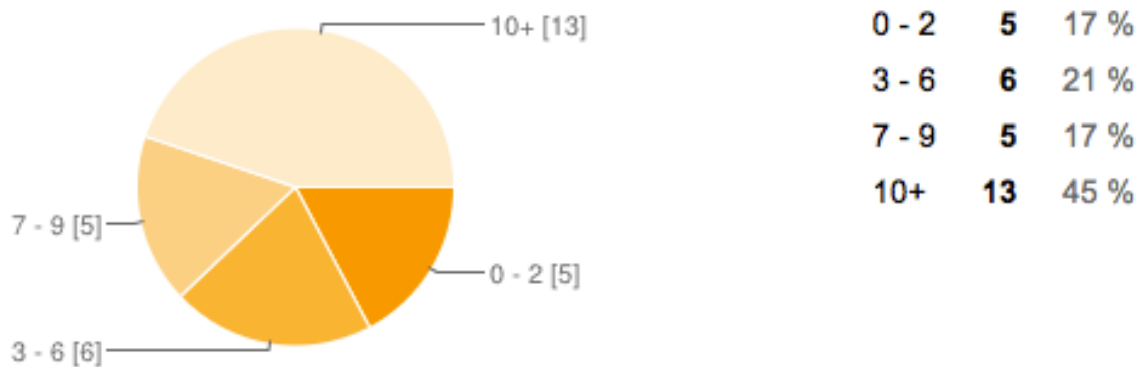
40 questionnaires were sent out in this survey and 32 were returned. Three of these were considered faulty due to not answering correctly (for example only filling out one of two pages). 29 fully answered questionnaires were used in the analysis of this thesis.

The results of the survey are as follows:

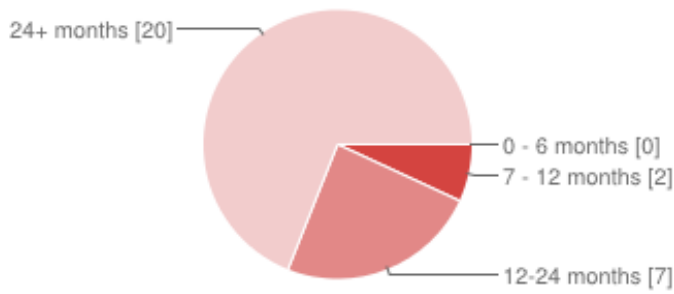
Age:



Years of experience in purchasing:



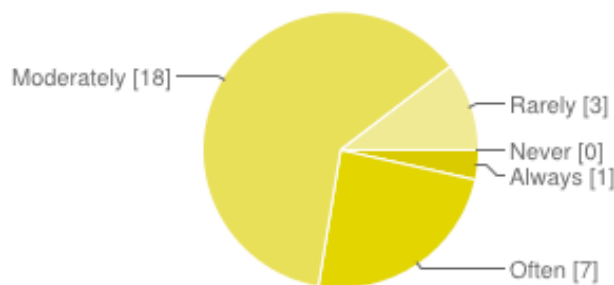
How long is the usual lead-time, from the first contact with a new supplier until the part is approved for production, in your segment?



0 - 6 months	0	0 %
7 - 12 months	2	7 %
12-24 months	7	24 %
24+ months	20	69 %

Sometimes, when the supplier base is limited (in for example an oligopoly), it might be wise to allocate a small part of the volume to develop a new supplier.

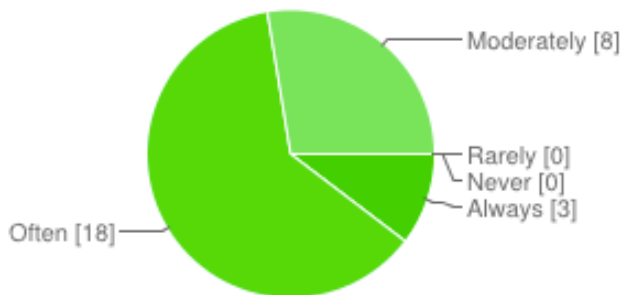
Do you feel that you have the support from management, to develop a supplier?



Always	1	3 %
Often	7	24 %
Moderately	18	62 %
Rarely	3	10 %
Never	0	0 %

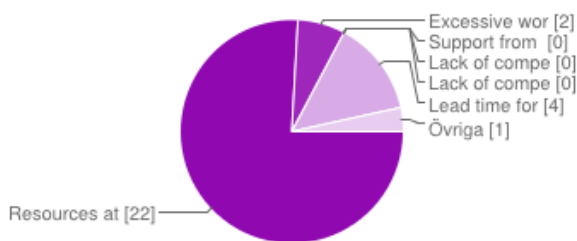
In some situations, it might not be necessary to use dual sourcing.

Do you feel that you have the support from management, to present single sourcing at the sourcing board?



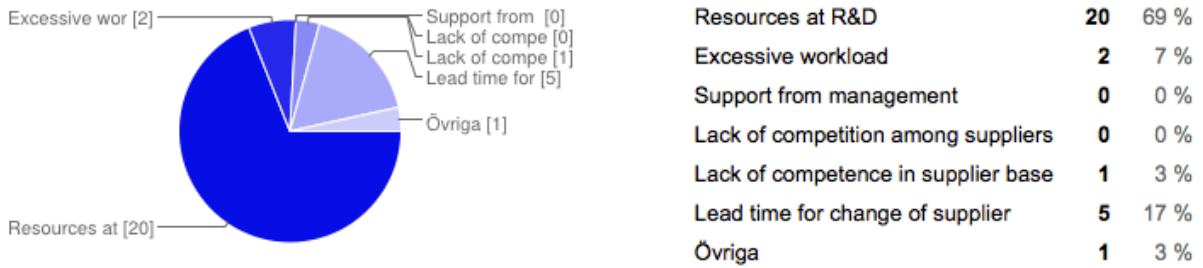
Always	3	10 %
Often	18	62 %
Moderately	8	28 %
Rarely	0	0 %
Never	0	0 %

What do you feel is the biggest obstacle for you to introduce a new supplier?



Resources at R&D	22	76 %
Excessive workload	2	7 %
Support from management	0	0 %
Lack of competition among suppliers	0	0 %
Lack of competence in supplier base	0	0 %
Lead time for introduction	4	14 %
Övriga	1	3 %

What do you feel is the biggest obstacle for you to change supplier (a supplier within Scania's supplier base)?



The respondents were also asked to rank the different challenges from the two previous questions. The possible answers were ranging from Very little (to nothing at all) = 1, Little = 2, Much = 3, Very much = 4. The mean value from those answers are presented in figure 10.

Please rate each challenge after how much you feel it acts as an obstacle for you to change supplier within the supplier base.

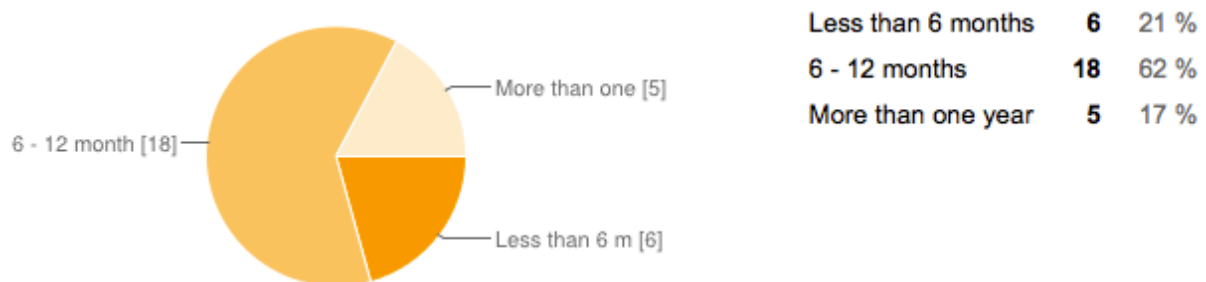
Please rate each challenge after how much you feel it acts as an obstacle for you to introduce a new supplier

Very little (to nothing at all) = 1, Little = 2, Much = 3, Very much = 4

Resources at R&D	3,55	Resources at R&D	3,48
Excessive workload	2,97	Excessive workload	2,86
Support from management	1,90	Support from management	1,97
Lack of competition among supplier	2,17	Lack of competition among supplier	2,10
Lack of competence in supplier base	2,07	Lack of competence in supplier base	2,03
Lead time for introduction	2,90	Lead time for introduction	3,03

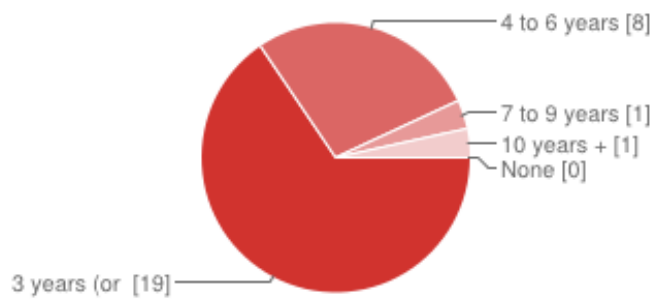
Figure 10. The different challenges ranked from 1-4.

How close to the end of an LTA, do you start to renegotiate with a supplier?



It is common for the purchasing department to ask for price reductions (usually 3-5 % per year) in an LTA.

How many years would it be reasonable to get a price reduction of 3-5 % per year, from the same supplier (and the same part)?



None	0	0 %
3 years (or less)	19	66 %
4 to 6 years	8	28 %
7 to 9 years	1	3 %
10 years +	1	3 %

6. Discussion

This part of the report aims to discuss the results that were presented in the previous sections.

6.1 Interviews with purchasers

It can be seen from the interviews with the purchasing managers that it seems as, if the situations require, single sourcing can be used without increasing the commercial risk noticeably. It is more a question on whether or not the correct precautions have been taken into place and if the purchaser is prepared of what the consequences of single sourcing are. All three interviews showed that if a long-term perspective is used, where the purchaser tries to be proactive when anticipating the end of an LTA, even single sourcing could be a successful strategy, regarding the commercial risks.

This can be compared to the varied theory that the author found in the literature review, where some authors believed one strategy was superior to the other (i.e. Faes & Matthyssens, 2009, discussion about conflicting evidence in theory). The conflicting results from the theory could be that while every author might have the correct conclusions from the studied cases in their research, every unique situation should be treated as such. Also, maybe these unique situations do not need to be one-dimensional. They can be solved using both single and multiple sourcing strategy, and changed between the methods over a period of time. It seems as though, from the interviews, that one might be able to combine the benefits of each strategy to the other. For example, in the first interview, the purchaser used a single sourcing method, but owned all the IP and the tools, so at the end of the contract period, a switch to another supplier would be a lot more similar to a dual sourcing method, where you are not tied to a single source.

The other example of combining benefits was the third interview where single sourcing was used with a recovery plan at the supplier, which provided something similar to a dual sourcing situation, where Scania would be sure that if the single source is unable to supply the product (for example a catastrophe) another production facility exists to act as dual source. In this case you have both the economies of scale of single sourcing, and the lowered risk of disruptions in the deliveries that dual sourcing provides. This is similar to the conclusions from one theory (Ramsay & Wilson, 1993) where they suggest that one should aim to maximise the benefits of both strategies as much as possible.

6.2 Benchmarking

The benchmarking that was conducted showed to some extent the same findings, as the ones found in the theory and later in the interviews with the purchasers. Each company had chosen different sourcing strategies, and none of them seemed to be in the dire need to change strategy. Some of the companies were however forced to choose a preferred sourcing strategy, due to too low volume (Company A) where they mostly use single sourcing or too high volume (IKEA) where they mostly use dual sourcing. It can be seen in figure 11 though that the volume does not state which sourcing strategy that is needed to be used, unless you belong in the extremes of when dual sourcing is not applicable due to low volume, or single sourcing is not applicable, due to high volume, which supplier can not deliver.

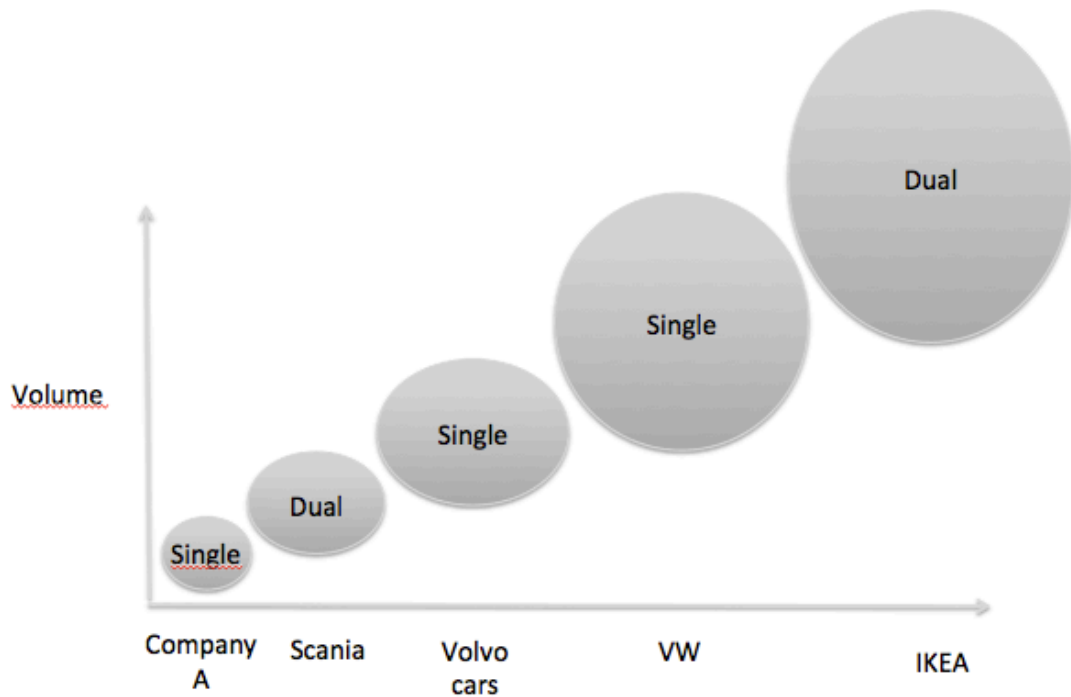


Figure 11. Visualization of the volume of purchasing material of the different companies in the benchmarking.

If we also look at turnover in figure 12, we see that there is no clear trend to which strategy that is to be used as the preferred one. This was not found in the theory either. Possibly the extremes as when the turnover is so low, that a company might have trouble to attract two suppliers, one is forced into single sourcing. In all other cases, there does not seem to be a quick-fix solution, on what strategy to use. Both single, and dual sourcing have proven themselves to be successful in the benchmarking.

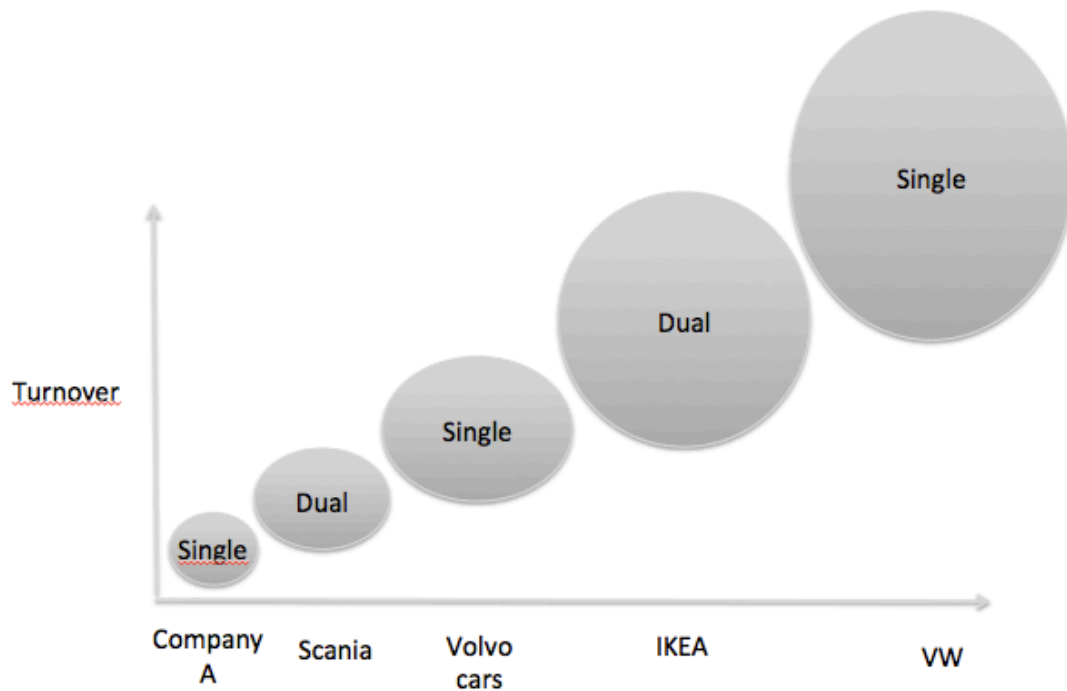


Figure 12. Visualization of the turnover of the different companies in the benchmarking.

Another thing that was interesting was the way companies acted to create competition among their suppliers. As Volvo Cars uses single sourcing when there are many suppliers who can provide the specific technical solution, Scania for example prefer to use multiple sourcing. Both do this in order to have competition, but Volvo Cars seem to think that the competition that is in the market is enough to keep the suppliers alert, while Scania prefers to have the competition “in-house”. This is much like the theory found in the literature review where many of the statements were contradictory in the different articles. Different strategies, with different identified advantages, are used to achieve the same goals (Faes & Matthyssens, 2009). Like in this example where single and dual sourcing is used to create competition.

6.3 Survey

The 32 of 40 respondents in the survey must be considered a great participation rating, considering theory warned for as low results as 10 %. However, the survey could maybe have been more clear and explanatory since 3 of 32 respondents had filled out the survey wrong and were therefore considered invalid for the research.

One of the interesting results from the survey was the comparison of the questions whether the respondents felt they had support from management to present single sourcing or to develop a supplier. For the first question, *“Do you feel that you have the support from management, to develop a supplier?”*, 62 % respectively 10 % answered moderately and rarely. For the second question, *“Do you feel that you have the support from management, to present single sourcing at the sourcing board?”*, 62 % respectively 10 %, answered often and always. The purchasers feel that they have more support to use single sourcing rather than to develop a supplier to create competition in a limited supplier base.

Another interesting result from the survey is when the respondents were asked to say what the biggest obstacle is when they introduce a new supplier or change a supplier within Scania’s supplier base. For the first question *“What do you feel is the biggest obstacle for you to introduce a new supplier?”* 76 % answered resources at R&D. For the second question *“What do you feel is the biggest obstacle for you to change supplier (a supplier within Scania’s supplier base)?”* 69 % answered resources at R&D. These two questions show how much the purchasers feel that biggest obstacle in their work of changing or introducing suppliers, is actually an internal obstacle.

Following these two questions the respondents were asked to rate all the alternatives after how much they act as an obstacle.

You can see in figure 13 that Resources at R&D are the biggest obstacle, but this is followed by excessive workload and lead time for introduction closely. The external factors (Lack of competition and competence among suppliers) seem to act much less as an obstacle, who together with support from management was rated very low.

Please rate each challenge after how much you feel it acts as an obstacle for you to change supplier within the supplier base.

Please rate each challenge after how much you feel it acts as an obstacle for you to introduce a new supplier

Very little (to nothing at all) = 1, Little = 2, Much = 3, Very much = 4

Resources at R&D	3,55	Resources at R&D	3,48
Excessive workload	2,97	Excessive workload	2,86
Support from management	1,90	Support from management	1,97
Lack of competition among supplier	2,17	Lack of competition among supplier	2,10
Lack of competence in supplier base	2,07	Lack of competence in supplier base	2,03
Lead time for introduction	2,90	Lead time for introduction	3,03

Figure 13. Visualization of the highest ranked challenges in the survey.

The following question was “How close to the end of an LTA, do you start to renegotiate with a supplier?” to understand when the purchasers start the renegotiation, and then compare those results to an earlier question where they were asked “How long is the usual lead time, from the first contact with a new supplier until the part is approved for production, in your segment?”. 62 % answered that they start their renegotiation 6-12 months before and 21 % answered that they start the renegotiation less than 6 months before. The lead time for introduction however was much longer. 24 % had a lead time who was 12-24 months and 69 % had a lead time longer than 24 months. Considering most suppliers have long lead times, if a renegotiation with a supplier is dissatisfactory, the purchaser has almost no chance to introduce another supplier prior to the end of the LTA. This could lead to Scania being stuck in a high cost situation for a long time, before another supplier is ready to take over.

The last question was “How many years is it reasonable to get a price reduction of 3 - 5 % per year, from the same supplier (and the same part)?” which was asked to establish for how long purchasers felt that a price reduction is reasonable. The majority (66 %) answered 3 years. This means that the goal to get 3 % price reduction every year is hard to reach, if the suppliers are not changed sometimes.

7. Conclusion

One of the biggest conclusions drawn from this research is that there exists no quick-fix solution to the matter of when choosing sourcing strategy. One should not simply state that either sourcing strategy is superior to the other, or that a company has a preferred method for all of its components. Instead, tools should be given to the purchasers, so that those who have all the information from each unique case and have the knowledge and experience can make the smartest decisions. With this said, companies should definitely identify clear scenarios and/or critical parts who require some special sourcing strategy, but the rest should be treated as the unique cases they are.

The key for success however, seems to be competition among suppliers. Whether it is when Volvo Cars use single sourcing because there exists competition on market, or when Volkswagen decides to develop another supplier, in order to introduce more suppliers to a market and create competition, or when a purchasing manager buys the rights for the IP and the tools from the suppliers so the supplier feels the urgency that it can be replaced, all of this boils down to competition. Either there exists competition between suppliers in the market, or you must create that competition.

Another thing is that the internal organization must allow these methods and strategies to be obtained. The survey stated that the biggest obstacle for a purchaser were the resources at R&D, closely followed by the purchaser's workload and the lead-time for introduction of supplier. If these obstacles are rooted in an organization, neither strategy is successful. As Beer & Eisenstadt (2000) stated, two silent killer of strategy integration are *unclear goals and conflicting priorities* and *poor coordination across functions, businesses or borders*. If an organization has goals and KPI:s on its employees for cost savings, but in other parts of the organization resources do not exist to implement the cost savings found by a purchaser, that organization will have frustrated employees and strategies will not be taken seriously.

It was also stated in the survey that most purchasers start their renegotiation with a supplier much closer to the end of the contract, than the lead-time to introduce another supplier. This means that they many times do not give themselves the opportunity to change a supplier, and the supplier do not feel the sense of competition. Purchasers need to have the resources to make changes in their supplier base in order to be successful, but they also need to be more proactive and start the renegotiation process earlier. One of the problems with this might be their workload, which was a defined obstacle in their work.

Lastly from the survey was the result about how long the price reductions are reasonable to get. If it is deemed to be hard to get price reductions of 3 – 5 % beyond three years from the same supplier, and the organization rarely have the resources to introduce (or change) a supplier, how are the purchasers supposed to reach these goals?

8. Recommendations to the company

As stated before, will the most important aspect for success be, to make sure that there exists competition between the suppliers. This is regardless whether single or dual sourcing is used. Either there exists competition in that market, or Scania must create competition. Even if Scania is aiming for a long-term relationship with the supplier, they must feel that there is at least a small chance that another supplier could replace them, in order to not grow complacent and offer cutting edge design, quality and cost.

When working in a development project with a few suppliers, and you realize (close to the end of the development project) that one of the suppliers will not be chosen because they can not reach the cost-goals, finish the development with that supplier anyway. If this is done, this expensive supplier will be available in the future, if a switch needs to be made. You have a backup alternative, and also, that supplier will have the possibility to become a competition to your supplier(s) if they manage to fix their costs. If this is not done, you are looking at a long lead-time, where much of the work done in the development project must be re-done. The model from Wheelwright and Clark (1992) justifies this where they ask for as many ideas in the funnel stage. Consider the development project with the suppliers to be the funnel stages of their model.

When working with single sourcing and innovative solutions (where competition is slim), try to write the contracts until the time where competition exists on the market. As stated by Utterback & Suarez (1993), after a few years of an innovative technology more actors arrive to the market, and if your contract expires with a single source, and there is no competition on the market, you might face price escalations from supplier. Also, as stated by Trygg (2013) the pioneers of a technology, are not always the companies who survive, so in the long term, it might be wise to anticipate the followers in a market.

Lastly, Scania must evaluate their internal processes, as many feel that they are the biggest obstacles in their work. It would not matter which sourcing strategy you choose, and how successful it is, if your processes do not allow it to be utilized.

The second research question *“What possibilities and commercial opportunities (and risks) does Scania have when working with the different sourcing strategies?”* is answered.

8.1 Decision model for Scania

The third research question was *“How could Scania handle the work with the different sourcing strategies?”* and this was done by creating a PowerPoint document which allows the user to maneuver over a timeline (see figure 14) where sourcing decisions arise. These are all based on the content in this research.

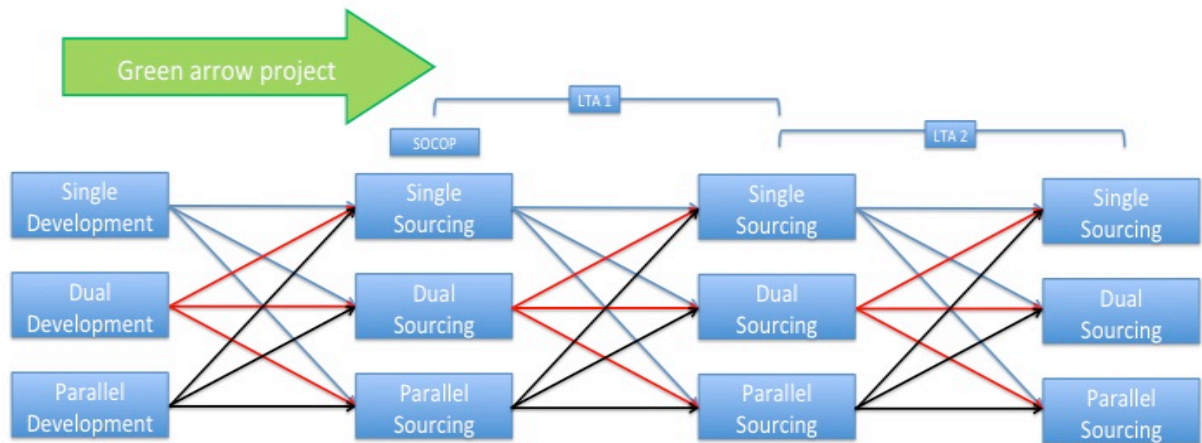


Figure 14. Timeline of purchasing in the IVT.

Considering the PowerPoint can not be presented in this report, an example will be shown on the path that can be taken in this tool (which is called Interactive Visualization Tool – IVT).

Step 1.

You decide which path you wish to learn information about (this example – Dual sourcing at SOCOP to Single sourcing after first LTA). You click on Dual sourcing at SOCOP and this figure 15 shows.

Dual sourcing at SOCOP

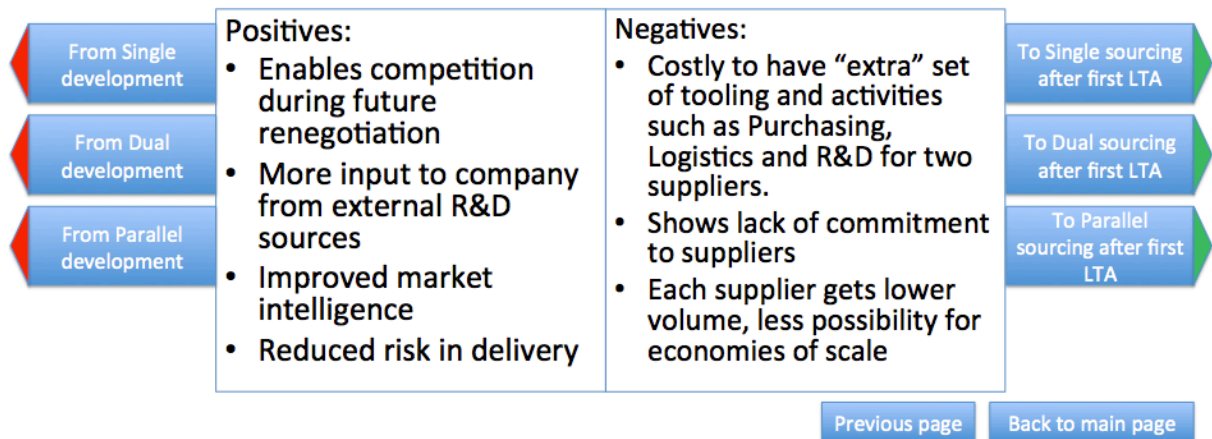


Figure 15. Step 1 in example.

Step 2.

You click “To Single sourcing after first LTA” and figure 16 shows.

From Dual sourcing at SOCOP to Single sourcing after first LTA

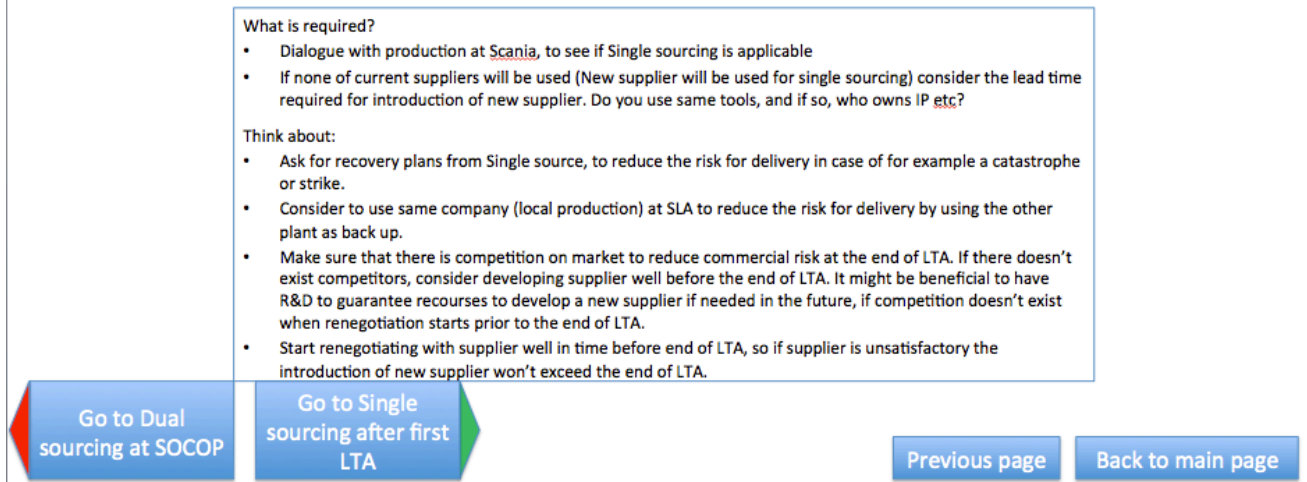


Figure 16. Step 2 in example.

Step 3.

You click on “Go to Single sourcing after first LTA” and figure 17 shows.

Single sourcing after first LTA

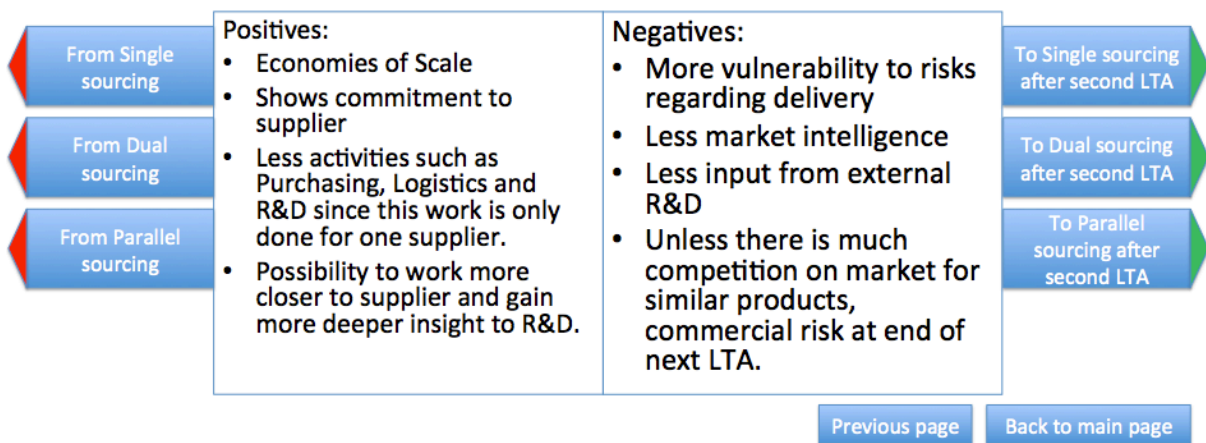


Figure 17. Step 3 in example.

From this step you can choose to proceed to future stages, or return to the main menu. The model can visualize what is needed to be done to reach a future state from a chosen starting point, or choose a future state and work backwards in the timeline.

9. Future Research

It is suggested to investigate the effects and challenges that other effected departments face, when working with purchasing at Scania, such as the R&D department. This seems to be a relationship that in some parts of the organization works well and other not so much. It might also be useful to provide a suggestion on how the collaboration between the effected departments should be set up in order to maximize the potential in this collaboration.

Another thing to investigate is if a classification model might be useful to identify critical parts in the production. This could be something similar to the calculation presented by Norrman & Jansson (2004) where they suggest that $Risk = Probability \text{ (of the event) } * Business \text{ impact (severity) of event}$. This model could help to set a limit that product with a certain identified level of risk, needs a certain amount of stock availability. That could result into easier decision on whether single or dual sourcing might an applicable solution.

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10. Appendices

10.1 Appendix A

Company information

- Turnover (SEK) / Turnover Purchasing department (SEK)
- Ratio of own parts/purchased parts (SEK)
- Market share (%)

Policy

- Ratio of suppliers business (%)
- Sourcing strategy (Sole, Single, Dual, Parallel and Multiple)
- Contracts with suppliers (Length, renegotiations, catastrophe plans)
- Global purchasing? (Yes/No, How?)
- Do you currently work with supplier development, or do you develop everything in-house?
Contract manufacturing?

Delivery

- How sensitive is the delivery to customer? (Time)
- How sensitive is the delivery to your production? (Time)
- Any “spoken” strategy for sensitive parts?
- How do you classify sensitive parts? Are all parts classified regarding sensitivity?
- Lead time for introducing new supplier? (Time)
- Different lead time for changing supplier (catastrophes also)? (Time)

Experience of purchaser

- What is your experience from Single/Sole sourcing?
 - In which situations do you feel that single/sole sourcing is the most beneficial solution?
 - In which situations do you feel that single/sole sourcing is a disadvantageous solution?
- What is your experience from dual/parallel/multiple?
 - In which situations do you feel that dual/parallel/multiple sourcing is the most beneficial solution?
 - In which situations do you feel that dual/parallel/multiple sourcing is a disadvantageous solution?
- How do you work when there is a monopoly at the supplier? What are the challenges? (sole, innovation, no competitors, government etc)
- What are the criteria that are used during the decision process?
 - Cost? (tooling, development, part price, logistics, taxes)
 - Delivery? (In/Out, References, Competitors)
 - Quality? (What kind of testing, References, competitors)

10.2 Appendix B

Age:

- 25
- 26-40
- 41-55
- 56+

Years of experience in purchasing:

- 0-2
- 3-6
- 7-9
- 10+

How long is the usual lead time, from the first contact with a new supplier until the part is approved for production, in your segment?

- 0-6 months
- 7-12 months
- 12-24 months
- 24 months+

Sometimes, when the supplier base is limited (in for example an oligopoly), it might be wise to allocate a small part of the volume to develop a new supplier.

Do you feel that you have the support from management, to develop a supplier?

- Always
- Often
- Moderately
- Rarely
- Never

In some situations, it might not be necessary to use dual sourcing.

Do you feel that you have the support from management, to present single sourcing at the sourcing board?

- Always
- Often
- Moderately
- Rarely
- Never

What do you feel is the biggest obstacle for you to introduce a new supplier?

- Resources at R&D
- Excessive workload
- Support from management
- Lack of competition among supplier
- Lack of competence in supplier base
- Lead time for introduction
- Other reasons: _____

What do you feel is the biggest obstacle for you to change supplier (a supplier within Scania's supplier base)?

- Resources at R&D
- Excessive workload
- Support from management
- Lack of competition among supplier
- Lack of competence in supplier base
- Lead time for introduction
- Other reasons: _____

Please rate each challenge after how much you feel it acts as an obstacle for you to change supplier within the supplier base.

	Very little (to nothing at all)	Little	Much	Very much
Resources at R&D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Excessive Workload	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support from management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of competition among suppliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of competence in supplier base	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lead time for introduction/change of supplier	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please rate each challenge after how much you feel it acts as an obstacle for you to introduce a new supplier.

How close to the end of an LTA, do you start to renegotiate with a supplier?

- Less than 6 months
- 6-12 months
- More than a year

It is common for the purchasing department to ask for price reductions (usually 3-5 % per year) in an LTA.

How many years would it be reasonable to get a price reduction of 3-5 % per year, from the same supplier (and the same part)?

	Very little (to nothing at all)	Little	Much	Very much
Resources at R&D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Excessive Workload	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support from management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of competition among suppliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of competence in supplier base	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lead time for introduction/change of supplier	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- None
- 3 years (or less)
- 4 to 6 years
- 7 to 9 years
- 10 years +