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Scania bus operations and supply chain management - two case studies

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Abstract

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With its core competence on bus chassis, Scania determined in the mid-2000s to co-produce coach products with two external bus body manufacturers, Lahden Autokori and Higer. However, after a decade's cooperation, well-functioning work processes were not established and problems still existed.

With this study, problems within Scania's operations system and Scania's supply chain management strategies towards these two partners have been identified and illustrated, by applying an abductive research method. With this study it has been evidenced that Scania's bus operations management is affiliated with truck and the truck operations system does not fit the request from the collaborations with Lahden Autokori and Higer. Moreover, it has also been shown that even though the relationship with these two partners is by nature long-term, Scania's attitude has been characterized by short-term thinking. This ambiguous supply chain management strategy has been causing problems. Furthermore, aside from problems within operations system and supply chain management, the third studied area is organizational identity. Due to the fact that some organizational identity issues caused by reorganization have largely influenced both of the collaborations, the formation of these identity issues as well as the impacts on the cooperation has been studied. Finally, some recommendations for improvements have been made based on the findings of this study.

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1 Terminology

This part explains expressions that are used in this article, in an alphabetic order. More information about the Scania organization structure, such as how the sectors, departments, section and groups are arranged see Appendix 1.

AROS – AROS is an IT-system for Scania's design structure, where all of the design/parts of a product are documented.

BBM – BBM or Bus Bodybuilder's Manual is a manual how to build a body on a Scania chassis.

BBM-QA – BBM-QA or Bus Bodybuilder's Manual Quality Assurance

Bill-of-material – Bill-of-material is widely used by bus body manufacturers to document the information of all of all the parts that a bus body consists of, after the bus is built.

Body/Bus body – A body is the part of the bus that is housing the chassis. It consists of for example, the floor, the ceiling and all of the internal decorations.

Chassis – Chassis is the bottom part of the vehicle that for example consists of the engine, the wheels and the steering control.

EPPS PRIO – EPPS PRIO is an open IT-platform between Scania and Higer to share spare part information.

FRAS – FRAS, Follow-up Report Administration System, is a global system by Scania used to follow up quality and product quality deviations. This report system is used by distributors, workshops, retailers and builders.

Full level of commitment – Full level of commitment means that Scania will be responsible for the aftermarket service for the complete vehicle.

Multi – Multi is an IT-system that the aftermarket department works with that consists of workshop manual, spare part information and information of the configuration of a Scania product. Multi is used in workshops when repairing a Scania vehicle.

PD process – PD-process is Scania's product development process that consists of three phases, concept development, product development and field quality.

Powertrain – Powertrain is the technical system in a vehicle that operates the vehicle to run forward. The powertrain consists, for example, of the engine and the transmission.

SPC – SPC is Scania's warehouse in Europe where all the spare parts are stored.

SPS – SPS is Scania's production system and it is how Scania manages the production. It is very inspired by Lean Production philosophy.

2 Introduction

2.1 Background

Scania CV, the Swedish heavy vehicle producer well-known for its truck products, has a history of producing buses for over a hundred years. There are three business areas within Scania bus operations, namely bus chassis, complete city buses and complete coaches. A city bus is usually used as a solution for public transportation that runs shorter distances inside of cities (Picture 1, Scania CityWide). A coach is a bus that drives longer distances among cities (Picture 2 and 3, Scania Touring and OmniExpress). These types of buses are usually more luxury and more comfortable than city buses, due to the longer transportation distance. Different from city buses, coaches often are equipped with, for example, a kitchen and a toilet.



Picture 1 Scania CityWide (Scania.com [1])

Picture 2 Scania-Touring (Scania.com [1])

Picture 3 OmniExpress (Scania.com [1])

Scania produces both bus chassis and complete city buses internally, whilst the complete coaches are jointly fabricated by Scania and its supplier partners, Lahden Autokori and Higer. Scania is to produce the bus chassis and these two partners are to build bus bodies on the chassis.

Due to globalization, producing a complete bus in Sweden is not cost-efficient anymore. A bus, compared with a truck requires much more handcraft to build the body. This is the reason why Scania, as all the other bus chassis producers, switched the focus on selling bus chassis and/or moved bus body production to low labor cost countries. Because of the high production costs aftermarket services have become the major income resource, not only for Scania, but generally in the complete bus market. Under the 1990s a new vision of giving

comprehensive support to all Scania vehicles was developed (Giertz, 1991:412, 563). This meant that, not only in Sweden, the aftermarket service was to be well developed on a global level. For a truck at that time the repair and maintenance cost was assumed to be the same with the selling price, which meant that, half of the financial revenue should be from the aftermarket sector (Giertz, 1991:412, 565). Scania's service revenue has been increasing during the past years (Scania Annual Report 2013). In 2013, the total service revenue of Scania rose by 6 percent and reached to 19 percent of the annual revenue (Scania Annual Report 2013). In fact the margin earned by bus products has become very little, which is a common truth among the bus producers. The financial importance of aftermarket service in bus sector has been largely enhanced.

A demand from the bus market that arose in the recent decade was the need for complete buses with one-stop service - that is the complete aftermarket service for both chassis and body. Traditionally bus chassis manufacturing and body building are done by separate producers, who are separately responsible for the quality issues. However, this kind of aftermarket service creates inconvenience for the customers. To meet the needs from the market, as well as to cut costs, Scania decided to cooperate with two bus body manufacturers to produce coaches with Scania's one-stop service, namely Lahden Autokori and Higer. For these coach products, due to the demand of one-stop service from the market, Scania is responsible for the aftermarket service for both chassis and body.

Being heavily involved in the collaborations with Lahden Autokori and Higer the aftermarket section at Scania, YSR (Appendix 1), has been encountering many problems for years. In order for Scania to produce aftermarket products, mainly spare part catalog and service materials, especially for bus bodies that are delivered by the external body manufacturers, the participation of the partners are needed. However, well-functioning work processes have not been established. Since the start of the collaborations efforts have been made to communicate with the two partners but the situation today is still far from ideal. Service products have not been delivered with expected quality, and insufficient information has even been putting stops to the delivery.

This study started from the aftermarket section YSR at Scania with the intention to identify problems and solutions to improve YSR's work processes towards the external partners. However, soon the fundamental problems were recognized to be bedded in a much bigger structure – Scania's bus operations. With truck as its major business area, bus business has

been affiliated with truck operations. Although the production for coach products is very different from truck, but this fact seems to have been neglected. The small volume of coach products is not comparable to truck, and the fact that “nearly no coach is the same with another” is a very challenging fact for the current coach production system.

However, the distinctions between coach operations and truck operations have not been well managed. The established work processes for truck operations have not been modified while co-producing coaches with external partners; besides, the current organization structure cannot facilitate communication either internally or externally with the partners. In fact, these kinds of frustration connected with the problems have been experienced not only by YSR, but all the other functions involved. Due to these issues we have decided that the first theoretical field of study to throw light on the problems between Scania, Lahden Autokori and Higer is operations management.

Furthermore, some problems seem to be rooted in Scania’s general strategies towards these two supplier partners. Although both Lahden Autokori and Higer are long-term close partners these collaborations were started rather simply. Insufficient preparations before the formation of the partnerships seem to have led to further problems. For example Higer, as a bus producer in China, had never sold to the Western market. The lack of knowledge on Western market was realized by Scania after a close partnership was shaped. Although there are similarities, different problems exist in the cooperation with Lahden Autokori and Higer. Even if Lahden Autokori and Higer are both bus body suppliers for Scania’s coach products they are two companies of obvious differences. Aside from other aspects such as culture and geographical location, Higer, as the second largest bus producer in China, is a significantly bigger company than Lahden Autokori, a small Finnish family owned company. However, Scania’s attitude towards these partners with distinctively different power positions seems to be the same. In the cooperation with Higer Scania had to compromise and adjust, which was rarely the giant Scania’s way of doing things. The second theoretical field where inspiration for understanding the problems between Scania, Lahden Autokori and Higer is supply chain management.

Last but not least, Scania’s management structure towards Lahden Autokori differs significantly with Higer. The management of Lahden Autokori has been mainly done by the bus marketing and sales organization KB (Appendix 1), whilst much more functions and departments are involved in the cooperation with Higer. The reason could be traced back to

the mid-2000s when both collaborations started, and when there happened to be a reorganization within Scania's bus organization. KB, the initiator of both of the collaborations was heavily restructured. This coincidence created an even more complex situation. Some organizational identity issues within KB, raised by the reorganization, created distinctive managerial approaches for respectively Lahden Autokori and Higer. It is therefore of great interest to understand how the identity issues were created and thereafter, what the consequences have been for Scania's cooperation with Lahden Autokori and Higer. Therefore the third theoretical field from which we draw inspiration is organizational identity.

2.2 Aim of the study

There are three business areas within Scania bus operations, namely, bus chassis, complete city buses and complete coaches. This study will take Lahden Autokori and Higer as two cases, to study how Scania has produced complete coach products with the partners. Both the internal operations management and the external supply chain management strategies are identified to be the two most relevant aspects of the collaborations, with the assistance of an abductive method. Due to the heavy involvement and financial importance of the aftermarket service function YSR is the study focus when analyzing the current operations system. Furthermore, organizational identity issues caused by bus organization's restructure is the third identified study focus, due to the fact that these identity issues have left further impacts on current cooperation with Lahden Autokori and Higer. Some suggestions on improvement are to be made, but the goal is to mainly illuminate and analyze problems.

2.3 Studied questions

The object of this study is Scania bus operations on the higher level down to each involved function, with the aftermarket function as the focus. However, among all Scania's bus business areas the studied business area is only the complete coach products that are co-produced with Lahden Autokori and Higer. In this article, by "bus operations" we mean the operations for complete coach products.

As mentioned above, three study areas have been identified, namely Scania's internal operations management, external cooperation strategy and organizational identity issues. In order to understand problems existing in Scania's operations management, the differences between Scania coach operations and truck operations are to be identified, due to the fact that coach operations have been affiliated to truck. Based on the distinctiveness of coach

operations, the current operations (outsourcing) strategy is to be evaluated and the problems bedded in work processes and organization structures are to be analyzed. The understanding of the internal operations management serves as a foundation for the study of external cooperation with the two supplier partners. In order to evaluate Scania's external strategies towards Lahden Autokori and Higer, the type of Scania's buyer-supplier relationship with these partners should be firstly identified. Thereafter, based on the buyer-supplier relationship, and variant power positions of Lahden Autokori compared with Higer, Scania's managerial strategies towards these partners is to be analyzed and evaluated. Furthermore, the study on the reorganization and thereby organizational identity issues will reveal some of the managerial mysteries that have been silently influencing the collaborations.

The studied questions are as follows:

1. What problems have there been during the cooperation with Lahden Autokori and Higer, and why?
 - 1.1. What are the differences between coach and truck operations management and in what way has this affected the cooperation with Lahden Autokori and Higer?
 - 1.1.1. How has the current operations strategy working with Lahden Autokori and Higer been functioning?
 - 1.1.2. How have work processes towards Lahden Autokori and Higer been functioning and what went wrong?
 - 1.1.3. What influences does the current matrix organization structure have on the collaborations?
 - 1.2. How have the current supply chain management strategies for Lahden Autokori and Higer been functioning?
 - 1.2.1. What kind of buyer-supplier relationship does Scania have with Lahden Autokori and Higer?
 - 1.2.2. How has the distinctive power positions of Lahden Autokori and Higer affected the cooperation?
 - 1.3. How have the organizational identity issues developed and affected the collaborations?

2.4 Boundaries and limitations

This study focuses on Scania's cooperation with the two bus body partners, Lahden Autokori and Higer, and on the production of coaches. Therefore, although the coach operations are affiliated with truck, we chose to focus on the understanding of coach operations and processes during the collaborations. We chose to obtain a brief understanding of the truck operations and processes, mainly through documentation studies, to facilitate the understanding of the coach operations by seeing the differences.

Besides, the two bus body partners' experiences and opinions would allow a comprehensive understanding of the cooperation. But due to limited time and resource more in-depth studies on these two suppliers were not conducted. With a study focus on Scania the information on the partners, although limited, was sufficient enough. However, if there is further interest on concrete suggestions on how to develop operations management and cooperation strategy, more inputs from the suppliers are certainly needed.

3 Theory

In this part, the theoretical ground, based on which this study has been developed, is going to be introduced. Based on the fact that this study is of an abductive nature, theoretical studies have been leading the way of further empirical studies. Finally, the empirical studies will further elucidate current theories on the studied questions. Therefore, instead of a broad description of the relevant theoretical areas only the specific pieces of theories that will be utilized to analyze empirical studies, the two case studies of Scania bus, will be introduced.

The introduced theories will be of three themes, operations management, Supply Chain Management (SCM) and organizational identity. Operations management and Supply Chain Management are closely linked with each other, in the context of this study, due to the fact of the outsourcing strategy applied by Scania to produce the complete coach products. The organizational identity theory is chosen to interpret the impacts left by the reorganization within the bus organization on the collaborations. Although, there are certainly other theoretical areas that are of relevance to the obtained empirical material, the chosen three themes are considered to be of the best relevance and interests, for both the studied object, Scania operations for coach, and the academia.

The framework of operations management and Supply Chain Management follows a casual relation (Figure 1). Operations management is the ground for process management, and process management is the ground for organization design. Aligning with operations management, mass customization among automakers is to be introduced, due to the fact that Scania coach operations system is heavily characterized by a mass customization character; aligning with process management, novel models of supply chain to realize mass customization, Cox's power relation theory, as well as the Japanese keiretsu, are stated. The Cox's power relation theory and the Japanese keiretsu serve to interpret the buyer-supplier relations between Scania and Lahden Autokori and Scania and Higer, and thereafter, to discover sources of the managerial challenges that Scania has been experiencing.

While organizational identity is not a question that is directly linked to operations or SCM, it was one major influential factor on today's work processes with the partners. Organizational identity theory is therefore chosen to explain the reason for the internal disagreement within Scania bus organization.

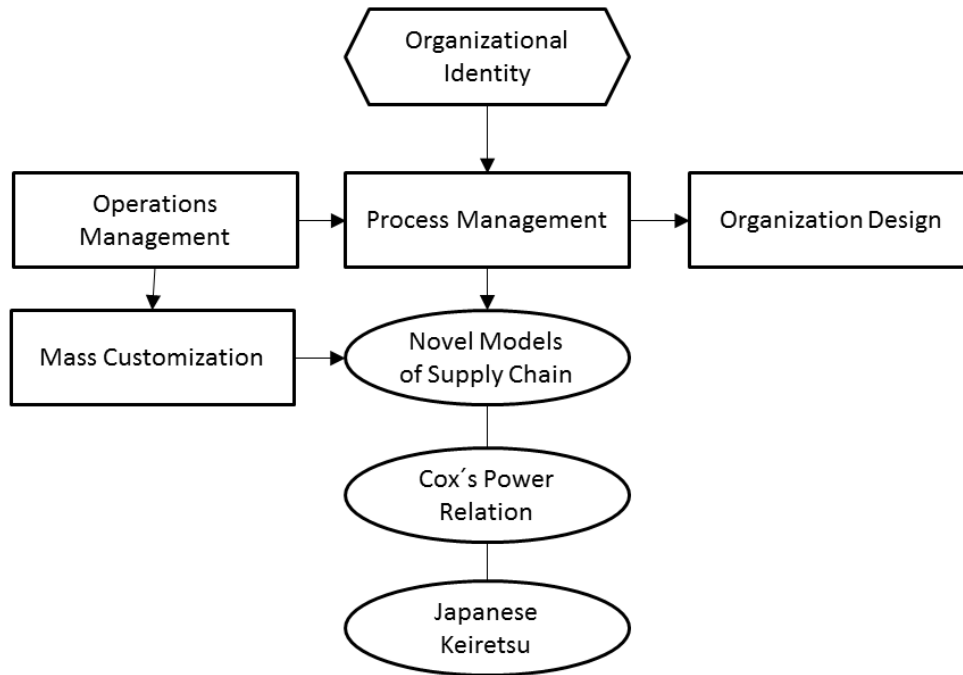


Figure 1 The theoretical framework

3.1 Operations management

The theories introduced in this section are applied when analyzing the empirical material, answering the stated studied questions:

1. What are the differences between coach and truck operations management and how has this affected the cooperation with Lahden Autokori and Higer?
 - 1.1. How has the current operations strategy working with Lahden Autokori and Higer been functioning?
 - 1.2. How have work processes towards Lahden Autokori and Higer been functioning and what went wrong?
 - 1.3. What influences does the current matrix organization structure have on the collaborations?

Three core functions are commonly applied by firms, namely the marketing function, the product/service development function and the operations function (Slack, et al., 2010:5). According to Slack, et al. (2010:4), **operations management** “is the activity of managing the resources that produce and deliver products and services”. Every organization that produces some kind of product/service has an operations function. The operations function is the function of production and delivery of products and services.

3.1.1 Operations processes

The actual realization of operations takes place through a combination of **processes**. A process is “an arrangement of resources that produce some mixture of products and services” (Slack, et al., 2010:15). The processes are the internal actors of an operation, and it is the network of processes that builds up an operation.

With the four dimensions of operations processes, presented below, we will analyze the differences between Scania's coach operations and truck operations

3.1.1.1 Four dimensions of operations processes

Operations processes differ, based on operations' outputs. There are four dimensions of operations processes, depending on their outputs, known as the four Vs (Figure 2) (Slack, et al., 2010:19):

- The volume of the output;
- The variety of the output;
- The variation in the demand for the output;
- The degree of visibility that customers have of the delivery of the output.

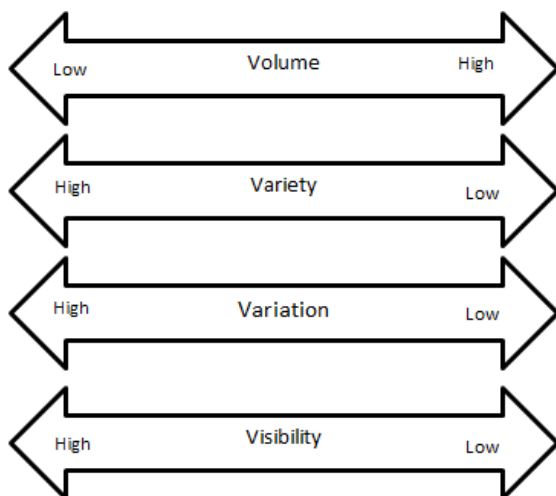


Figure 2 A typology of operations (Slack, et al., 2010:22)

3.1.1.1.1 The volume dimension

A large volume oriented operation process is characterized by repeatability of the tasks and the systematization of the work. There are standard procedures with concrete specifications of how each part of the job should be done. Because of the large volume and repeatability, specialized machineries are made for the work process. All these factors give low unit costs. On the other hand, small volume means lower repetition and fewer staff. Therefore, each of

the staff is likely to perform a wider range of tasks. This is less open to systematization and less feasible to invite specialized machineries. So the cost per product is likely to be higher. (Slack, et al., 2010:19)

3.1.1.1.2 The variety dimension

A prerequisite for variety is flexibility. A more customized product/service will require flexibility from the operation, whilst a less customized product/service is characterized by standardization and regularity, which results in lower costs compared with the former. (Slack, et al., 2010:20)

3.1.1.1.3 The variation dimension

The variation of demand from the market is one dimension that should be considered. If the demand varies with time or season or other factors, the operation must change its capacity in some way. Therefore, costs will likely be higher, considering for example, recruitment costs and overtime cost. On the other hand, if the demand is relatively stable, activities can be planned in advance that leads to routines, a high utilization of resources and as a result, unit costs are likely to be lower. (Slack, et al., 2010:20)

3.1.1.1.4 The visibility dimension

The visibility of an operation is how much of the operation's activities the customers experience. A physical store, for example, is much more exposed to its customers than a web-based operation. Customers of a high-visibility operation will have short waiting tolerance, and the staff is supposed to have good customer contact skills. A low-visibility operation expects less customer contact and therefore allows more standardized processes, and high staff utilization. Furthermore, some operations might be a mixture of high- and low-visibility processes, depending on the need of exposure to the customers. (Slack, et al., 2010:20)

3.1.2 Process design

Once the operations strategy is clear, processes to realize the goals from products/services are to be designed. The **design of processes** is to deliver solutions based on the objectives of the operations (Slack, et al., 2010:87). Operations objectives are generally quality, speed, dependability, cost and flexibility (Slack, et al., 2010:40).

With these five aspects we will analyze the problems existing in current work processes. With the five aspects we will analyze the problems within process design towards Lahden Autokori and Higer.

Quality, except for its obvious influence on customer satisfaction, has other meanings inside of the operation. First of all, quality reduces costs (Slack, et al., 2010:40). Because high quality of deliveries by each process reduces the need to correct mistakes and it also reduces confusion and irritation. Besides, good quality enables a fluent work flow that is a prerequisite of a stable and efficient process (Slack, et al., 2010:40).

Speed, for the customers, means the time needed from ordering to receiving the product/service. However, inside the operation, speedy processes enable fast response to external customers. Speed reduces inventories and risks. (Slack, et al., 2010:42)

Dependability is “doing things in time for customers to receive their goods or services exactly when they are needed” (Slack, et al., 2010:44). Besides, there is another dimension of dependability within an operation. Dependability inside an operation means “how reliable the processes are in delivering material or information on time” (Slack, et al., 2010:45), if each process is supplier and customer of others.

While cost objective is a common concern of operations due to obvious reasons, the flexibility objective is becoming essential for more and more operations. The flexibility objective will be introduced in upcoming part.

Processes design should, when all products and services can be created, reflect process objectives (Slack, et al., 2010:89). Slack et al. meant that: “The whole point of process design is to make sure that the performance of the process is appropriate for whatever it is trying to achieve.” (2010:88) For example, if an operation is dominated by demand of short delivery time, its processes should be designed to give fast throughput times.

3.1.3 Organization design

Once the process design is made, **organization design** will follow, to define an “organization structure” where tasks and responsibilities are divided and coordinated (Slack, et al., 2010:238). With organization design theory problems existing in the collaborations regarding Scania’s current organization structure will be analyzed.

Within an organization, resources can be managed and categorized in different ways, while the lines of responsibility that link the resource clusters can be grouped in different ways (Slack, et al., 2010:240). Although there might be infinite number of organizational structures,

there are pure forms of organization design, namely the U-form organization, the M-form organization, Matrix forms and N-form organization (Figure 3).

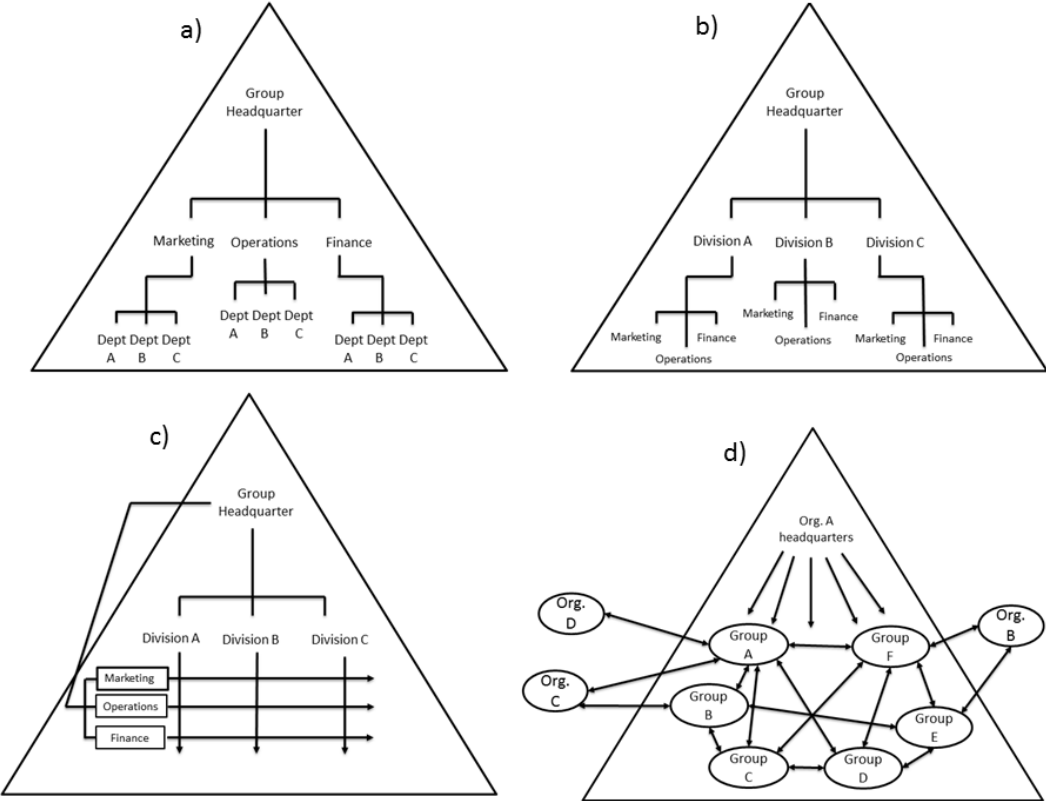


Figure 3 a) U-form, b) M-form, c) matrix form, d) N-form

The U -form organization groups its resources by their functional purpose, in different levels (Slack, et al., 2010:240). M-form organization clusters together the resources needed for either each product, or each market, in separate divisions, where different functions exist. This kind of organization design is usually applied by big organizations with complex products or markets (Slack, et al., 2010:241). Matrix forms are a hybrid of M-form and U-form. Both M-form and U-form exist in a matrix structure, and each resource group has at least two lines of authority (Slack, et al., 2010:241). The “N” in N-form stands for “network”, is a way to group resources that each cluster of resources is linked to others to form a network. The relationships between clusters might change over time, depending on changes of needs (Slack, et al., 2010:241).

3.1.4 Operations flexibility and mass customization

Among objectives such as quality, speed, dependability and cost, an operation’s flexibility has become a more and more explored aspect both of organizations and the scholars (Slack, et al., 2010:40). According to Slack, et al. (2010:46), an operation’s flexibility means “being able to

change the operation in some way”. High flexibility allows the possibility to produce a high variety of products or services. The higher demand of an operation’s flexibility is largely due to the trend from the market, that the customers become more and more attracted to tailored “individual” products/services (McCutcheon et al., 1994). These products/services are not necessarily to be exclusively of small amount and high prices anymore, but somehow can be done in a mass production manner with relatively low costs. How can the demand of high variety and low cost be realized by organizations, such as Scania, to produce coach products? The answer is “mass customization”.

Mass customization, as discussed above, is the capability to produce customized products/services for each customer, while the company manages to apply the mass-production manner to produce in a high-volume so as to keep costs down (Slack, et al., 2010:47). However, while how “high” the volume should be cannot be easily defined, the trade-off between variety and costs seems to be the key when defining mass customization. Pine’s definition of mass customization, which is focusing on its customer-orientation, is the operation system to “develop, produce, market and distribute goods and services with such variety that nearly everyone finds exactly what they want at a price they can afford” (Pine, 1993:24). Moreover, except for the trade-off between variety and costs, a third dimension, lead time, is mentioned by other studies. According to Brabazon, et al. (2010), key requirements for achieving mass customization are the capabilities to enable high levels of product variety and to keep delivery lead times acceptable. Trade-offs while reaching a mass customized operational system exist among the level of offered *customization*, *manufacturing costs* and *delivery lead times* (Squire et al., 2006).

Today, more and more automotive manufacturers are exploring a mass customization operations approach, aiming to provide nearly every customer what they want. However, automotive industry is traditionally dominated by lean production that aims to cut cost and eliminate waste by comprehensive standardization. To meet the needs from every customer by realizing “made-to-order” according to each customer’s specification is certainly a challenge for this traditional mass production system. Besides, from mass production to “high-variety-low-volume” production, the conventional production development approaches as well as supply chain management are challenged. How can the traditional lean mass production system enable mass customization? Attempts and experiments are made by automakers and some experiences are going to be presented in the following texts.

3.1.5 Mass customization in automotive industry

To enable mass customization, three major strategies are commonly applied by automakers: product design, information systems and process design and management (Brabazon, et al., 2010). By introducing these approaches Scania's current outsourcing strategy to realize mass customization for coach products will be discussed later.

3.1.5.1 Product design

Customization is the realization of differences among products. This demand for variety will lead to a serious problem of part proliferation that the numbers of distinct spare parts that the company must purchase or fabricate largely increase (Child et al., 1991). Design variation can lead to serious inefficiencies not only in manufacturing, but also in many support functions such as inventory control and purchasing (Vakharia et al., 1996).

Design for mass customization is the realization of product variety with cost-efficient design solutions at the early stage of product development process (Tseng and Jiao, 2001). The solution is to, instead of designing individual products, design a product family, where a common platform can be utilized. Modular product architectures (Ulrich and Tung, 1991) and components commonality (Jiao and Tseng, 2000; Duray, et al., 2000) are foundations. Commonality can be defined as "a measure of the number of common components in a system relative to the total number of components in the system" (Jiao and Tseng, 2000:226; see also Thomas, 1992). The principle of design for mass customization is to provide variety and speed by establishing as much standardization and commonality as possible by product design. By increasing product design commonality, the problem of increased part proliferation can be solved (Jiao and Tseng, 2000).

A module refers to "a physical or conceptual grouping of components that share some characteristics" (Jiao, Simpson and Siddique, 2007:5). Modularity is "to separate a system into independent parts or modules that can be treated as logical units" (Jiao, Simpson and Siddique, 2007:5). By unifying interfaces among modules, modularity makes it possible for a number of standard parts to be combined in numerous ways (Ulrich and Tung, 1991) (Figure 4). However, increased modularity can lead to increased assembly cost. Therefore, the balance between commonality and modularity should be kept.

Components commonality is to realize variety by developing common components which can be architectures, parts or sub-system that can be used by new products, usually across the

product family (Jiao and Tseng, 2000). Product family architecture (PFA), that “aims at presenting a generic architecture to capture and utilize commonality” (Jiao and Tseng, 2000:226), allows new designs to be based on a common product line structure.

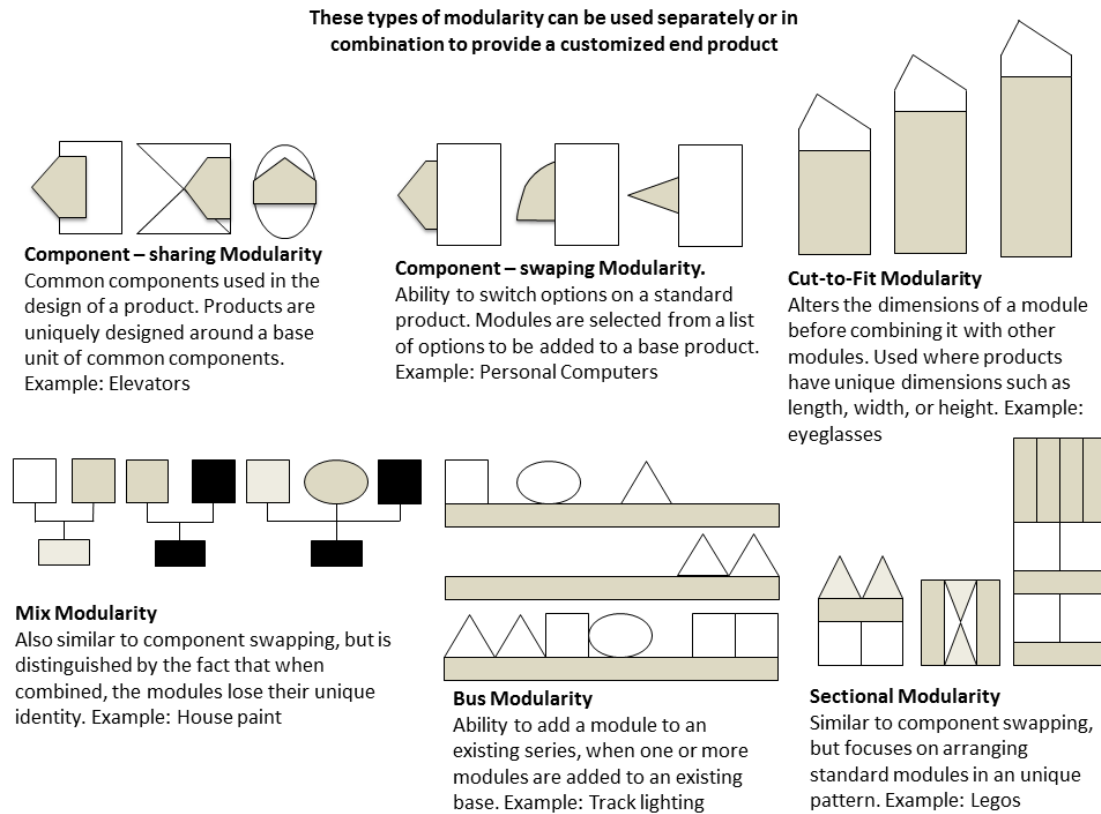


Figure 4 Modularity types (Ulrich and Tung, 1991)

The modularity and common components approaches are usually integrated into product platform based development approach. Product platform is “a set of subsystems and interfaces developed to form a common structure from which a stream of derivative products can be efficiently developed and produced” (Meyer et al., 1997:12). Common platforms are one approach for automakers to reduce investment in the later stage such as body fabrication and other exterior styling. One example is the Ford Puma, which was a product targeting a niche market. That was produced based on the Fiesta platform - a high-volume vehicle, in 17 months (Alford et al., 2000). Volkswagen is another example that uses common platform to produce several models (Mikkola and Skjøtt-Larsen, 2004).

3.1.5.2 *Information systems*

Masses of data are a result of the desire to provide extensive choice. Especially for automotive industry, the introduction of electrical and electronic (E/E) systems has dramatically influenced the develop process (Müller, et al., 2006). Consequently, the amount

of information to be processed has become huge. One example is that, in a modern car, there are up to 70 electrical control units that consist more than 10.000.000 lines of code (Knippel E. and Schulz A., 2004). Information systems are transforming product development process (Alford, et al., 2000). Information systems allow information on product design available, so that variations and networked systems can be managed and traced (Müller, et al., 2006). By this means, component commonality, modularity and platform design can be realized (Alford, et al., 2000). Furthermore, communication and information exchanges among departments, teams and even external suppliers that participate in the product development processes can be facilitated by IT systems. By applying IT systems, resources and expertise can be combined and managed among design teams. This approach, by managing data and data flow, helps to reduce time to market and even development costs (Müller, et al., 2006; Alford, et al., 2000). The complexity of information management is demonstrated by Figure 5.

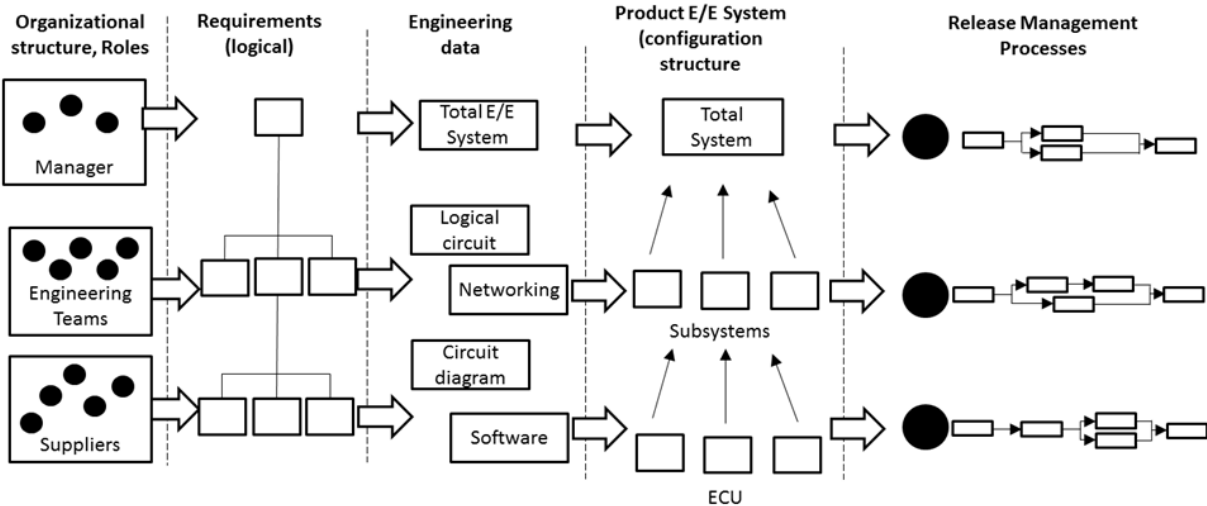


Figure 5 E/E development with highly linked organizational structures, requirements, documents, product structures and processes (Rouibah and Caskey, 2003)

3.1.5.3 Process design and management

3.1.5.3.1 Virtual-Build-to-Order (VBTO)

One approach to realize mass customization by process management is known as “Virtual-Build-to-Order” (VBTO) in which the “array of cars already in existence, including vehicles on dealer’s storage, in transit, on assembly lines, and scheduled for production” is available to customers (Agrawal et al., 2001). The essence of VBTO is that, all products, from the ones that are planned to be produced, to the ones that are under manufacturing, and finally to the ones that are finished, are all “open to view” (Brabazon, MacCarthy and Woodcock, 2010). The fulfillment strategies are identified as two, locate-to-order, where a suitable vehicle is

sought across the dealer network, and amend-to-order, where the specification of a vehicle in production is modified to meet the requirements of a customer (Holweg and Pil, 2001).

3.1.5.3.2 Delaying differentiation

Delayed product differentiation strategy is widely used by industries to meet the need from product variety on operational performance (Forza, et al., 2008). According to Alderson (1950), the principle to postpone differentiation is to invite changes in form and identity at the latest possible point in the production flow. Therefore, the process and assemblies are the same for the products up to the point of differentiation. The postponement of differentiation is rooted in commonality and modularity of product architecture designs and an effective supply chain management (Mikkola and Skjøtt-Larsen, 2004). Figure 6 illustrates a configuration with differentiation.

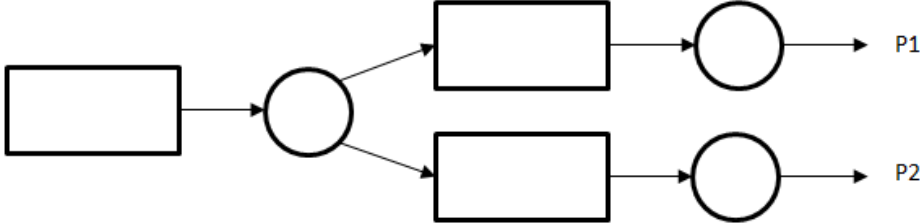


Figure 6 Configuration with differentiation (Hu, 2013 in Tseng, Hu and Wang)

3.1.5.3.3 New models of supply chain

The last aspect includes innovative models of supply chain management (Alford, et al., 2000; Salvador, Rungtusanatham and Forza, 2004). The integration of suppliers into the product development as well as the production process is a common practice utilized by automakers (Alford, et al., 2000; Salvador, Rungtusanatham and Forza, 2004). Facilitated by modular design, automakers explore the supply chain for solutions to the growing complexity in production processes (Baldwin and Clark, 1997). Suppliers, in contrast to being traditionally selling parts, start to be responsible of the delivery of systems and even modules for the automakers (Kamath and Liker, 1994).

3.2 Supply Chain Management

This part will focus on theories and practices within Supply Chain Management. An overview of how supply chain is utilized to enable mass customization in automotive industry is made. Moreover, how supply chain can be managed based on a power relations view, and finally the Japanese keiretsu model, are introduced.

The theories that will be introduced in this section will be applied when analyzing the empirical material, to answer these stated studied questions:

1. How has the current management strategies for Lahden Autokori and Higer been functioning?
 - 1.1. What kind of buyer-supplier relationship does Scania have with Lahden Autokori and Higer?
 - 1.2. How has the distinctive power positions of Lahden Autokori and Higer affected the cooperation?

Handfield and Nichols (2002:8) define **Supply Chain** as follows: “The Supply Chain encompasses all organizations and activities associated with the flow and transformation of goods from the raw materials stage, through to the end user, as well as the associated information flows.” Material and information flows both up and down the supply chain (Figure 7).

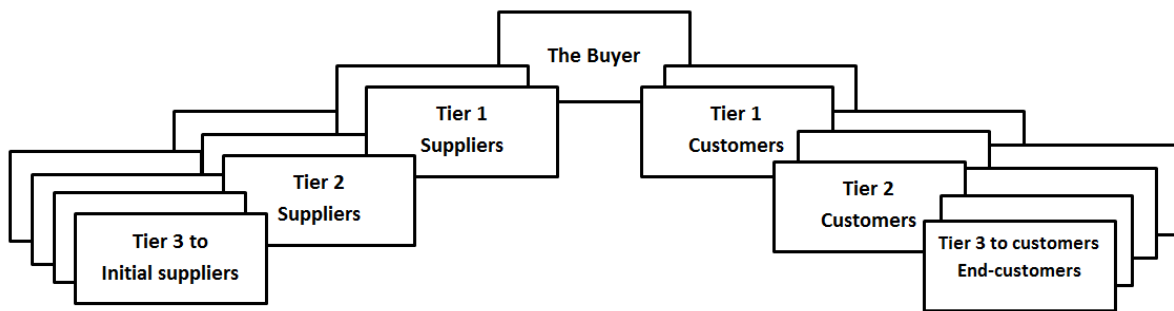


Figure 7 Example of a supply chain (Jespersen and Skjøtt-Larsen, 2005)

Jespersen and Skjøtt-Larsen (2005:12) defined **Supply Chain Management (SCM)** as “the management of relations and integrated business processes across the supply chain that produces products, services and information that add value for the end customer”. The focus of SCM is relationship and process management among the buyer, the suppliers and the customers. Compared with logistics, which is typically to make “logistics system more efficient through internal and external planning and control” (Jespersen and Skjøtt-Larsen, 2005:14).

Regarding the scope of management through the supply chain, Jespersen and Skjøtt-Larsen (2005:14) meant that businesses in a supply chain do not have to involve all players in the supply chain but between the buyer and its key suppliers and customers. They stated that: “Rarely is supplier cooperation expanded to include the vendor’s suppliers or the customer’s

customers.” (Jespersen and Skjøtt-Larsen 2005:14) To interpret Jespersen and Skjøtt-Larsen, SCM is not necessarily the management of the complete supply chain, which is all the suppliers and customers of different tiers, but can also be only focused on the buyer and the first tier suppliers and customers. Jespersen and Skjøtt-Larsen emphasized that, however rarely, the complete supply chain management type, still exists, typically within the automotive industry. In the automotive industry, there is, in many cases, hierarchic supplier cooperation, where the automakers cooperate with a number of first tier suppliers, while each of the first tier suppliers is responsible for cooperating with a number of second tier suppliers, who are in turn responsible for cooperation with their vendors of a lower level within the supply chain (2005:14).

In fact, the complete SCM model exists typically in Japan, as the Japanese keiretsu (to be introduced further on in the text) (Cox, 2004; Liker and Choi 2004). Inspired by Japanese keiretsu, Cox (2004:350) defined SCM as “a sourcing technique that involves the buyer undertaking proactive supplier development work, not only at the first-tier of the supply chain but also at all stages in the supply chain from first-tier through to raw material supply”. Cox’s understanding of SCM is more of a network view, where the suppliers’ suppliers (sub-tiers) are to be included while managing a supply chain.

In this article, the definition used is the “general” version of SCM, where the buyer is to manage the relationship and work process with the first tier suppliers. However, in the following text, Cox’s view on power relations within supply chain will be introduced, where his “complete” view of SCM, that is the management of vendors of different levels, is used.

3.2.1 Mass customization by new supply chain management models

When the variety demand from the customers stretches beyond the boundaries of the company’s value chain, supply chain is usually the solution for meeting the challenge of mass customization (Salvador, Rungtusanatham and Forza, 2004).

By different involvement in the assembly process, suppliers usually can be differed in four catalogues, as remote suppliers, dispersed suppliers, system suppliers and modular consortia (Alford, et al., 2000). Instead of purchasing parts and small components, automakers cooperate with suppliers on a higher level today. Due to the complexity of the outsourced system or module, system suppliers and modular consortia are the vendors that the automotive

manufacturers need to work tightly with (Alford, et al., 2000). As a result, close partnership is to be created to ensure the cooperation (Alford, et al., 2000).

The choice of supplier relations is based on combined factors such as total manufacturing costs, the retention of control and the devolution of risk to suppliers. While a perfect balance can be achieved, there are risks that the buyer would bear once the balance is lost. By inviting suppliers into the product development process, the core competencies and balance of power with suppliers can be intimidated. Moreover, suppliers, by receiving assembly responsibilities, must learn to manage a larger and more complex supply chain. Although risks seem to have been transferred from the buyer to the supplier, the buyer has little to influence when any failure from the supplier will finally lead to negative impact on the buyer itself (Alford, et al., 2000).

3.2.2 Cox’s power relation view

The involvement and choice of type of suppliers depend largely on the need from the manufacturing process. Once a buyer has made the decision to outsource production to suppliers, the question followed is: “How to effectively manage the supply chain?” There is a group of scholars suggest that the approach of managing suppliers should be various, and should be based on the power relations between the buyer and the supplier (Cox et al., 2001; Ramsay, 1994). This power relation view will be applied later in the analysis of the relationship between Scania and the two partners Lahden Autokori and Higer.

Focus of buyer relationship with the supplier	Proactive	Supplier development	Supply Chain management
	Reactive	Supplier selection	Supply Chain sourcing
		First Tier	Supply Chain
		Level of work scope with supplier and supply chain	

Cox, et al. (Cox et al., 2003:5; Cox, 2004), developed four basic sourcing approaches, based on the level of involvement that buyers have with suppliers, namely reactive and proactive, as well as the degree of buyers’ involvement with suppliers in the innovation process, namely first-tier or within the supply chain. These are shown in Figure 8.

Figure 8 Level of involvement (Cox et al. 2003:5)

In the reactive relations, which are supplier selection and supply chain sourcing, where buyers keep the suppliers at arm's length. The only difference between supplier selection and supply chain sourcing is the involvement of the buyer in the first-tier's supplier relation. For supply chain sourcing, the buyer select not just the first tier, but from tiers of all levels. But, the sourcing activity, for both approaches, is based on, instead of a long-term agreement, a relatively short-term contract. The buyers select from the available suppliers "on the basis of the currently perceive best trade-offs between functionality and price" (Cox, 2004:349). Buyers' involvement in the suppliers' innovation process is very low if not none.

Supplier development and supply chain management are proactive ways of management supplier. As mentioned earlier, Cox (2004) defined supply chain management as the management of the complete network, not only the first tier suppliers but even the sub-tiers. When a buyer reacts proactively, the relationship with the supplier becomes usually long-term and highly collaborative. It becomes a joint effort from both the buyer and the supplier to create new products. Trust is needed for the partners to provide better transparency over costs and production techniques.

Cox (2004) meant that, the Japanese automakers' way of managing their suppliers is a typical example of the proactive "supply chain management" model. In contrast with the believers of a universal feasibility of the Japanese model, Cox et al. (2001) argue that the applicability of the Japanese automakers' management style is for one thing very bond to the automotive industry, for another, it represents only one type of various supplier-buyer power relations. These scholars believe that, the Japanese model only works "when the buyer has a high level of dominance over suppliers who have to pass value to the buyer, and often while making only low returns" (Cox, 2004:348).

However, there is a challenge for taking a proactive approach – the transaction costs for developing the closer relationship is much higher. In the case of establishing a proactive relationship with the supply chain, which is what the Japanese automakers such as Toyota and Honda usually do, the benefit is a comprehensive innovative chain that brings constant innovation on technology and cost, but the investment to establish and to maintain such an innovative network is very high (Cox, 2004). It becomes, therefore, a problem for companies that are not capable of such a huge investment to undertake the work. Besides, it is shown by research (Cox et al., 2000, 2003) that, a proactive approach, that is supplier development and supply chain management, works best when buyers have dominance over the supplier, or

there is an interdependency between them. The power relation between a buyer and supplier is therefore another re-requisition for achieving a proactive supplier relationship.

Beside of the choices of a buyer-supplier relationship, Cox (2004), also suggested management styles that should be applied based on the nature of a buyer-supplier relationship. To understand how to choose a proper management style it is necessary to also understand the commercial intent of the two parties. Cox (2004) suggested two types of commercial intentions, adversarial value appropriation and non-adversarial value appropriation. An adversarial value appropriation is that, according to Cox (2004:353), “the buyer or supplier is primarily interested in maximizing their share of value from the relationship at the expense of the other side”; while a non-adversarial value appropriation is that “the intention of the buyer or supplier is to provide open and transparent commercial information about profit margins and the costs of operations, such that any improvements can be shared relatively equally”.

Cox (2004) argued that, many firms failed to manage their suppliers, because they misjudged both the internal and external power circumstances and chose inappropriate relationship management styles. He, therefore, developed a comprehensive guide-map, taking consideration of both the internal and external power circumstances, for firms to identify their power position in a relationship, and thereafter, to choose the most appropriate management style. The complete roadmap can be found in Cox’s research article (Cox, 2004). Due to the relevance to this study, the suggested management styles only for supply management and supply chain management are going to be presented in Table 1.

Table 1 Comprehensive guide-map (Cox, 2003)

SUPPLIER DEVELOPMENT	BUYER DOMINANCE (>)	Buyer Adversarial Collaboration/Supplier Non-Adversarial Collaboration
	INDEPENDENCE (0)	Not Applicable
	INTERDEPENDENCE (=)	Buyer and Supplier Non Adversarial Collaboration
	SUPPLIER DOMINANCE (<)	Buyer Non-Adversarial Collaboration/Supplier Adversarial Collaboration
SUPPLY CHAIN MANAGEMENT	BUYER DOMINANCE (>)	Buyer Adversarial Collaboration/Supplier Non-Adversarial Collaboration
	INDEPENDENCE (0)	Not Applicable
	INTERDEPENDENCE (=)	Buyer and Supplier Non Adversarial Collaboration
	SUPPLIER DOMINANCE (<)	Buyer Non-Adversarial Collaboration/Supplier Adversarial Collaboration

3.2.3 The Japanese keiretsu

Supplier management is widely studied by the academia. Two distinctive models have been developed respectively among the American automakers and the Japanese automakers. American automakers, in fact, as typically the “Western style”, usually keep their suppliers at arm’s-length. The relation is based on contractual clarity. The Japanese model, the Japanese keiretsu (to be described in the coming texts) is “based on trust and goodwill” (Aoki and Lennerfors, 2013). While the advantages of the Japanese keiretsu are widely accepted by both the academia and the automotive industry, there are wonderings and doubts on the applicability of keiretsu. Firms wonder if keiretsu is the best practice of all. And if a keiretsu model is to be achieved, what should be done? In this part, the management strategy regarding close supplier partners, the Japanese keiretsu model, is introduced. The characteristics of the Japanese model are described and suggestions conducted by academic researches on how to achieve a keiretsu way are stated.

Keiretsu is a Japanese word that means “series”, “is seen as a thoroughly Japanese form of business practice, involving long-term relationships between firms” (Aoki and Lennerfors, 2012:1). The keiretsu way of managing suppliers, the Japanese model, is “based on trust and goodwill” (Aoki and Lennerfors, 2013:110). Keiretsu is described as “close-knit networks of vendors that continuously learn, improve, and prosper along with their parent companies” by Liker and Choi (2004:25).

The American automakers, after attending to adopt the keiretsu model after the quality movement at the 1980s but failed, questioned the possibility to replicate the model in another culture than Japan (Liker and Choi, 2004). Liker and Choi (2004:27), by studying Toyota and Honda’s business plants in North America, argued that “the Japanese supplier-partnering model is alive”, not only in Japan but also in North America. This study showed that, these two Japanese automakers have built up keiretsu across Canada, America and Mexico, even with the same suppliers that have been closely working with the Big Three (General Motors, Ford, and Chrysler). Toyota and Honda were selected as the most preferred companies to work with according to *Planning Perspective* in 2003 (Liker and Choi, 2004), after Benchmark of 17 categories, from trust to perceived opportunity. Nissan, another Japanese automaker was as the third, followed by Chrysler, Ford and GM (Liker and Choi, 2004). Studies show that, Toyota and Honda, by effectively managing their suppliers, not only far exceeded their American rivals in new product launch rate (12 to 18 months compared with

two to three years by US automakers), but successfully decreased the manufacturing costs (Liker and Choi, 2004).

In fact, the Japanese automakers are considered to be tough partners by their American vendors (Liker and Choi, 2004), because they have very high standards and expectations. However, the Japanese automakers want to maximize their profits, not at the expense of their vendors, but by helping them reaching the high expectations.

How exactly does the keiretsu way lead the Japanese automakers to success? Scholars have been trying to find out the answer. First of all, they study their suppliers and try to learn as much as they can about their suppliers. It takes time in the beginning, but a better understanding as the foundation for partnerships is valuable in a long time perspective (Liker and Choi, 2004). Besides, not like their Western rivals that base the target price on nothing, the Japanese automotive manufacturers encourage their suppliers to cut cost and would even share the benefits if cost cutting is achieved (Aoki and Lennerfors, 2013). The Japanese automakers consider their suppliers as a most important resource of the companies’.

They educate their suppliers, help the suppliers to meet the demands, to find and correct errors, and ask the suppliers to do their best to meet deadlines. Honda, for example, would commit 13 weeks at the supplier’s plant to its development program, helping the supplier, among other things; develop a model production line in the supplier’s factory (Liker and Choi, 2004). Liker and Choi’s study (2004:45) showed that Honda’s development program “has increased suppliers’ productivity by about 50%, improved quality by 30%, and reduced costs by 7%”. However, as in return, the suppliers have to share half of the cost saving with Honda. Moreover, the Japanese automakers encourage their suppliers to enhance their innovation capabilities, invest heavily to improve the first-tier vendors’ ability to develop products (Liker and Choi, 2004; Aoki and Lennerfors, 2013).

3.3 Identity

The theories that will be introduced in this section will be applied when analyzing the empirical material, to answer the last stated studied question:

1. How have the organizational identity issues developed and affected the collaborations?

3.3.1 Social Identity Theory (SIT)

Social identity theory (SIT) serves as a platform from what other kinds of identity theories developed, such as organizational identity. To understand how identity exists and affects the daily operations within an organization, social identity theory is to be firstly introduced.

Identity, simply, is the answer of the question “Who am I?” One’s social identity is the answer of “Who am I” based on her social involvement with others. The concept of social identity was first introduced by Tajfel as “the individual’s knowledge that he belongs to certain social groups together with some emotional and value significance to him of this group membership” (1972:292) The social identity of a person is the tendency to classify herself and others into different kinds of social categories, such as gender, race, religious affiliation, age group and organizational membership, etc. (Tajfel and Turner, 1985). Social identity exists by the demand of people to classify others or themselves. According to Ashforth and Mael (1989:21), firstly, social classification serves as “a systematic means of defining others”, and secondly, social classification “enables the individual to locate or define him- or herself in social environment”. By differing people from each other, similarities are created among people. These similarities form groups of people that share the same identities. Therefore, social identity rests on intergroup comparisons, that means, by comparing ingroup with outgroup, people confirm their distinctiveness from others (Turner, 1975). Typically, the distinctiveness positively affects ingroup members’ self-esteem (Hogg and Turner, 1985).

3.3.2 Organizational identity

Social identity gives suggestions on why people behave differently, also in the context of organizational behavior. Organizational identification is one form of social identification, because the belonging to an organization is one of the answers for the above mentioned question “Who am I?” (Ashforth and Mael, 1989). An individual’s organizational identity comes from “the attraction and the desire to maintain an emotionally satisfying, self-defining relationship with the organization” (O’Reilly and Chatman 1986:497). Similarly, Tompkins (2005) argued that there is a great connection between identification and commitment to the

organization. This creates positive outcomes for work attitudes and behaviors in, for example, job performance and satisfaction, motivation, individual decision making, and interaction among employees. Organizational identity, therefore, can positively enhance the effectiveness, the productivity and also the profit (Tompkins, 2005).

3.3.2.1 *Subunit identity*

However, an individual's organizational identity is usually strongly linked to the subunit, the department or group that the individual works with. One might wonder, why out of kinds of identities, from organizational level, to department, to section and finally to the group, one identities herself with one unit much more strongly than others? The question has been attempted to be answered by scholars. According to the "identity work" theories, managerial approaches can shape stronger identity within a unit (Watson, 2008). On the other hand, there are evidences on how shared experiences of events contribute to a strong shared identity of a group (Lennerfors, 2013).

It is true that, within an organization, there are diverse group identities, whose existence is inevitable. Based on the nature of social identification, where people tend to compare with each other, and groups, by comparing with other groups, seek positive differences (Turner, 1975), it is natural to explain intergroup disagreement based on the fact that groups exist (Tajfel, 1982). In organizations, due to the existence of groups, either based on work relations or other factors such as gender and ethnic groups, there are comparisons, and rather often, competitions. Studies suggest that in order to establish a positive difference, groups would be willing to sacrifice financial gains that are to be brought by negative comparison with outgroups (Brewer and Silver, 1978; Turner, Brown and Tajfel, 1979). Other studies also suggested that group members prefer information that emphasizes intergroup differences than similarities (Wilder, 1981; Wilder and Allen, 1978). The subunit identification and differentiation in organizations are, among other factors, the primary reasons for intergroup disagreements.

3.3.2.2 *Merger and acquisition*

Except for subunit identities, another case that leads to identity deviations within an organization is the merging of two firms or the acquisition of one firm by another. Merger and acquisition is not simply to be the "physical" fusion of two companies, but also ideally the "psychological" and "emotional" unification. However, case studies show that it has been the major challenge after a merger or an acquisition for firms to integrate their identities. Some

mergers failed because the “us” and “them” dynamics prevailed and the employees did not abandon their old identities (Blake and Mounton, 1985; Buono and Bowditch, 1989). In fact, similar phenomena were observed even in case of group mergers within an organization, where the ingroup and outgroup biases existed (Haunschild, et al., 1994).

“Subject belief structures” are applied to predict the success of a merger by social identity theorists (Tajfel and Turner, 1979; Ellemers, 1993). It is believed that, the behaviors adopted by group members “to pursue self-enhancement through positive social identity” are influenced by the “beliefs about the nature of relations between the ingroup and relevant outgroups” (Hogg and Terry, 2000). According to this theory, the belief held by the organization of lower-status is vital for the success of a merger. If the firm of lower-status believes that this position is stable and legitimate, and is willing to acquire an identity as a member of the more prestigious firm, it is unlikely that these two organizations will exist in a competing status. Instead, members of the less-prestigious organization will develop identification with the new, merged organization, by gaining psychological entry to the prestigious one. However, if the lower-status is not accepted and believed to be unstable and illegitimate, and if it is believed that a different interorganizational status is achievable, interorganizational competitions will be developed. Furthermore, the members of the higher-status organization tend to respond negatively to the permeable boundaries between the two merged organizations, because these boundaries are threatening to the prestigious status they enjoy (Hogg and Terry, 2000).

3.3.3 Managing diverse subunit identities

The existence of diverse subunit identities is natural and inevitable (Huo et al., 2005; Peters et al., 2012). While subunit identity is an important motivation for a cohesive team work (McShane and Von Glinow, 2008), it is also the core of intergroup conflicts in organizations (Fiol, Pratt and O’Connor, 2009). While problems might be interests and resources related, many are also “characterized by tensions stemming from differences in how groups fundamentally define themselves and from threats to those self-definitions” (Fiol, Pratt and O’Connor, 2009:32). In understanding persistently negative intergroup interactions in organizations, the importance of identity dynamics has become clear (O’Connor, Fiol and Guthrie, 2006). Researchers have found that, when identities are involved, the conflict tends to be intensified, by becoming long-lasting and encompassing increased number of issues (Rothman, 1997; Rouhana and Bar-Tal, 1998). The reason was interpreted by Rothman

(1997:5) as, “When people’s essential identities, as expressed and maintained by their primary group affiliations, are threatened or frustrated, intransigent conflicts almost inevitably follow.” Negative interactions among groups triggered by identity issues can change members’ motivation of behavior. That can lead to costly errors, ineffective communication and learning processes and even creativity can suffer (Friedman and Davidson, 1999; Williams and O’Reilly, 1998).

Managerial approaches to establish intergroup harmony have been studied by the scholars. The key role of leaders in managing intergroup relations has been widely argued (Huo, et al., 2005; Fiol, Pratt and O’Connor, 2009; Peters, et al., 2012). Studies show that, neither by totally neglecting subunit identities nor by overly emphasizing the differences will contribute a better intergroup relation (Huo, et al., 2005; Peters, et al., 2012). Huo, et al. (2005:241), by conducting two case studies, stated that: “Concerns about treatment quality seem to rest on a middle-of-the-road solution that calls out for a balance between reminding members of different subgroups of a group membership they share while respecting that there are legitimate differences that distinguish them.” Later, the pursuit of “best practice” was taken on by other researchers, and some models of managerial solutions were suggested.

It seems that, all the solutions are based on one fundamental approach – to achieve a shared understanding of diverse identities. Because, as Northrup argued, “if change occurs in the identities of at least one of the parties, the chances for long-term change are greatly increased” (1989:78). Once understanding and acceptance of the other identity are achieved, there is the chance for the parties to mutually form a shared superordinate identity that finally will allow harmony and coexistence. However, the coexistence is in the condition of “dual identities”, where people understand the fact that they are both similar to and different from members from the other subunits (Fiol, Pratt and O’Connor, 2009; Hornsey and Hogg, 2000). In order to start the process of acceptance, it is important to disrupt the process of “mutual disidentification” (Fiol, Pratt and O’Connor, 2009). “Disidentification” can be simply understood as “defining who one is based on who one is not” (Fiol, Pratt and O’Connor, 2009:34; Elsbach, 1999). When a mutual disidentification is achieved, the parties tend to see the ingroup as the opposite of the outgroup, where they “ignore the potential plurality of outgroup members’ identities” (Fiol, Pratt and O’Connor, 2009:34). Therefore, a mutual disidentification is the key for the enhancement of intergroup disagreement, where only differences between the ingroup and the outgroup are seen by the group members. When

managing intergroup identities, the turning point for achieving acceptance, is to make the members see the plurality of the outgroup members' identities, where there are in fact shared aspects with theirs. The realization of some shared identity is the pre-requisition for building up a shared superordinate identity.

4 Method

It has been such a journey, from the day we got the assignment from the aftermarket department (YS) at Scania with the aim of finding out why the cooperation with Higer and Lahden Autokori has been frustrating, to how the study has become today.

YSR is the section under aftermarket department that produces aftermarket service products for both bus and truck products, such as workshop manuals, driver's manuals, maintenance manuals and spare part catalogues. When we showed our interest in doing a thesis work at YSR, an immediate positive response was received. The work experiences with Higer and Lahden Autokori, two external bus body manufacturers that build buses together with Scania, had not been ideal. YSR, who has been heavily involved in the collaborations for years, was eager to understand why. The aim of the study was preliminarily decided to be a research on the two collaborations and thereafter to find out lesson learned out of an aftermarket perspective.

Interviews were therefore started at YSR, about their work experiences and frustrations. We gradually identified some problems within YSR and developed strategies to improve the cooperation process. However, things started to change once we started to talk to people from other departments at Scania, that are also involved in the cooperation, such as the bus team RBVS at research and development department and the purchasing department SR. Some internal conflicts within Scania started to appear, which seemed to have impact on the whole cooperation on every function involved. One department that had been named many times seemed to play a key role - the bus marketing and sales department, KB.

We started to wonder what has happened during the years of the cooperation, not only from an aftermarket perspective, but the complete bus side of Scania. The study focus was therefore shifted outside of YSR, to every function that has been involved, for example KB, where there is the complete history of Scania's bus business. The reason for the decision to change study subject was, only by looking at the complete history and the bigger structure, fundamental problems can be identified. Beyond these fundamental problems there are real solutions and possibilities for a functioning process for Scania bus, including YSR.

4.1 Methodology

The main interest of this study, although key questions have changed, is to, by looking into the recent history, to get a better understanding of Scania's coach business today, with the

focus of cooperation with external bus body builder partners, namely Lahden Autokori and Higer.

4.1.1 A qualitative study

To study the coach business of Scania CV and how it has evolved until today, aside from documentation studies, an important approach is to study the actors - the people that's been involved throughout the time. According to Bryman (2013), in order to get a better understanding of the progress of the studied questions and interaction among the actors, qualitative studies should be taken on. A qualitative study is about what people think and what they mean, in opposite to the quantitative study where the focus lies in numbers and quantities. According to Alvehus (2013) a qualitative study is used when the meanings of a situation are more interesting than the statistical relations.

A qualitative study usually involves observations, interviews and focus groups. In all of these study methods the actors are in focus. Actors that have stories to tell are of strong interest to this research. The qualitative study approach is a relative "convenient" way to perform a research, considering the possibility to validate empirical information by direct information exchange with the informants.

In fact, when this research project was assigned, the study questions were very open, depending on largely of what could be found by empirical studies. The choice of a qualitative study was made because of the unclear study subject and a flexible approach to what the study would give.

4.1.2 An abductive study

Based on the nature of this study, that discussions and results are to be made based on empirical studies, a deductive study approach was eliminated, where a theory is to be proved by empirical material. Also, an inductive study approach is not proper because the aim of this study, instead of leading to new theories, is rather to understand empirical information with help of existing theories – that naturally makes it an abductive approach. An abductive approach involves the interaction between empirical material and theories, as well as the mutual development of both empirical material and theories under the study process. According to Peirce (1974), while working with an abductive approach the work can switch between empirical and theoretical reflections and the different reflections can be influenced

by each other. For example, new information from the empirical study can give new aspects to the study and the theory will be changed accordingly.

4.1.3 Thick description of empirical information

Besides, there are different ways to present empirical studies. There is the “thin description” approach where empirical information is stated with short and summarizing text. Geertz (1973) on the other hand argued for thick descriptions when it comes to qualitative studies of people, events or social environments. The thick descriptions are descriptive details of the studied environment that are used to give a contextual understanding of a social behavior and significance for the study. But this type of description has also been questioned. Lofland and Lofland (1995) meant that too many descriptive details can prevent the analysis of the collected data instead of supporting, because not all details can be relevant. But in our work thick descriptions have been used. By awaking thoughts through detailed and vivid descriptions, a better understanding of the history and the people in the story can be achieved by the readers.

4.2 Study methods

Methods utilized by this qualitative study were: semi structured interviews, observations, study of documentations and literature study. The interviews and the observations were conducted to get a better understanding of how the bus business has changed over time and how it looks today. Documentation was studied to see what already was done. The literature has been studied to get a foundation of existing theories that can explain why the bus business has been changing the way it has.

The empirical information covered by this study is before 1st May, 2014.

4.2.1 Interviews

To conduct a qualitative study, as introduced above, interviews are a preferable approach. The type of interviews to be made was semi-structured. According to Bryman (2013) semi-structured interviews are considered to be a proper means of a qualitative study in the way that the questions are not fully decided but spontaneous interactions might occur and the person interviewing can be very flexible in the follow-up questions. To conduct semi structured interviews, a study goal and accordingly study areas are decided in advance. However, during the interviews, questions are to be formed based on, for example, the interviewees’ background and experience. This is to say that, the questions can still be very

individual, although all the interviews share the same goal. This characteristic of semi-structured interview makes it possible to study individual-based experiences and thereafter to achieve a comprehensive understanding of the history.

The sampling of informants was not precisely defined but was done aligning with the interviews. Without knowing in advance who were involved, it was not possible to make a comprehensive design of the sampling. Instead, people of interest were to be gradually revealed by informants, mainly under interviews. No informant under this study knew everything, but everyone knew something and therefore the sampling of interviewees for the interviews was done through a kind of **snowball sampling**. This type of sampling is according to Bryman (2013) a way to get in touch with key persons by starting off with a small group of people that are relevant to the study and from these people get further contact with other key persons.

In total, sixty-one interviews were done, eight was done when Lin was at Higer, one with Lahden Autokori via internet, and the rest with Scania employees, either in Södertälje or via internet when the persons were located at other locations (for more information of the informants see Appendix 3). The interviews were held with informants who have experience working towards these external bus body builders. Interviews were conducted mainly from January to the beginning of April. Two interviews were done in May. Around seven people were interviewed twice, based on their heavy involvement in the cooperation. For some others, questions were sent via emails if extra information was needed after the interviews. Every interview was about 50 - 60 min long, and semi-structured, with some questions prepared, while flexibility was allowed. All of the interviews were recorded to make the interviews more fluent and to be able to go back during analysis, notes was also made during the interviews. The empirical material of this study is obtained mainly from interviews.

There had been challenges while conducting interviews. Some things were apparently sensitive, for example, the start of the collaborations. People, due to their different “political” standpoints - identities, told histories in different ways, sometimes even against each other. We realized that, on some sensitive questions, when everyone was not giving the same “truth”, there might not be a single truth. Although we tried to find out the absolute single “reality”, we finally understood that the reality was that there were several sides of the story. Therefore, for some parts of the history, where there were deviations, we decided to present all the possible “interpretations” we got from the informants.

Another challenge during the interviews had been Lin's Chinese background, when it comes to discussion about Higer, especially culture aspects. Lin's Chinese background was considered to be an advantage for the study on Higer. However, it was occasionally a disadvantage. Some informants would ask: "You are from China aren't you?" There was no way to find out if their statements would be different otherwise, but it was clear that Lin's culture background was taken into consideration.

Finally the last challenge was our "Scania identity". We got Scania ID cards for entering the security gates of buildings, work laptops and work phones and Scania email addresses. This Scania identity made it easy for us to get access to information about the company and the employees through its intranet. It also made us welcome throughout Scania and this was the reason for us being incredibly efficient finishing around sixty interviews in two months' time. However, it made it difficult for us to earn trust from the cooperation partners. For Lahden Autokori, for example, we claimed our "neutrality" via email so as to win the possibility from the employees that we wanted to interview.

4.2.2 Observations

As a complement to the interviews to witness the atmosphere and the social interactions among the actors in the organizations, observations were to be made. Observation is a kind of ethnographical approach. An ethnographical study is according to Bryman (2013) a method used to study of, for example, a village, a group of people or an organization during a longer period of time. The goal with an ethnographical study is to see and describe, for example, the culture within the group and how they interact with each other. This is to be done by a number of events, such as a number of observations during a regular time, listening and interacting within social events, interviewing informants and collecting valuable information regarding the studied group. An ethnographical study usually takes a long time, even several years. This thesis project that lasted for 6 month became a micro-ethnographic study. Instead of looking at an entire organization and doing a number of regular observations we studied a part of the organization, the bus business and the cooperation with Lahden Autokori and Higer. According to Wolcott (1990), a micro-ethnography focuses on a certain theme or a particular aspect and the observations does not have to be for several years but for some weeks or a few months.

During January to the end of March 2014, while it was the data collection phase, around two to three times a week we were at Scania, either conducting interviews or working in the office

at YS. The frequency was around one to two visits a week from April to June. A visit to Higer was paid by Lin during the Christmas holiday while she paid a home visit to China. Three days were spent at Higer. Due to limited budget, a visit to Lahden Autokori was finally not made. The aim with observation is partly to understand how work routine and work environment are at the studied companies and departments, partly to see how people's "real" reactions and attitude towards the cooperation partners other than how they described themselves at interviews, and finally to understand the intangible factors such as culture and emotion. All the information that can only be achieved by observation is important for our study, because on one hand, facts observed serve as complement to facts that are told, and on the other than, factors such as attitude, emotion, culture play key roles on the collaboration. The lack of Lahden Autokori-visit leads to insufficient understanding of Lahden Autokori, regarding its company culture, way of doing, and eventually attitude towards Scania. Although efforts have been made to complement the shortcoming by other measurements such as interviews and email contact, but it is indeed a limitation of this study.

4.2.3 Study of documentation

As a complement to interview and field observation studies, study of documentations is usually done when conducting a qualitative study. A small amount of files and documents had been reviewed, due to the fact that the documentation that was of "historical" interest was very limited. Since management of Lahden Autokori was done mainly by KB, whose documentation was not available, the study on documentations regarding Lahden Autokori was very little. The files obtained by accessing the Scania intranet, or obtained from informants, mainly regarding Higer cooperation, were project descriptions, minutes of decision making meetings and presentation materials and reports written by people from Scania. From the project descriptions and minutes of decision making meetings, information on time, people that were involved and the aim of the cooperation were found. From the presentation materials and reports written by the people that have been working or worked with Higer, their work experiences, frustrations, challenges and problem solutions were presented vividly. Regarding Lahden Autokori, one presentation on cooperation made by Lahden Autokori was sent by one Lahden Autokori employee that works heavily with Scania.

The documentation study regarding Scania bus business took place mainly under February and March, aligning with interviews. When empirical material was analyzed in April and May, we decided to conduct a comparison between Scania bus and truck product development

processes. Therefore, information regarding Scania truck business, such as sales volume, Scania truck modular design, was obtained.

4.2.4 Literature study

Theory studies were taken on already right after the preliminary study areas were identified. In the beginning, it was theories regarding supply chain management, production process, culture and manager theories. With the help of theories, empirical information was collected accordingly. However, based on the change of study areas, the theories that were finally of interest were operations management, supply chain management and organizational identity. Articles were obtained by searching via Uppsala University's access to databases, with above mentioned phrases as key words. Also books in the related fields were reviewed, obtained mainly from Uppsala University library.

This literature study method where theories are changing during the study because of new information is called a narrative literature study. According to Geertz (1973) this kind of literature study method is used to give an initial image of the theme that you want to study and it is used when you in advance do not know where you are going to end up. In other words, new information makes it possible to change the direction of the theory when using a narrative approach, according to Noblit and Hare (1988).

4.3 Validity

Validity of the qualitative studies was verified in different ways. It is important in a qualitative study that the collected information is authentic and according to Michrina and Richards (1996:31) there are some methods that can be used. The interviewer can give assertions to the informant to confirm, either during the interview or sending drafts of the assertions. If something is unclear during an interview, it is a good thing to ask if the answer to a question was correctly understood. Or if something was not clear enough, the interviewer can ask the informant to refine the explanations.

It happened sometimes that there were different opinions among the informants regarding a same happening. In some cases validation was made by asking several informants the same question so as to get closer to the truth. It became clear that, in some cases, some of the informants' answers were not the correct information but more of hearsay. In other cases, when there was not a unique truth where different opinions should be allowed, the variants of opinions would be presented in the empirical study.

The observations at Higer and at the YS office have given us a better picture of how they worked. But was it the correct picture? There was a possibility that a different impression can be obtained if the observations were done during another time. For example, if the trip to Higer would have been a week later would it look the same? Or if we would have been at the office five days a week would we have noticed something different? To be able to answer these questions it is important to validate what have been observed. LeCompte and Goetz (1982) meant that one way to make sure the authenticity of the observations is by an intern validation. This means that the observations are consistent with the studies theoretical ideas. And one way to be sure of that consistency is to observe and be involved in the social event that has been observed, during a longer period of time. And at the meanwhile, the researcher should make sure to witness all of the possible events that can occur. During this study, the observations taken place at Scania, especially the office area at YSR, are considered to be of significant frequency - two to three times a week in the first three months and once a week during the last two months. Besides, a relatively consist impression of key questions were observed under different contexts, for example, formal meetings and lunch breaks.

Another way to validate the observed events is by comparing experiences with people that have been at the same place or in the same group. The visit to Higer falls under this description. The visit lasted for three days. Because of the short period of time it was not possible to do regular observations. But by comparing Lin's experiences to other people's experiences, who have also been to Higer, the observation gets more valid.

When studying documentations one should be critical. According to Scott (1990), some things have to be taken into consideration: is the material authentic, is the material believable, is the material representative and does the material have any meaningfulness? In our case, documentations served as a complementary approach for interviews and observations. Documentations were a supportive source of information. Moreover, most of the time, information from the documentations was gone through during the interviews and was confirmed by the informants.

4.4 Bias

People all have a foundation of values that makes them who they are. This foundation together with personal, cultural and political biases (Michrina & Richards 1996) forms every person's worldview structure and an understanding about how everything works. For a qualitative study, not only the informants' bias affects the study, but also the researchers'.

One way to prevent for biases to affect the study is by reflexion. Reflexion means that one tries to identify your own biases before the interview and by being aware of them it can help us see the informants as they are rather what we think they are.

We were encountered with informants' bias rather often during the interviews. People turned to make perceptions of others in many cases. In some extreme cases, when several parties with different interests were involved, for example, regarding how the collaborations with external partners were started, bias was one major reason for variant views of the reality from different people. Bias from informants made the study difficult, but was also one part of this qualitative study.

As to bias held by us, the researchers, the most optimal situation would be to have a totally neutral point of view, and to have a blank mind to what the informants have to say. But this was certainly not possible because of our biases and values. We confronted our bias many times during the study. One example was how we considered Lahden Autokori's attitude towards the cooperation. In the beginning, when we understood that communication was not working well between YS and Lahden Autokori, the explanation was considered to be that the willingness from Lahden Autokori for communication was low. However, the view was totally changed later when we understood how heavy those Lahden Autokori employees' workload was, responsible of communication with all the departments from the "enormous" Scania. To make bias as such as little of a problem as possible we had tried to be as open as possible with the interview questions as well as interviewees' answers. When conducting interviews, we tried to develop empathy, by standing at the same standpoint as the informants, instead of immediately developing judgments. By empathy, we managed to get as much out as we could from an interview. Of course opinions and judgments - our bias, could inevitably not be avoid while we processed empirical information, but we gave the informants chance to argue for their opinions during the interviews.

4.5 Analysis of the empirical material

When the qualitative studies were done the collected material was to be analyzed. As mentioned earlier a thick description was used to describe the history that serves as a good foundation for the analysis. The aim of the analysis of empirical material was to get the big picture of the story about the bus business at Scania and how the collaborations were involved. The analyzing method that was used was of a narrative kind. According to Kvale (2009:240) in a narrative analysis the focus lies in the stories from the interviews and the

purpose is to find the common structures and intrigues within the stories collected from the interviews. In other words, a narrative analysis makes it possible to put all of the stories that have been told during the interviews into one coherent story that involves them all.

The narrative analysis can be done in many ways. According to Riessman (2004) the narrative analysis can be made through four different models: a thematic, a structured, an interactive or a performative analysis. With a thematic analysis the focus lies in what has been said but not how it was said. A structured analysis focuses on how the stories were told. An interactive analysis focuses on the dialogue between the informant and the interviewer. And a performative analysis focuses on the story as a performance, and to create a story, words and gestures are used.

Since the goal of this study is to give an understanding and a better picture of how the bus business at Scania CV evolved through time and how the cooperation has been developed, a combination of the four models has been used. The interest lies in the complete story, how it was told, the dialogue and the informant's reactions to the topic.

4.6 Ethics

Because of the involvement of people, both in the interviews and during the observations, research ethics was taken into consideration. According to Bryman (2013) integrity, free will, confidentiality and anonymity are the essential matters when it comes to ethics towards the informants.

Kvale (2009:42) meant that ethical problems occur in an interview study because it is hard to "study people's personal lives and at the same time talk about it in the public place". The ethical questions should be taken into consideration throughout the entire interview study, from the purpose of the study to the writing of the report.

In the matter of confidentiality, since all of the interviews were recorded and transcribed and later used in the report, the question of how to make sure that every piece of information was held completely confidential and anonymous was considered. To protect the informants all of the information that was collected during the study has been carefully handled, the recorded files and transcriptions were saved only in the Scania work laptops. Any transfer of such information was done by USB instead of via internet. Besides, anonymity of personal information has been considered both while writing reports, and during any conversation that

could point to any individuals. We tried to conceive any possibility to reveal a person, especially regarding sensitive issues.

The observations can also be discussed if they were totally ethically correct. Did the people being observed know that they were observed? And did they know that how they interact in the observed social event could be used in the study? To be as ethical as we could on such questions, we made sure to inform as much as possible what our study was about and what it was going to be used for. In our case, moreover, compared with other studies where behavior is the study object and therefore observation is the main approach, information obtained from observation served as a minor resource of information. Besides, observation is not to be reflected on a personal level but rather a big unity, such as a department or a company. This might raise much less personal consequence.

5 Empirical study

In this part, the detailed information of the cooperation with Lahden Aukokori and Higer, from the beginning of collaboration until May 1st, 2014, is presented. Firstly, how Scania's bus operations today and later a brief history of Scania bus operations. Finally, a description about Scania building complete coaches with external partners is presented. The information without reference is obtained from interview studies.

5.1 Scania bus operations

From the 1990s, when aftermarket service, mainly spare part and repair and maintenance, became an important part of the financial income for automakers, Scania reacted to follow the trend. Scania, under the 60s and 70s developed an effective distribution channel for spare parts (Giertz, 1991:412, 563). This well-developed management model with fluency from purchase, to inventory and to the distributors has been kept using until today.

The strategy of developing financial income brought by aftermarket service has been kept since 1990s. Today, an increasing demand for services is recognized, due to the fact that, transport companies focus more on logistics services, and the fact that the more sophisticated vehicle technology makes it complex to repair and maintain efficiently (Scania Annual Report 2013). What is more, because "service sales are less sensitive to economic cycles than vehicle sales", a well-established aftermarket service would contribute the stability of automakers earnings (Scania Annual Report 2013:14).

5.1.1 Scania bus operations today

Bus is a very different market area compared with truck, due to the fact that bus market is much more customer-oriented and culture/geography depended, while trucks are mainly for the purpose of industry usage. The customer orientation of bus products, mainly bus bodies, requires much more flexibility and creativity than truck business, where products can be well defined in earlier stage than buses.

Also, the size of the bus market in general is much smaller than truck market. This means that the sales volume of each bus model is smaller than a truck model. Furthermore, Scania, although a big player in the truck market, is relatively small in the bus market. For one thing, its capability of producing complete bus products is very limited. Compared with its competitors, such as MAN, Volvo and Mercedes Benz, although the total amount of bus products sold per year is similar, among 6000 - 8000 products/year (except for Mercedes

Benz that has a year production of 35,000 buses), Scania sells much more bus chassis and very few complete buses than other bus manufacturers. While Scania has a well-established production system for trucks, a tailored production system for complete buses has been under-developed. It is possible to develop a modularized production system for complete buses, but a prerequisite is a large amount of order. Scania, with its limited order amount for complete coaches, [REDACTED], cannot develop a modularized production system as it does for trucks. Instead, one strategy that has adopted by Scania under its bus develop history is to keep good relations with bus body manufacturers (Giertz, 1991:565). Scania bus and truck products’ sales volumes, including chassis, are presented in Table 2.

Table 2 Scania sales volume for Scania truck and bus products (complete and chassis), 2010-2013 (Scania annual report 2013)

	2010	2011	2012	2013
Truck	67,336	69,136	65,885	73,678
Bus	6,874	7,707	65,885	73,678

The numbers stated in Table 1 are sales volumes for both complete bus and bus chassis, for bus, even including complete city buses and coaches. The concrete number of sold complete trucks is not available, but it is much larger than the sold complete coaches [REDACTED]. Besides, compared with trucks, the sales of coaches are very season-based, and mainly happen from January to May every year, according to empirical studies. The lead time for Scania to deliver a complete truck and a complete coach differs significantly. The standard lead time for a truck of a standard embodiment is approximately 6-8 week, whilst the general lead time for a coach product is much longer, [REDACTED].

5.1.2 Brief history of Scania bus

With a history that can be ascended to the end of 19th century, Scania has become a global leading heavy vehicle producer today. Started as a railcar producer, under its over a hundred years’ history, Scania has gone through a long way adapting to the changing market. Having had also railcar, bicycle, and passenger car in its product catalogue, today’s Scania has defined its core competence in truck products, with additionally bus products and industrial and marine engines to widen its product assortments (Scania.se).

5.1.2.1 1911 – 1990s

Scania's bus production started already in 1911 in Södertälje in Sweden. The first bus was an omnibus that was called "Nordmarksbuss" (Picture 4) (Scania buses and coaches). The bus market in Sweden burst in the 1920s, with a fast growing demand of city buses and short-distance intercity buses. At the end of 1920s, with a sales volume of around a hundred buses, bus business took over truck, became Scania's major business area. However, the bus body manufacturing was stopped and outsourced to other independent bus body manufacturers (Giertz, 1991:132).



Picture 4 Scania's first "Nordmarksbuss" produced in 1911 (Scania buses and coaches.

For some years after, the bus business developed steadily, with a sales volume of above 100 buses per year (Giertz, 1991:133). Scania engineers took trips to the US and learned the best knowledge for bus development. The first "bulldog" bus had a design of both the engine and the driver within the cart – a more bus-like design – was made in 1932 (Picture 5). However, the World War II led to drastic decrease of the civilian market and almost put a stop to the bus business; Scania quickly switched its product development focus to military vehicles (Giertz, 1991:174). After the war, Scania went through a re-start, developing its competence in mainly chassis and engines. Bus chassis were produced in Södertälje, while bodybuilding was still outsourced. While the civilian market started to recover, the demand of buses increased significantly.



Picture 5 Scania's "bulldog" bus (Scania buses and coaches).

Under the 60s, due to the expended sales volume, Scania started to also build up new production line for buses. In year 1964, the bus- and equipment- workshop (buss- och utrustningsverkstad) became 17 000 m² in total, as an independent technical department, with own designers, parts preparers, equipment engineers, and purchasers. However, due to the largely growing demand from the small transport companies after the war, trucks became the main product of Scania (Giertz, 1991:229).

In 1968, the complete bus production was moved to Katrineholm, due to the rapid decrease of market demand. Bus organization was at the same time reformed into a subsidiary company, as Scania-Bussar AB, located in Katrineholm, with functions such as product development, production and sales (Giertz, 1991:361). Producing only city buses at that time, Scania-Bussar AB had developed its own product development system and its own purchase and sales channels. The reason for the separation from Scania's truck development system was the difference of market demand between city buses and trucks (Giertz, 1991:412, 565).

5.1.2.2 *The 2000s to today*

In 2002 the complete bus production went through, once again, reorganization. The production of chassis and powertrain was relocated back to Södertälje and the bus body production stayed in Katrineholm, under the name of the new subsidiary company Omni Katrineholm AB.

Within the parent company Scania CV, there had been a bus marketing and sales organization, B-organization that was in charge of the sales of bus chassis. Omni bought in bus chassis from B-organization and built complete bus products - only city buses (OmniLink, OmniCity and OmniLine), and sold them. Therefore, during "Omni time", Omni was to

manage the city bus sales and production, while Scania, except for producing bus chassis, sold bus chassis to, including Omni, other, up to 100 external bus body manufacturers. In 2004, the bus body production line was, still under the charge of Omni, moved from Katrineholm to Poland, where the labor cost was supposed to be lower. At the same time, Omni’s other functions, such as marketing and sales, were still kept in Katrineholm.

Omni had been a relatively independent organization until 2006, when the “Katrineholm Omni” was moved back to Scania’s headquarter in Södertälje. In fact, this reorganization was only “geographical”. Omni was moved into the same office area with B-organization in 2006. B-organization was renamed as KB in 2006. Due to the several reorganizations within the bus organization and therefore several renames, the name “Omni” and “B-organization” are kept using in this article, for reading convenience, regardless of their actual organizational titles.

Although B-organization and Omni became “Scania buses and coaches”, Omni was still seen as a relatively independent subsidiary company for city bus products, while B-organization

was seen as a part of the parent company Scania CV that was in charge of chassis business. Finally in 2010, Omni completely merged into its parent company and together with B-organization (called KB by that time) formed a new KB organization that was to be in charge of the bus business.

However, Omni kept all of its functions, such as city bus production in Poland, city bus body design, purchase and city bus sales and services, etc. After the fusion, although KB is under the sales and marketing organization of Scania, the complete Omni existed, together with B-organization, the bus chassis sales organization

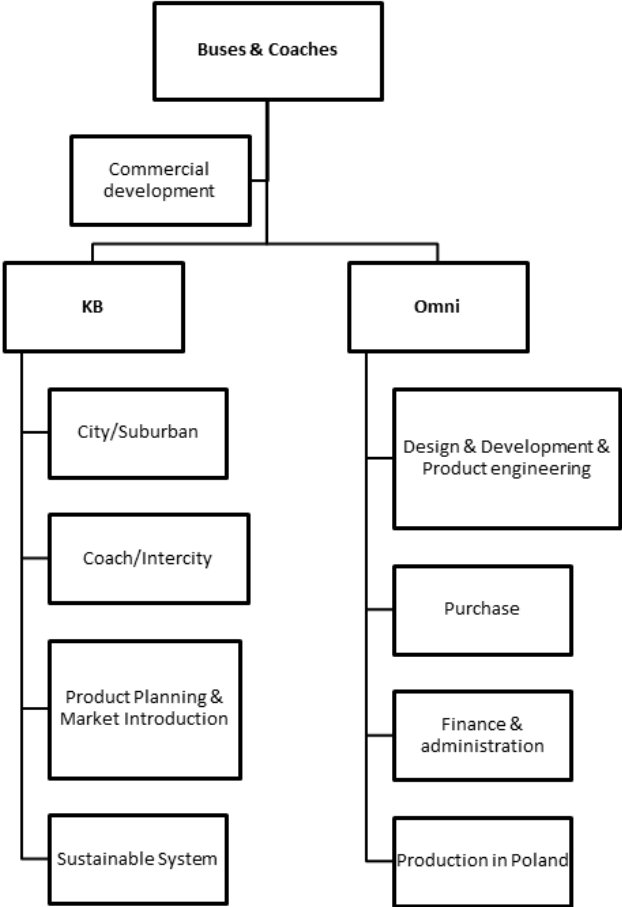


Figure 9 KB organization map

(Functions within KB see Figure 9). At the same time, within the Scania CV structure, there was a bus chassis development department, called RB (Appendix 1), within the Research and Development (R&D) function, the aftermarket department YS that was in charge of after sales functions as well as the bus chassis production function that worked with bus products. Not purely a sales and marketing organization, KB was not the complete bus function either within Scania. Besides, within KB, the fusion seems to have further effects. B-organization had been historically a marketing function of Scania for bus chassis sales, while Omni had been seen as a bus body manufacturing subsidiary company for Scania. Omni, later called the industrial side, kept its identity as the bus body producer, while B-organization, later called the commercial side, kept its identity as the bus chassis owner. These long existing distinctive identities have been leading to disagreements within the KB organization.

Omni, Scania's bus body manufacturer, had developed a very independent, simple and quick process of doing business, where for example, aftermarket service was very underdeveloped. This simpler process, after merger, has been challenged by questionings from the parent truck producer Scania. Besides, to meet the need of the fast changing market, B-organization, as Scania's sales organization for bus chassis, made fast decisions – to produce complete coach products with two bus body makers, Lahden Autokori 2006 and Higer 2007. These two partnerships started at the same time when Omni moved back to Södertälje. The coincidence of reorganization within the bus structure, together with the lack of cooperation experience when starting the partnerships, led to rather turbulent collaboration experiences later on. Figure 10 shows the timeline of events within the bus organization from 2002 to 2010.

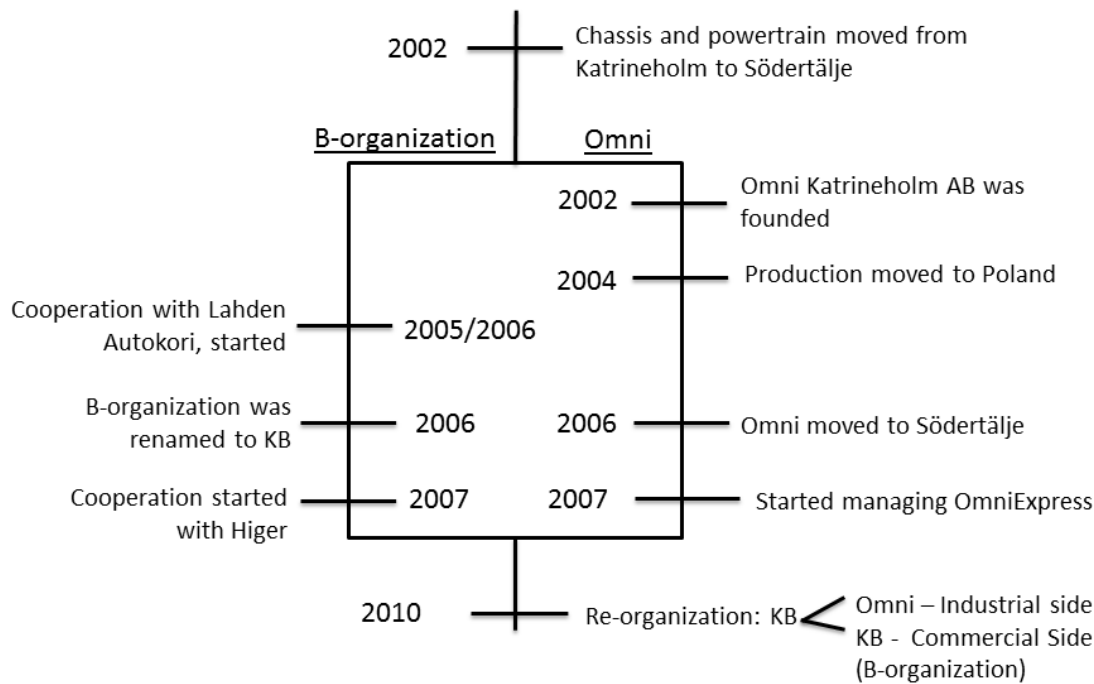


Figure 10 Timetable of the changes within the bus business

5.2 Scania building complete coaches with external partners

Before 2007, except for the only complete city bus products made by Omni, Scania (B-organization) had been mainly selling bus chassis to external bus body manufacturers. There were more than hundred external purchasers/body manufacturers that built bus bodies on Scania's bus chassis (around 60 today). However, this kind of sales model raised a big problem for the customers – they had to turn to different companies depending on if they needed service for the chassis or the body.

Scania recognized this strong need from the market for a complete bus product, with which Scania offers a complete package including aftermarket solutions from the after sales and service sectors. Scania recognized the market potential of coaches and decided that it had to fill in its product catalogue with complete coach products. However, Scania did not have production capability for a complete coach product - it only had been producing bus chassis and city buses. In order to launch a new coach product, Scania had to turn to external bus body manufacturers.

5.2.1 Cooperation with Lahden Autokori

Lahden Autokori had been a family-owned bus body manufacturer in Finland, from 1945 to 2013, when it claimed bankruptcy on September 11th. During three generations' time, Lahden Autokori had been building bus bodies on chassis from different producers, such as Volvo,

Mercedes and Scania. The first production line was located in Villähde, with a capacity of around 1 bus per day. Having Finland as the main market area, Lahden Autokori had historically developed a functioning sales channel and service channel that suited its small sales volume. The aftermarket service had not been systematically managed as big vehicle companies, such as Scania, do, but it is rather based on good customer relations – the customers could call in and ask for service.

Things started to change in the late 90s, when Volvo bought up a few other Finnish bus body manufacturers. Lahden Autokori was left alone and felt the need to lean against a big player – Scania was to be the hero to rescue Lahden Autokori. Soon after, in 2001, the SCALA buses were launched. SCALA, “SCA” for Scania and “LA” for Lahden, was a low entrance bus model that Lahden Autokori built exclusively on Scania’s chassis. SCALA was sold by both Lahden Autokori and Scania, in Finland as a city bus, and in Sweden and Denmark as an intercity bus. Without an intercity bus model at that time, SCALA served as a good complement for Scania’s product catalogue.

The relationship between Lahden Autokori and Scania became even tighter in 2005 – 2006, when Scania, namely the B-organization, felt the need to expand the bus program with an express bus. Due to Lahden Autokori’s good knowledge on this bus assortment, together with the fact that Lahden Autokori had already developed coach models that would fit the requests, Scania soon decided to outsource the bus body manufacturing to Lahden Autokori.

In 2007 Scania and Lahden Autokori started to build the new intercity express bus. Having been suffering from financial difficulties, Lahden Autokori was more than happy to start the partnership with Scania. However initiated by B-organization, the cooperation was soon managed by Omni, who newly moved to Södertälje at that time. The new express bus was therefore named OmniExpress, a bus type that could be sold at more than one market, the Nordic and possibly a few other markets in Europe, for example Italy and Britain.

OmniExpress was based on existing bus models of Lahden Autokori, Scania did not participate in the bus body design. However, being different from SCALA buses, OmniExpress is seen as a “Scania product”, with Scania’s one-stop solutions, from sales to aftermarket support. Although Lahden Autokori namely was a bus body manufacturer for a Scania product, Scania/Omni did not purchase the design information from Lahden Autokori. This cooperation was initiated with good will and a thought of “to keep it as simple as

Production System into the Lahden Autokori production line, with signal control, visual planning, daily planning meeting and quality control on line, etc. The production capacity was enhanced and Lahden Autokori’s employees gave good feedback on the Scania way of managing production.

Scania, having considered Lahden Autokori’s good knowledge on bus as well as profitability of OmniExpress, announced its purchase of Lahden Autokori on the 1st May 2014. The events timeline is shown in Figure 11.

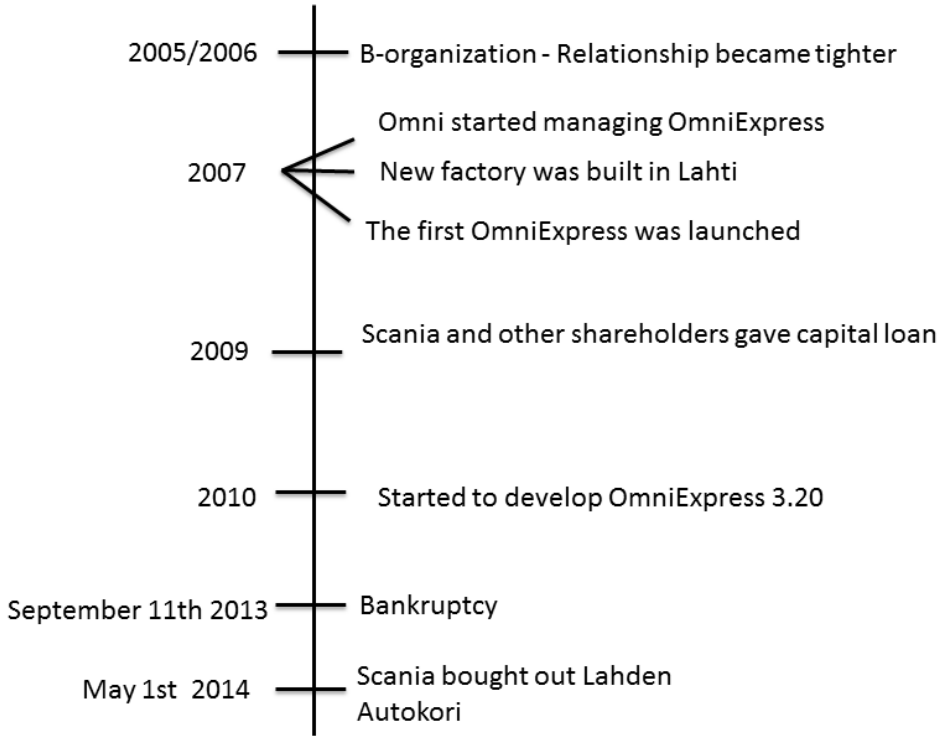


Figure 11 Timetable of cooperation with Lahden Autokori

5.2.1.1 Scania’s management structure towards Lahden Autokori before the bankruptcy

Omni has been working tightly with Lahden Autokori. Before bankruptcy, the functions involved were pre-sales and ordering, R&D, purchasing and product follow-up. The only organization other than KB that has been heavily involving is YSR, the section that work with bus aftermarket service products within aftermarket department YS (Figure 12). Being a small company, Lahden Autokori developed a very dynamic culture. Teams are small and people work closely and cross-functionally. The design team, for example, consisted of only 10 people; the assigned team that was to work towards the whole Scania, was only of 5 people,

covering functions such as product development, sales, purchasing, field quality and aftermarket service.

Generally, communication between KB and Lahden Autokori has been working smoothly. Pre-sales defines market needs, and together with input from the R&D team, the product manager sends new requests regarding product updates constantly. KB’s R&D team had been more as a supporting function until OmniExpress 3.20, for which the R&D team within KB has been heavily involved. Before 3.20, KB, however, did not participate in the design of 3.40 and 3.60. 3.40 and 3.60 inherited Lahden Autokori’s design philosophy. The cooperation at that time was supposed to be quick and simple. But due to the fact that Scania financially supported the development of 3.20, the R&D team has been involving much more. KB’s product follow-up function together with YQ (Appendix 1) is mainly to solve quality problems reported from the customers. Scania’s computer system will report matters into KB from the retailers or workshops, and each of the matters will be sorted and solved by responsible persons. If it is Lahden Autokori who to solve the problem, for example regarding product quality, Scania will inform Lahden Autokori immediately. Most problems can be solved relatively quickly. For OmniExpress, due to its exclusivity to KB, the complete products are purchased back to Scania through KB.

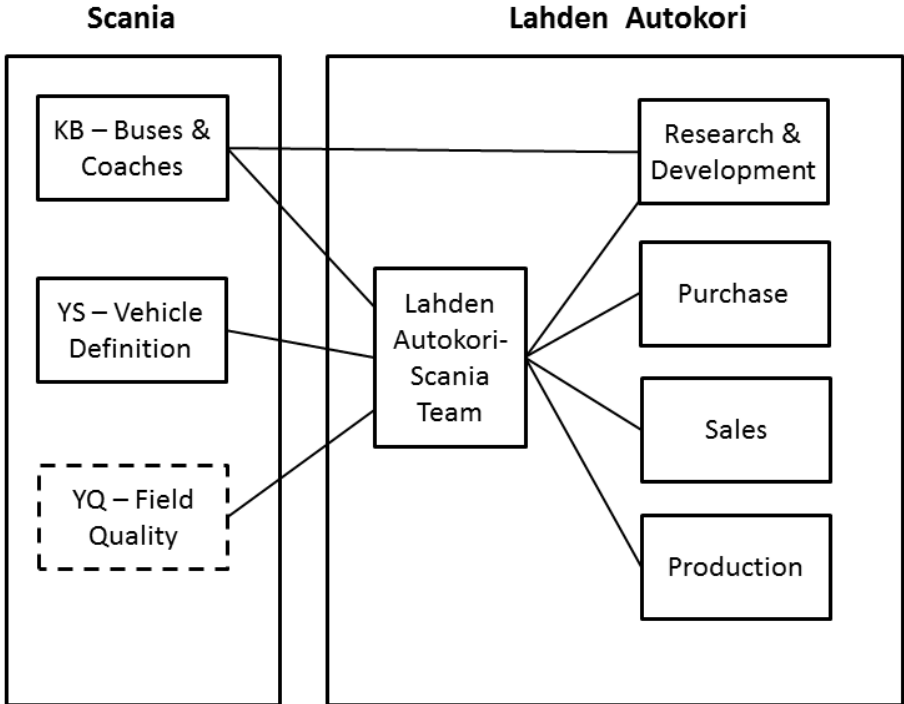


Figure 12 The interface between Scania and Lahden Autokori

However things might go smoothly within KB, the biggest problems hit YSR, the only major function that stays outside KB.

In fact, some aftermarket function existed within Omni before the fusion. There was one spare part preparer that worked with spare part catalogue for example. But other service materials, such as workshop manual, driver's manual and maintenance handbook did not exist within Omni – for all its city bus products. In short, aftermarket service had not been the focus within Omni. After reorganization, the spare part preparer was moved from KB (Omni) to YSR at 2008. This is why today's KB is without any aftermarket function – it was underdeveloped, and was moved into YSR.

In order to offer a one-stop solution for OmniExpress, Omni at 2007 financed YSR for the aftermarket support. A project group was started by YSR to prepare all the aftermarket materials, from spare part information, to workshop manual and to driver's manual, etc. At that time, the workshop manual and driver's manual were outsourced to a consult company. People started to realize how differently Lahden Autokori did things compared with Scania and how important it was to communicate and to understand each other. Soon after the project was finished by 2008, all the materials were supposed to be managed by YSR and YSR was to update the materials in the future. However, it was more difficult than people expected.

Firstly, the responsibility was not clearly allocated to anyone within YSR. Secondly, YSR was not informed of any changes under the time. The first re-start took place with YS representative visiting Lahden Autokori for material updates. Soon the second re-start took place with one YSR representative hired from a consulting company located at Lahden Autokori working with updates. But this person had never been well received. YSR was frustrated until 2013, when KB stood out and supported YSR. Things finally started to work. YSR finally started to get response from Lahden Autokori for its requests.

The reasons for YSR's frustration could be several. First of all, when Scania started the cooperation on OmniExpress, it did not purchase the right for design. This was a major reason for Lahden Autokori not willing to give up design information to YSR – why should it? In fact, the design information of 3.40 and 3.60 was shared with KB gradually, while YSR, who was also in need of this information, was not aware of the fact. The reason was, while KB was able to communicate directly with the product development team, YSR was talking only to the “Lahden-Scania” team that managed the communication with the whole Scania. This team

certainly did not have access to the design information. Besides, Lahden was a very small company where one would have several responsibilities. One Lahden Autokori employee working at the “Lahden-Scania” team might receive several emails per day from different Scania employees; what was worse, these Scania employees seemed to not have talked with each other. The Lahden Autokori team was overwhelmed and confused. “Why cannot there be one voice from Scania?” As a result, they had to prioritize things – YSR had not been the function that was prioritized all the time. Moreover, Lahden Autokori had very different ways of doing things, especially aftermarket service. They never had the need to develop any comprehensive material support because their customers could call in and solve the problem easily. But for Scania, all spare part information should be documented into Scania’s system, and the repair method and time studies should be done according to Scania’s standard. The rigidity of Scania took a lot of administration work from Lahden Autokori employees and above that, understanding from the Lahden Autokori employees. For Lahden Autokori’s engineers that had never got negative feedback from their customers, it was obviously difficult for them to understand that they were not doing well enough according to Scania. It was only when Lahden Autokori started to receive complains from the customers for a bad aftermarket service, they started to change their attitude. They started to send the design information to Scania anyway.

5.2.2 Scania – Higer cooperation

Back to 2004, while B-organization was looking for other bus body building partners, one strategy was to cut the cost. Chinese bus body manufacturers came into the focus. B-organization paid several visits to China to look for a potential partner under the year 2004 - 2005. An American consulting company was involved in the evaluation process. Finally, Higer, the second biggest bus body manufacturer in China was “selected” as the partner. The reason was partly a better possibility allowed by Higer’s ownership structure - the complex ownership structure of big Chinese companies can be obstacle for international cooperation. Although partly state-owned, Higer is driven partly by private owners and this allows collaboration with a foreign company. Besides, Higer was very willing to do business with Scania. Higer has always had the ambition to sell globally. Being left behind by its Chinese competitors, namely Yutong and King Long (who is actually Higer’s parent company), who had sold buses to the European market back at 2005, Higer was eager for a partnership with Scania. The management team of Higer assigned a project manager immediately, and even

built a complete new production line for Scania. Scania was pleased and was more than happy to start working with Higer right away.

Higer, as the second biggest bus producer in China, has a production capacity of around 25,000 buses per year. Scania planned to develop a tight partnership with Higer from the very beginning, that Scania will produce one-stop coach products with Higer. But when the cooperation started in 2006, Higer was treated as one of Scania’s external chassis purchasers – Higer built bus bodies on Scania’s chassis and the responsibilities for chassis and bodies were separated. Since 2007, A-Series, whose bus bodies were developed completely by Higer, has been produced on Scania’s chassis. A-80 is a luxury coach type [REDACTED], A-50 is a less luxury coach type [REDACTED] and A-30 is a simplified coach [REDACTED]. The reason for not “stepping in” deeply at once is, according to Scania, to see what Higer has. However, [REDACTED]

Scania and Higer formed a tighter partnership to produce a coach model with Scania’s full level of commitment, for the European market. There have been different opinions on why Scania chose Higer, a Chinese producer that never had been selling a bus for the European market. While [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]. Higer quickly became a close partner [REDACTED]

It was the B-organization that started the new cooperation upon a “one-stop” coach product with Higer. This new coach model is Scania Touring, which is an A80-like model but is redesigned by Scania. For Touring buses, Scania will offer “one-stop” service from ordering

to delivery and finally to aftermarket service. This Touring model is to have Scania's "Wrapping T" design.

However, the start of the Touring project was not fluent as people wished. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] The Touring project, as mentioned above, was firstly initiated by the B-organization in 2007. For the design of Touring, B-organization turned to RBV (Appendix 1), the section that worked with chassis and body interface, within the bus chassis development department RB, for help. From 2007 an official product development project for Touring was started, within the standardized Scania product development process, where a project manager was assigned to coordinate different functions involved. This is how Scania does things, for the development of new products that require cooperation among functions, according to product development process (PD process) (Appendix 2), a cross-functional project team should be created, with members from different line-organizations working with a project manager. Once the project is closed that is to say once the product is put into production, the project team is ended and responsibilities fall into the line-organizations.

For OmniExpress, there was never a product development project on a Scania level it was managed by Omni. For Touring, since B-organization turned to RBV, a large amount of resources were needed for the product development process and a new green arrow product development project was therefore started. One interesting thing here was that, within the Scania R&D department, there was no competence on coach bus body existing at that time – but in fact Omni had been working with city bus body manufacturing. RBV had only knowledge on bus chassis and the interface with the bus body - Bus Bodybuilder's Manual Quality Assurance (BBMQA). To support the chassis buyers to build bus bodies on its chassis products, Scania has developed the BBMQA manual as a quality guide. Why B-organization did not ask Omni for help? Some say that a coach bus body and a city bus body are not the same thing, whilst some other say that it is still much easier for Omni to work with the design of the new coach since it is a bus product. Another explanation is that Omni, although shared the same office area with B-organization, was recognized as a subsidiary company when the Higer cooperation started. This is in fact the fundamental explanation for B-organization to have turned to RBV instead of Omni, for B-organization had another identity – a part of the

parent company. However the reason was, RBV instead of Omni, from the parent company, got the offer to work with coach body design for Touring.

Under the first years of cooperation, things went roughly. Scania, who is used to work with it's completely owned and well developed product development system, did not have knowledge on how to integrate Higer – an external production process. Within the green arrow project, who was to do what had been extremely unclear. People were frustrated. Although the project manager tried to follow Scania's work flow to precede the Touring project, nothing seemed to work as accordingly. Besides, [REDACTED]. Reasons were several. [REDACTED]

[REDACTED]

After the green arrow project, in 2010, the purchasing department became the main communication channel towards Higer – the department that manages bus body purchasing and therefore the strongest voice towards Higer.

On the other hand, at Higer, things have been turbulent too. Before Touring buses, Scania sent a support team from RBV for the design of A-Series. This support team was at Higer to help out with design works for A-Series according to BBMQA. For Touring, that was to be a complete Scania product, Scania started to send over a cross-functional team, to ensure the implement of every function at Higer, from design to product quality and to aftermarket service. The reason for the full support was that, after stepping further into this relationship, Scania [REDACTED]

The timeline of events is shown in Figure 13.

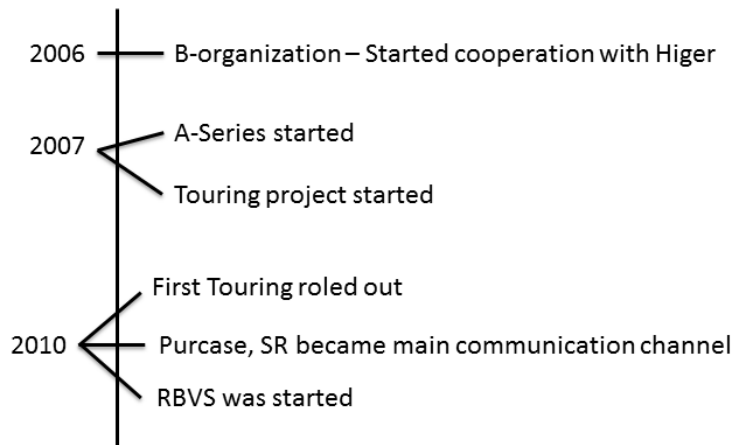


Figure 13 Timetable of cooperation with Higer

5.3.2.1 Scania's management structure towards Higer

The structure of the Scania-Higer team that works towards Higer is as follows (Figure 14):

- The site manager
- Aftermarket service – bus aftermarket service section YSR
- Pre-sales and ordering - marketing and sales organization KB
- R&D – bus construction section RBV
- Production and product quality - the purchasing department SR
- Price handling - the purchasing department SR
- Field quality - field quality department YQ

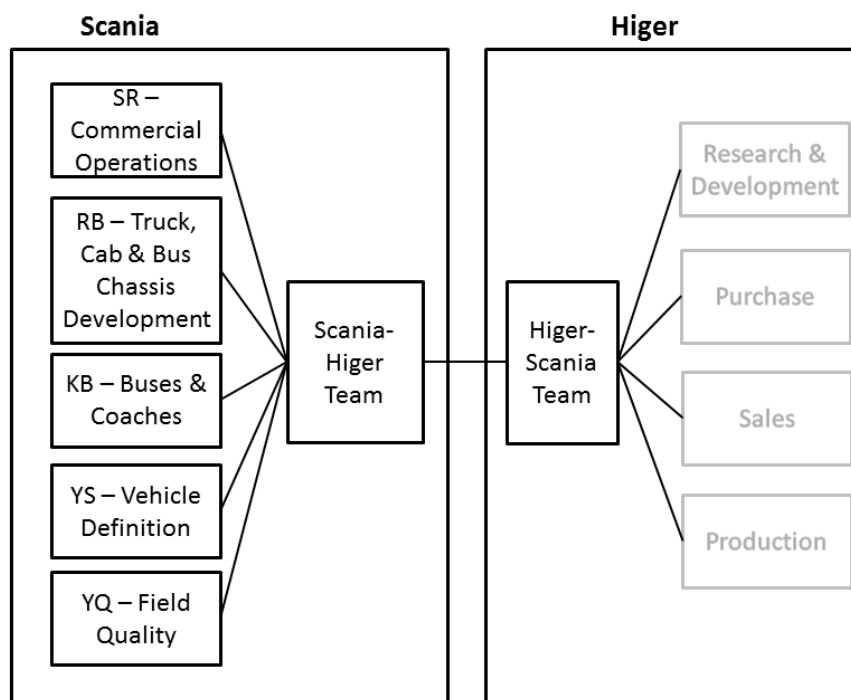


Figure 14 The interface between Scania and Higer

The site manager

In fact, it was not Scania's intention to assign any "manager" to be in charge of the Scania-Higer team. Each of the representatives was to realize different Scania functions according to the line-organization structure, as how things are done within Scania. But since KB (B-organization) was heavily involved in the cooperation in the beginning regarding A-Series, the KB representative was seen by Higer as the site manager. Higer needs a manager to talk to, regardless of Scania's matrix organizational structure. Soon a new site manager started at Higer in 2009, to start Touring project, when Higer officially became Scania's close partner.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

To continue with what was developed, the task for the recent site manager was much clearer – to integrate the Scania-Higer team, to build up a better relationship with Higer, and to integrate Scania's production philosophy into Touring's production line. The Scania-Higer team started to work more independently as a team, instead of barely getting orders from their assigned departments from Södertälje. Many decisions could be made without waiting for Södertälje's answer. Having a background in production, the new site manager was able to give concrete suggestions on how to integrate quality awareness into the production line as well as how to improve productivity. The management team at Scania Södertälje, with the wish to build a good relationship with Higer, pays visit to Higer ever so often. "You cannot work with each other without trusting each other" – believed by the product development project manager for Touring project.

Aftermarket

The bus aftermarket service sector YSR has been facing big problems. The challenges for YSR have been mainly spare part change management, spare part quality management and repair method and time studies for the workshop manual.

Higer has not established an aftermarket service as comprehensive as Scania. This is the major reason why YSR's work cannot be performed. No information needed by YSR can be gotten easily from Higer. For example, regarding spare part change management, Higer would change spare parts without making documentation, or they would mark two items, for example a blue chair and a red chair, as the same item. These are not acceptable by Scania. Moreover, spare part quality has been a problem. Things might be destroyed before shipping, or, after shipping, Scania found things totally different from its orders. Spare part change management and quality management have been challenges for YSR. In fact, even if Higer wants to meet Scania's requests, it is difficult. The relationship between Higer and its suppliers are complicated [REDACTED]. This internal problem affects Scania indirectly. Under the years, due to the effort of YSR representatives who have been trying to "educate" Higer in different ways, Higer has gradually understood Scania's way of managing spare parts and has been adjusting its process according to Scania's.

Beside of spare part management, another challenge for the aftermarket team was to produce repair method and time studies for workshop manuals. In Lahden Autokori's case, the Lahden Autokori's engineer is to do the studies and send draft for YS to verify; for Higer, there is an engineer hired from a consulting company to do the studies for Scania. Without similar service such as workshop support, Higer could not understand why Scania wanted to screw open a bus, especially before paying for it. This concern had been putting stop to any attempt from the aftermarket team until the newly assigned YSR representative, who managed to go to the "higher" management team to convince Higer that no big damages would be done, and even if there would be things broken, Scania would pay. The method engineer finally got a bus to do studies! Gradually, it became easier to borrow buses from Higer, because Higer has realized that they get nothing to lose there. In fact, while buses are stopped at Scania's BBM-QA lab for quality check, there is possibility for YSR to do method studies. Although it has been seen by the method engineer as a possibility, this work process is not well established between the quality team and the YSR team.

However, the work process between the method engineer, who is a hired consultant that works for YSR at Higer, and the aftermarket team that is located at Södertälje has been less desirable. The consultant, with help of a technical writer who is also a consultant, is to send draft for all the aftermarket products, workshop manual, driver's manual and maintenance protocol, and all the information is to be verified by the team at Södertälje. On one hand, this

consultant has been working on too many responsibilities that are shared by several people from the YSR. On the other hand, there is no work-standard for any of these products, which has made the work process difficult. The consultant does not know what is really expected, while it is impossible for the aftermarket team to communicate upon every detail. In fact, this lack-of-standard has been a problem while working with Lahden Autokori's engineer too. Without a standard, discussions sometimes become exchange/argument of personal opinions that largely enhances misunderstandings and efficiency suffers.

Pre-sales and ordering

Working tightly with the customers, the KB organization collects market information and sets new order-specifications to Higer. There are two kinds of order-specifications: one is the regular updating of the products, the other is "spontaneous" tender orders. For the regular orders, Scania KB collects the needs from the market and updates with Higer 4 times a year. The RBV section is to help out with describing specifications before the information is sent to Higer. After receiving the specifications, the KB representative at the Scania-Higer team will share the information with the RBV representatives - Scania constructors, as well as Higer design team to verify the possibility of achieving the new specifications. The purchasing department will be involved to handle price issues.

The tender orders are the kind of public open offers by big, typically French, transportation companies. These companies release offers with usually specified requirements, a good volume and a relatively short lead-time for delivery. Bus manufacturers usually bid for this kind of orders with a well-developed proposal. It is a business field that is profitable but requests good production capacity. If Scania is to win any of these tender offers, Higer must be able to offer possibility and flexibility - to give a "soft" yes. However, the cooperation on tender orders has not been working so well. Partly the reason is that Higer has no experience working with any tender offers before; for Higer, if there is not a concrete order, it seems to be a waste of effort to create any possibility - what if Scania does not get the offer? On the other hand, possibility and flexibility can be created only by the management team. The co-workers that Scania works daily with cannot or do not want to give Scania any promise - in case they would be blamed. [REDACTED]

[REDACTED]

R&D/Design

RBV had been helping Higer with bus body and chassis interface issues for A-Series, according to BBMQA standard. Soon in 2007 when the Touring project started, RBV realized the challenge. There was knowledge on the bus chassis and interface with bus body, but not the bus body itself. It was [REDACTED]

[REDACTED]. Later in 2010, the bus body design team RBVS was built up to work specifically with bus body definition towards Higer.

RBV realized [REDACTED]

Production/Product quality

In the [REDACTED]

Beside of the technical support, there is a group of quality controllers that control the bus quality, one sent from Södertälje by the purchasing department SR, and around 10 people that Scania (the purchasing department) employed locally from China.

The difficulties

[Redacted]

Price handling

It is the purchasing department SR that buys bus bodies from Higer. In the beginning when Scania wanted to find a Chinese partner, it was partly due to the fact that the wage cost was low.

[Redacted]

There are therefore

[Redacted]

[Redacted]

[Redacted] improvement.

Field quality

YQ, the department for vehicle quality, is in charge of the field quality issues. To manage problems regarding product quality, Scania has developed a comprehensive process.

The ordinary process for field quality control starts from the workshop or distributors. Deviations and questions regarding product quality are sent via a system called Fras into Scania. These issues are sorted then into Q – Quick, M – Medium and H – High.

Q-issues are quality problems that can be fixed directly in the production line. The lead time is normally one week after being reported, if supply chain works as expected. To solve Q-issues, the Q-team is located next to the line in every producing factory of Scania. Suppliers might be involved in problem solving, if needed.

H-issues are bigger problems for and big design changed might be needed. To solve this kind of issues, the line organizations are to be involved. Human resources, such as the engineers from the lab and calculation engineers would participate, to re-develop the product in question. [Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

Thanks to the effort from both sides, [Redacted]

[Redacted]

[Redacted]

[REDACTED]. The green arrow project upon the integration, mainly with the focus on aftermarket products, is now ongoing.

6 Analysis

6.1 Operations management

The management of operations is the key to ensure the success of any business. How to make strategies and managerial decisions to achieve best results are concerns of the management teams. To understand if the strategies or managerial approaches are properly made to deliver results, the characteristics of the company's operations have to be analyzed. Based on the outputs of operations, proper processes to deliver the output are to be developed, and, following with process design, the organization structure should be designed to enable the feasibility of processes. Scania bus operations system is affiliated with truck. However, is Scania bus operations system for complete coach products the same with truck? In the following texts, the characteristics of Scania bus operations for cooperation with Lahden Autokori and Higer are to be defined by comparing the outputs with truck operations; process management is then analyzed based on the expectations from the operations for coach delivery; and finally, the current organization design is discussed, based on its capability to enable the needs from the processes.

6.1.1 What are the differences between coach and truck operations management and in what way has this affected the cooperation with Lahden Autokori and Higer?

Based on operations processes 4V model (Slack, et al., 2010:19), there are large differences that can be identified by looking at the four dimensions of operations processes, namely the volume, variety, variation and visibility of the output (Slack, et al., 2010:19).

The operations processes between coach and truck products differ, as shown by Figure 15. This analysis is not based on exact numbers or measurements but only an estimate and comparison to illustrate differences. The annual sales volume of complete coach products is around ██████ per year; although the total number of complete truck products sold is not obtained, it is much higher than ██████ according to empirical studies. Compared with complete truck products, the variation of coach products is much higher, due to the fact that the sales of coaches mainly happen in the first half of the year. Beside of the fact that both of these two operations share a commonality of low visibility, coach products are of much higher variety than trucks, due to coaches' high customer orientation. Given the much smaller sales volume, high variety becomes a significant challenge for coach production, especially the bodies, where most design variations come from.

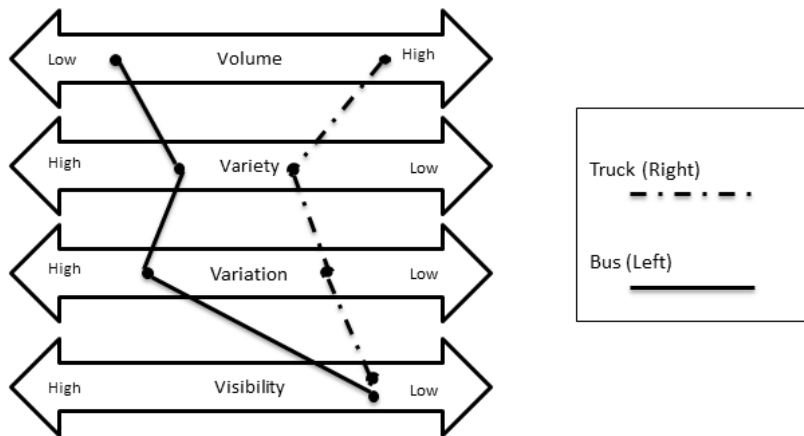


Figure 15 Scania complete coach & truck operations output by 4v model (Slack, et al., 2010)

6.1.1.1 *Realizing mass customization for Scania coach operations*

The coach operations system has clearly a stronger character of mass customization than truck, in the way that coaches are more customer-oriented and the volume is low. Due to the low sales volume, almost every coach is different in some way. Mass customization is the capability to produce product/service according to the need of each customer, while the company manages to keep production cost low, and deliver at an acceptable time (Slack, et al., 2010; Pine, 1993; Brabazon, et al., 2010). High variety of products leads to a high demand of flexibility of the operations system. Low volume results in a big challenge for automakers to manage an effective production system.

By outsourcing bus body manufacturing to Lahden Autokori and Higer, Scania realizes the possibility of product variety for its coach products. For complete coach products, the variety of bus chassis is low, which is produced by Scania internally; the challenges come from the bus bodies, the inside decorations, where details are many and almost all are open to customer choices. Moreover, it is difficult to “mass produce” bus bodies, due to the fact that only handcraft is able to mount for example the windows and all the decorating details. Therefore, outsourcing the bus body manufacturing is a solution to meet the requests from the operations that are low volume and high variety.

However, based on the empirical studies, the current outsourcing strategy seems not able to keep production costs optimally low. By looking at other strategies applied by automakers to achieve mass customization, namely product design, information systems and process design and management (Brabazon, et al., 2010), a more comprehensive evaluation of Scania’s current outsourcing strategy for its coach operations can be made.

To allow mass customization, the comprehensive utilization of IT systems is proved to be needed to facilitate the operations processes (Müller, et al., 2006; Alford, et al., 2000). By applying IT systems, not only design information can be managed and easily shared among departments and teams, but also they help to reduce time to market and even development costs (Müller, et al., 2006; Alford, et al., 2000). However, the lack of open platforms appeared to be an obstacle during Scania's cooperation with the suppliers. Scania's computer systems for information management were well developed, for its internal usage. For example, all design information is stored in [REDACTED], and all information produced by the aftermarket department is managed by Multi. However, there were no open platforms that allowed the partners to share their information or manage information together with Scania. The later development of [REDACTED], [REDACTED], [REDACTED], would facilitate both the design team and the aftermarket service team and therefore decrease management costs. But further needs of such open platforms still exist.

Modular product architecture is one solution to realize mass customization by design. However, increased modularity comes hand in hand with increased assembly cost (Ulrich and Tung, 1991). An assembly line with high production volume might be less affected by production costs, as Scania truck (Appendix 2); however, assembly costs get much more sensitive once volume goes down. In this sense, the amount of complete coaches is not big enough to meet the pre-requisite for a modular production concept.

Regarding other approaches for mass customization, such as components commonality and common platforms, and delaying differentiation, there is little evidence that these aspects have been taken into consideration during the design phase of Scania coach products. As a result, spare part proliferation would increase the workload for spare part management, and also increase the costs from inventory and other managerial costs. Problems led by spare parts proliferation will largely affect YSR's daily work on spare part management. On one hand, the large amount of spare parts require big efforts to administrate; on the other hand, [REDACTED] [REDACTED] [REDACTED]. Not only the administration becomes more difficult and costly, [REDACTED]. If parts or platforms commonality, or delaying differentiation, would be possible solutions to cut cost and ease management, one pre-requisite is that Scania is to participate in bus body design work together with the partners.

Furthermore, the Virtual-Build-to-Order (VBTO) approach, as introduced in the theory part, is a comprehensive approach to integrate, not only design for mass production, but also the production and even the supply chain (Brabazon, MacCarthy and Woodcock, 2010). To achieve VBTO, not only the coaches are to be designed for possible modifications in later phases, but also the production and the distribution chain are to be open for modification. To achieve VBTO, Scania is to integrate the bus body suppliers into its innovation and production system, that is very challenging based on the current situation.

Although, to outsource the coach body manufacturing is a strategy to achieve operations flexibility, it is not able to keep operations costs low. However, there are further cost-saving possibilities by IT open platforms, product design and processes design. In fact, it is a relative unique approach among automakers, to outsource the complete body manufacturing, considering how big a part of the product is done by one first tier supplier. The study by Alford, et al. (2000) showed module supplier and system supplier as the highest level of supplier type, while in Scania's case, the outsourced part of the product largely outranges modular level. As a result, in order to realize any further cost-saving strategies mentioned above, a much closer cooperation with the partners' is the pre-requisite.

After discussing Scania's applications to realize mass customization for coach production - by inviting external suppliers Lahden Autokori and Higer into product development and production processes – the next question is how the current work processes have been performing. In the following section, the process design strategies are to be further discussed.

6.1.2 How have work processes towards Lahden Autokori and Higer been functioning and what went wrong?

In this section, process management when working with supplier partners is discussed. The current work processes, PD process (Appendix 2), is based on Scania's operations for trucks. By looking at the compatibility/incompatibility between the processes tailored for truck operations and bus operations, problems within the current work processes are to be explored.

Compared with purchasing a component, a system and even a module, to produce coaches with "full level of commitment" with external body suppliers is a much more complex process that involves several functions from both Scania and the supplier partners. Therefore, both Scania's current work processes (PD process), and the partners' work processes are to be integrated so as to achieve a fluent work flow (Slack, et al., 2010:88) (Figure 16). The current

problems are to be demonstrated based on the work processes' capability to deliver solutions for the five objectives of the operations, namely quality, speed, dependability, cost and flexibility (Slack, et al., 2010:87, 140).

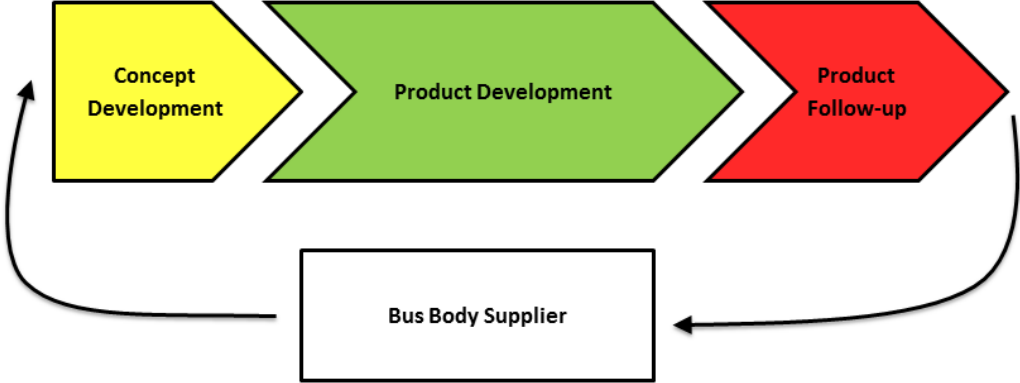


Figure 16 PD process with external partner

Scania's work flow (PD process) shows a high dependability of processes (Slack, et al., 2010:45). High dependability of processes within Scania's PD process allows the smooth cooperation among departments and functions. However, the dependability of the processes involving Lahden Autokori and Higer was low. The product develop project (as represented by green arrow in PD process), while products are to be developed together with external partners, should not only involve the functions within Scania, but also the functions within the partners. Both Lahden Autokori and Higer's experiences showed that the lack of understanding, from the beginning of cooperation, [REDACTED]. In Lahden Autokori's case, [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED].

These functions at Higer [REDACTED]
[REDACTED]
[REDACTED]. For Higer, [REDACTED]
[REDACTED]
[REDACTED].

Flexibility should be developed by processes while working with external partners, based on the flexibility characteristics of coach operations objectives (Slack, et al., 2010). Scania's rigidity was obvious, and has cost Scania loads. The fact that bus body manufacturers usually work with "bill-of-material" – the design information of a bus body cannot be finalized until the bus body is finished – has raised problems for Scania, especially for the management of spare parts. Scania, for its truck products, is used to close the design firstly and then fabricate products according to the design information. There, the spare part preparation can be started early so as to fill in the storage with new parts in time. However, due to "bill-of-material", the current way of spare part preparation is not efficient enough anymore.

Beside of "bill-of-material", because of the small amount of orders and the large variability among the coach products, the aftermarket section YSR is to deliver service products based on the new condition. The goal of Scania for aftermarket service is to offer the customer the best, from availability of spare parts, to the efficient mending and maintenance services. To achieve these goals, for the truck products, which are of bigger orders and less variability, YSR managed to produce detailed service for each product. However, the fundamental conditions for coach products are completely different. Except for the small orders and high variety, these products are not completely produced by Scania, and the productions are located overseas. The possibility to delivery aftermarket products at the standard as truck products is very little, if not impossible.

Expect for dependability and flexibility, the quality as well as cost aspect of process design are challenged too. Taking YSR for example, for workshop manuals, given the fact that half of the coach products are made by an external partner, and the production is overseas, there must be a new process to accept all the challenges from quality and cost-saving. Compared with if YSR does the work by sending engineers to the suppliers' companies, either to outsource the work to the partners, or to a consulting company, as how YSR has done, could be one solution with lower cost, but the quality cannot be ensured. Regarding the quality aspect of the process, the approach of outsourcing, in both Lahden Autokori and Higer's cases, is questionable. These consultants, or right now in Lahden Autokori's case its own employee, without full understanding of Scania's standards, cannot possibly deliver as well as how Scania expected. What is more, the fact that there is no standard on what to do, how to do and what is good enough for bus aftermarket services products, makes it very challenging for the engineers from both Scania side and the supplier side to do their jobs. Right now, none

of the information needed by workshop manuals is produced at the first hand by an YSR employee. Without clear standards regarding method studies and time studies, these people should be able to deliver as how they want. This is why after-control by YSR has been a consuming work – if the possibility for deviations was not limited in the beginning by giving standards, the consequence would be naturally endless of deviations.

The speed aspect is clearly suffering, due to the low dependability, lack of flexibility and extra efforts needed to assure quality, etc. Work efficiency would be largely enhanced if problems regarding dependability, flexibility and quality are to be solved.

6.1.3 What influences does the current matrix organization structure have on the collaborations?

When processes are designed to realize the outputs of operations, organization structure is to be developed to ensure the performance of processes (Slack, et al., 2010:239). The aim of organization design is to realize and facilitate processes by the most suitable organizational structure (Slack, et al., 2010:238). In this section, Scania's current organization structure is discussed based on the cooperation with Lahden Autokori and Higer. A general impression is that, Scania's matrix organization is largely challenged by the demands from the cooperation with Lahden Autokori and Higer. Rather, the benefit of an organization structure where better autonomy can be realized, such as an M-form organization design, is desirable (Slack, et al., 2010:241).

When cooperating with an external partner, Scania is supposed to react as one unit. Only when mutual agreements are achieved among all the functions internally, there is the possibility to develop a clear and strong voice externally. In a big organization as Scania, where responsibilities and knowledge are kept in a matrix structure, by each of the lines, the "core force" of a cross-functional team is rather weak. When collaborating with an external partner, new processes should be created, and new problems should be solved. To achieve these, a tight working cross-functional team, as according to an M structure, is needed (Slack, et al., 2010:241). However, when the cross-functional team is very over-shadowed by the matrix organization, their ability to react is limited.

After the product development project, responsibilities, according to Scania's PD process, should fall into the lines (Appendix 2). This management model works well for Scania's truck modular design system (Appendix 2), but not for coach products. Lahden Autokori struggled

to understand Scania’s matrix organization. For a little company as Lahden Autokori, employees easily work and communicate cross functions – not as in Scania, people that work towards Lahden Autokori, for example KB and YSR, are very dispersed. The Lahden Autokori employees that have been working with Scania for years are still confused by Scania’s line-thinking - why there have been so many Scania employees that have contacted Lahden Autokori, and those Scania employees seem not to have communicated with each other?

In Higer’s case, there has been a group of Scania employees working locally with Higer, who are assigned by each other’s line organization. However, Higer needs one united voice – they asked for a site manager from the Scania team. However, even if there is a cross-functional team located at Higer, this team is not as self-independent as it is to be. The team members are still more as assigned to each other’s line organization than as one member of the cross-functional team. One consequence is that, a fluent work flow involving all the functions has not been developed. The efficiency of the cross-functional team that currently is dominated by “line organization” thinking can be largely enhanced if it becomes more self-governed. For example, when there was a limited access to coaches from Higer for YSR to do method studies, there were in fact buses in Scania’s BBM-QA lab undergoing quality controls that could be utilized by YSR. The hinder was the dominance of “line organization” thinking.

In fact, [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED].

6.2 Supply Chain Management

After having analyzed Scania’s internal strategies to realize co-production of coach products with Lahden Autokori and Higer, in this section, discussions on Scania’s strategies managing

these two suppliers are to be made by inviting Cox’s power relations theory. Furthermore, by comparing with the Japanese keiretsu model, some thoughts are to be raised, regarding the management of long-term supplier partners.

6.2.1 What kind of buyer-supplier relationship does Scania have with Lahden Autokori and Higer?

The fundamental difference between a proactive and a reactive buyer/supplier attitude is if the purchase is a short-term behavior that is based on “best trade-offs between functionality and price” (Cox, 2004:349), or a long-term collaboration aiming to achieve innovation and product development together (Figure 17).

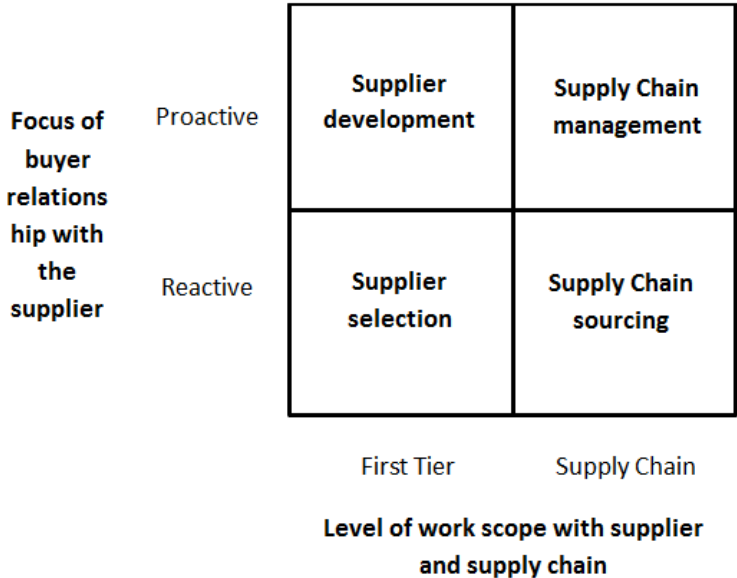


Figure 17 Level of involvement (Cox et al. 2003:5)

The initiation of both of the collaborations seemed to have a strong “reactive” character. In Lahden Autokori’s case, Scania was not involved in the product development process for OmniExpress 3.40 and 3.60 – they were existing bus models of Lahden Autokori and the design was kept as how it was. Without involving in the product development process, it seemed that, Scania wished to keep this partner at arm’s-length. However, the reality that the OmniExpress are one-stop coach products of Scania proved the arm’s-length strategy wrong. The spare part management, for example, suffered for years, because YSR could not receive design information from Lahden Autokori. However, later, even if not planned, the relationship with Lahden Autokori became much closer anyway – Scania invested in Lahden

Autokori on the development of OmniExpress 3.20 and Scania’s design team has participating heavily in the product development process.

In Higer’s case, the selection was very much based on the “cost-saving” purpose. The reason for looking for a bus body manufacturer in China was the lower labor cost. The start

[REDACTED]

The attitude of Scania when starting the cooperation with Lahden Autokori and Higer seemed to be of a “reactive” character, but in fact, by nature, when developing a complete coach product together, it should be certainly of a “proactive” character where the cooperation was to last and to be closely collaborative. Based on Scania’s degree of involvement in Lahden Autokori and Higer’s supply chain, which is that Scania has been very little involved in these first-tiers’ supplier relations, a “supplier development” relationship could be defined (Cox, 2004). However, because of the misjudgment of relationship type problems were created, which was thought to be of a reactive character.

To develop a “supplier development” relationship, a long-term relationship, a comprehensive selection process is usually needed. The buyer is to select a proper partner amongst a number of candidates, knowing that a long-term relationship is to be developed (Cox, 2004). The buyer and supplier should firstly get to know each other, from capability, way of working and even long-term vision (Cox, 2004). This “get to know each other” phase was not sufficiently

done in Higer's case. Without knowing [REDACTED]
[REDACTED]
[REDACTED].

When establishing a long-term cooperating relationship, agreements and knowledge are to be shared. Honda's 13 weeks' supplier development program (Liker and Choi, 2004), as mentioned in the theory part, is a very good example of how an investment in establishing a cooperation could be. By helping establishing a comprehensive understanding and practice of Honda's way of doing things, the company not only built up a sound basis for long term development with the supplier, but also transformed the supplier into a part of Honda's own innovation system. Some kind of "development program" was applied by Scania at the beginning of collaboration with Higer. A production line was built upon Scania's request, and demands regarding quality and aftermarket service were presented by Scania. [REDACTED]

[REDACTED]. The
"development program" becomes an on-going program [REDACTED]
[REDACTED].

Once a "supplier development" relationship has been started, the next step is to maintain the relationship (Cox, 2004). To maintain a "supplier development" relationship, not only a long-term development plan should be prepared, but also heavy involvement of Scania in product development process is in request. In Lahden Autokori's case, the relationship between Scania and Lahden Autokori was kept at arm's-length, until the start of 3.20 project. Unlike its Japanese peers who closely monitor the suppliers and give them feedbacks, supports and suggestions, Scania considered Lahden Autokori, the partner, an independent individual who makes its own decisions and should be on its own when solving problems. However, the truth is the opposite. [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
[REDACTED]
[REDACTED].

In Higer's case, [REDACTED]
[REDACTED]
[REDACTED]. While both Higer and Scania [REDACTED]
[REDACTED]
[REDACTED].

6.2.2 How do the distinctive power positions of Lahden Autokori and Higer affect the cooperation?

An adversarial value appropriation is that, according to Cox (2004:353), “the buyer or supplier is primarily interested in maximizing their share of value from the relationship at the expense of the other side”; while a non-adversarial value appropriation is that “the intention of the buyer or supplier is to provide open and transparent commercial information about profit margins and the costs of operations, such that any improvements can be shared relatively equally” (Table 3). Cox (2004) meant that, the reason for management failure of suppliers was often that the buyer being not fully aware of their power relationships and therefore took the inappropriate management strategy.

Table 3 Comprehensive guide-map (Cox, 2003)

SUPPLIER DEVELOPMENT	BUYER DOMINANCE (>)	Buyer Adversarial Collaboration/Supplier Non-Adversarial Collaboration
	INDEPENDENCE (0)	Not Applicable
	INTERDEPENDENCE (=)	Buyer and Supplier Non Adversarial Collaboration
	SUPPLIER DOMINANCE (<)	Buyer Non-Adversarial Collaboration/Supplier Adversarial Collaboration
SUPPLY CHAIN MANAGEMENT	BUYER DOMINANCE (>)	Buyer Adversarial Collaboration/Supplier Non-Adversarial Collaboration
	INDEPENDENCE (0)	Not Applicable
	INTERDEPENDENCE (=)	Buyer and Supplier Non Adversarial Collaboration
	SUPPLIER DOMINANCE (<)	Buyer Non-Adversarial Collaboration/Supplier Adversarial Collaboration

6.2.2.1 Scania-Lahden Autokori: Supplier development -> Buyer dominance

Lahden Autokori is a much smaller producer than Scania, whose maximum yearly production volume was about [REDACTED] in total, [REDACTED], whilst Scania, having truck as the main product, has been selling around 6000 bus products per year, including both complete bus products and bus chassis. The relationship is obviously dominated by Scania. This is also evidenced by the fact that Lahden Autokori became very depended on Scania under the years of cooperation, having only OmniExpress in production before its bankruptcy.

According to Cox (2004), in a proactive way of cooperation, when it is the buyer dominance situation, the buyer, who is with power, will be interested in maximizing its interest in this relationship, as “buyer adversarial”. This theoretical conclusion is well proved by the Scania – Lahden Autokori relationship, where while Scania’s interest was only OmniExpress, [REDACTED].

However, according to Cox (2004), although this “buyer adversarial collaboration” has been correctly applied by Scania, [REDACTED]. [REDACTED]? Are there no sustainable ways to maintain a “buyer adversarial collaboration” relationship? Some answers can be found in the later analysis based on the Japanese keiretsu.

6.2.2.2 Scania-Higer: Supplier development -> Buyer dominance or Supplier-buyer interdependent

The relationship between Scania and Higer is more complex. Only looking at the production volume, Higer, making 25,000 buses per year, is a much bigger player than Lahden. Besides, [REDACTED]. [REDACTED]. The main reason for Higer to stay in the relationship with Scania, is that it has the dream to sell in Europe. The “Scania” name would be a short-cut for the journey to West. Although Higer shows the willingness to be cooperating, this supplier has its temper. Although Scania is willing to perceive itself as the powerful one in this relationship, it has been stepping back and adapting to this partner. A “buyer dominance” relationship, where the buyer is to maximize its interest in the partnership, seems not to completely agree with the reality.

In fact, the Scania – Higer relationship is more of a supplier – buyer interdependent relationship, considering that both parties are beneficial from the relationship, and neither would lose heavily if there is a breakup. According to Cox (2004), in a buyer proactive

situation, while the supplier and buyer are interdependent, a non-adversarial value appropriation should be realized. This is to say that both the buyer and the supplier are to share improvements with each other, and even the commercial information about profit margins and the costs of operations are to be openly provided to each other. Openness and trust seem to be the key words to maintain a “non-adversarial” relationship.

[REDACTED]. Costs and margins are not shared which raised doubts and suspicion. [REDACTED]

[REDACTED]

[REDACTED]. It a non-adversarial, transparency is the best way out. For such an interdependent relationship as Scania and Higer, there are efforts to make to achieve mutual trust and openness.

6.2.2.3 *Scania’s long-term relationship with Lahden Autokori and Higer – seen from a keiretsu way*

The Japanese keiretsu model is considered as one most comprehensive proactive way of managing not only the first-tier suppliers but even the other tiers in the supply chain. Although, according to Cox (2004), the Japanese keiretsu is characterized as buyer dominant relationship, it is in fact not purely “buyer adversarial value appropriation” but rather a “buyer-supplier non-adversarial collaboration”. To the opposite of “maximizing its share of value from the relationship at the expense of the other side” (Cox, 2004:353), the buyer and supplier rather share transparency on a certain level, and share the benefits and improvements together. The keiretsu way of thinking is indeed to, by jointly working with a supplier, extend and enhance the company’s innovation capability – the suppliers are members of the company’s innovation process. To achieve this, a sound foundation should be created, by getting to know each other, transferring knowledge on product development and production; also, a sustainable collaborating relationship should be achieved, by helping the suppliers to meet goals, helping to correct mistakes and making investment to improve innovation capabilities (Aoki and Lennerfors, 2013). As Aoki and Lennerfors (2013:1) put it shortly, a keiretsu-like partnership is of four words “support, cooperation, trust and goodwill”.

Scania’s strategy of managing Lahden Autokori and Higer seems to be rather as keeping each other as independent individuals than seeing the suppliers as one part of the innovation system. This explains why Scania wishes to keep the partners at arm’s-length. The Japanese

automakers, before the collaboration, would closely “examine” the candidates. Once the decision is made, the Japanese automakers would not hesitate to invest on the suppliers, with the aim to integrate the suppliers into their own innovation systems. Later on, when maintaining the relationship, the Japanese automakers keep challenging and supporting the suppliers so as to develop together with them. Scania, in the cases of these two bus body suppliers, wished to keep the relationship as simple as possible by starting with as little transaction cost as possible, but it became more costly later when problems started to show.

Moreover, [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Trust, that is needed to maintain a long-term partnership, seems to be difficult to achieve between Scania and Higer. Even if the project to “transform” Higer to meet the expectations of Scania is huge, Scania has made a significant effort and, gladly, progresses. Yet, there are still insufficiencies that are going to take a lot more effort and resources to improve. However, on the other hand, a break-up seems to be a huge loss for both of the partners. If there is willingness from the both sides to keep this relationship going, some changes must be done to achieving a win-win situation. In order to achieve a win-win situation, as how the Japanese automakers do, the first step is to identity the supplier’s true competence, instead of the cost-cutting purpose, and thereafter, an integration plan for a long-term mutual develop.

6.3 Organizational identity

In this section, how identity issues within KB have evolved and how they have affected the partnerships are to be discussed. Although it was a coincidence that when the collaborations started, there was reorganization within the bus organization, the identity issues did have resulted in the current two different structures of managing the two bus body suppliers. Therefore, when discussing the future development of the collaborations with bus body suppliers, the internal identity issues within KB is of a strong interest.

6.3.1 How have the organizational identity issues developed and affected the collaborations?

Omni, the subsidiary bus body manufacturer of Scania CV, was once a relatively independent company that nurtured the city bus business for Scania. Except for buying bus chassis from its parent company, namely B-organization, the development of city buses, production and marketing and sales were all managed internally. After years of independency, the relocation due to financial reasons in 2006 occurred to be a threat for Omni's autonomy. Omni was to work together with B-organization, who was in charge of sales of bus chassis for Scania CV. To some extent, it could be understood that, Omni was one of B-organizations' customers that ordered bus chassis. Although it was meant for the two organizations to jointly manage the complete bus business for Scania after the relocation, these two organizations held very different understandings of who they were. Omni was believed to be the subsidiary company, while B-organization was seen as a sales organization of the parent company. Although after 2010, Omni and B-organization were officially merged into the new KB, the separate identities were still kept, which have been overweighing their shared identity – Scania bus.

Although the fusion of Omni and its parent company Scania was a kind of reorganization, there are similarities shared with company mergers and acquisitions – both involve two organizations becoming one, “physically” and ideally “psychologically”. Therefore, by learning from the cases of company merger, the fusion of Omni and B-organization could be better understood.

One of the main challenges after a merger is not the physical integration, but the emotional acceptance of the oneness. According to a social identity theory, groups tend to seek self-esteem by comparing with other groups, where positive comparison can be found (Turner, 1975). In the case of merger, the pre-perception held by the less prestigious organization of relations between the “ingroup” – itself, and the relevant “outgroup” – the higher-status

organization, is vital for the merging outcomes (Hogg and Terry, 2000). Integration is easier to achieve if the less prestigious organization believes that this position is legitimate and stable; but if the belief is the opposite, that this position is illegitimate and new interorganizational status is achievable, disagreements would be raised, from both of the parties (Hogg and Terry, 2000).

In the case of Omni and B-organization, who was the one with a lower status? In fact, the power position of Omni and B-organization was very ambiguous. Omni could be seen as the less prestigious organization, given the fact that it was a subsidiary company, while B-organization was one part of the parent company. However, for Omni, aside from its history of being relatively independent, it ran a complete business, from design to production and finally to sales, while B-organization was solely a marketing organization. For Omni, the lower status was not “legitimate”, while B-organization certainly enjoyed its prestigious identity of being a part of the parent company. Both of the groups, therefore, with the intention of being positively compared with the other, were eager to achieve better so that to confirm their higher status. It became, therefore, a situation of competition, as how it happened in the history.

Although both bus body collaborations were initiated by the commercial organization, B-organization, Omni became the “owner” of OmniExpress. However, Omni was almost not involved in the cooperation with Higer. By handing over the design responsibility of Touring to RB, the bus chassis research and development organization, it was evidential that B-organization shared a stronger identity with RB, as one part of the parent company Scania CV, than together with Omni running the bus business for Scania. However, RB, at that time, only had the knowledge on bus chassis and the interfaces with the bus body, not the bus body itself - knowledge on bus body was held by Omni. Although different opinions were kept regarding how similar/different bus body and coach body were, the invitation of Omni’s knowledge on bus body could not be harmful for the development of Touring. The choice of Omni running OmniExpress business without relying on the rest of Scania and the choice of B-organization keeping Higer “away” from Omni were apparently of the nature of identity disagreement. Omni and B-organization clearly went through a process of mutual disidentification where the two parties should share no similarity (Fiol, Pratt and O’Connor, 2009). Omni, the industrial side, kept working on city buses and OmniExpress while B-organization, the commercial side, worked mainly on A-Series, Touring and bus chassis. One

group's responsibility has been very isolated from the other, which contributes to the lack of a mutual identity between these two subunits. Although the obvious similarity is that both are Scania bus products, due to the need to withhold their separate identities, the similarity was neglected.

In fact, there seems to be another reason for the neglect of the mutual identity – the mutual identity, KB that is weak. It is clearly shown by studies that a strong “superordinate” identity, that is to say a strong shared identity, is the key for the subunits to feel sharing similarities with others (Fiol, Pratt and O'Connor, 2009; Hornsey and Hogg, 2000). Omni and B-organization became one organization, KB, to manage Scania bus, which should be the shared “superordinate” identity. But KB was not the only owner of Scania bus, but there were bus chassis design organization and chassis production that were also parts of the bus business. The identity of KB was never clear – it was more than a marketing organization, but was not all. The ambiguous definition of KB was at the first place, the reason for the lack of a strong identity that could integrate these two parties into one.

It is ideal, if an organization can integrate all its knowledge, so as to identify and involve the right competence at the least cost. Considering innovation capability, Scania CV, although mainly a truck producer, is capable of a large amount of resource and has developed a sound knowledge basis for large vehicles. Even if coaches and trucks are very different products, there are still similarities, for example, chassis and electrical systems. There are possibilities for coach development to share the fruits from the truck side. Moreover, taking financial capability into consideration, if large innovative projects are to be taken place, such as Touring, it is only to be achieved by the joint involvement of the whole organization. For the coach operations to become really innovative and effective, a shared identity among subunits is needed, so that cooperation and knowledge sharing could be done more smoothly.

7 Conclusions

7.1 Results

To sum up, based on the study of Scania's cooperation with Lahden Autokori and Higer, existing problems have been recognized in all the studied areas, namely Scania's operations system for coach production, Scania's supply chain management strategy and the organizational identity issues.

Scania's operations system for complete coach products differs from truck, in the way that the outputs of coach operations are of much smaller volume, larger variation and larger variety. The operations system for complete coach products is therefore of a strong mass customization character, where a high production flexibility is requested. According to our analyses, to outsource bus body manufacturing is a way to realize flexibility for Scania coach production. However, the current operations strategy is incapable of keeping costs optimally low. Lack of efficient IT open platforms to facilitate communication with the external partners and spare part proliferation are identified reasons for the high operations costs.

Regarding the current work processes, a low dependability, a lack of flexibility, a struggling balance between cost and quality, and thereafter low speed are recognized. Insufficient integration of Scania's PD process with the external partners' work processes is the major reason. Moreover, Scania's current matrix organization structure seems to have obstructed both internal and external communication when collaborating with Lahden Autokori and Higer. To be able to react more efficiently towards problems and to make joint decisions, better autonomy is needed within the bus organization.

Based on Cox's power relation view (Cox, 2004), the both partners are of long-term close partner type, with whom Scania should react proactively. However, our analyses indicate that Scania's attitude has been ambiguous and is characterized by, on some level, reactivity. This ambiguity might have led to the insufficient preparation, both internally and externally, before the start of both of the collaborations. Furthermore, Scania failed to realize different managerial strategies requested based on the different power relations it has respectively with Lahden Autokori and Higer. Even though both Lahden Autokori and Higer are long-term partners, the managerial strategies should differ, according to Cox (2004). With Lahden Autokori, where Scania is in the dominant position, Scania has the possibility to maximize its interests; however, with Higer, where both the partners are interdependent to each other, the

relationship is to be built on trust and transparency, this cannot be seen from the empirical studies. By looking at the Japanese keiretsu, Scania's long-term strategy towards these two partners can be further reflected. In contrary to the Japanese automakers who, by collaboration, integrate the suppliers' innovation capability into their own, Scania has the tendency to keep these two supplier partners at arm's-length.

Finally, by inviting organizational identity theories, the reason for the disagreements between Omni and B-organization can be interpreted. These two subunits kept their own distinctive identities after reorganization, due to the fact that neither of them held a legitimated "lower position", and the shared identity – KB – was not strong enough to conquer the distinction. The impacts on the collaborations with both Lahden Autokori and Higer, such as the two management structures, left by the internal identity issues of KB, exist until today.

7.2 Recommendations

Based on the analyses, some recommendations for further improvement are made as follows:

1. To decrease operations costs, effective communication with the suppliers as well as a less amount of spare parts are to be realized. It would save Scania much effort, for example, if a shared system regarding aftermarket service information was developed, so that the partner could do part of the job. Moreover, if Scania is to decrease the amount of spare parts, commonality in design and delaying differentiations are possible solutions. However, a possible prerequisite is that Scania is to participate in bus body design together with the partners.
2. To enhance process dependability, speed, quality and flexibility and to cut costs, the key word is to integrate the partners' work processes into Scania's current PD process. Scania's work processes and standards are to be adjusted to enhance flexibility. Expectations and standards should be clearly made to develop dependability, speed and quality. Take YSR for example, expectations for needed information from the partners and reasons should be explained; furthermore, for workshop manuals, YSR is to standardize work flows and tasks so as to eventually guarantee product quality and decrease costs. Standards for both work process and tasks are in high-time to be created, if YSR is to continue outsource the production of workshop manuals. In fact, internal knowledge management would be benefited by standardization, considering possible staff turnover.

3. Currently, Scania's matrix organization and the dominant line-thinking seem not to be the most effective organization structure in order to manage the new processes where external suppliers are largely involved. One solution is to create better anatomy within Scania's bus organization where all the functions work tighter with each other.
4. The importance of aftermarket services is to be emphasized when Scania develops operations system for its coach products. As mentioned in the empirical studies, earnings made by aftermarket services have become the main financial resource. However, by looking at the two case studies, demand from aftermarket department was not prioritized to allow a better service possibility. To enhance service availability, possibilities should be considered in every stage, from operations management to process design and finally to organization design.
5. As to Scania's supply chain management strategies towards Lahden Autokori and Higer, it is important for Scania to realize that much more is needed to start and to maintain such long-term relationships. In fact, although the transaction costs in the beginning might be higher, if a comprehensive preparation would be done, costs might be saved in later stages.
6. Additionally, if Scania is to integrate the suppliers' innovation capability to its own innovation system, as how the Japanese automakers do, the payback is uncountable. For Higer, considering the initial cost-cutting temptation is not realizable anymore, it is high time to identify this supplier's true competence and thereafter to develop an integration plan. Besides, to cooperate with Higer, trust is to be achieved. This can be, for example, achieved by transparency on costs and margin (Aoki and Lennerfors, 2013). As how the Japanese automakers do to encourage the suppliers to cut the costs, instead of giving cost-reduction expectations, Scania might consider rewarding the suppliers once cost-cutting is achieved.
7. Finally, the different subunit identities within KB after the fusion between Omni and B-organization were due to the fact that these two subunits were kept rather disconnected even after the fusion and a shared superordinate identity was not created. It is clearly shown by studies that, the integration of subunit identities, while leads to intergroup harmony, is a challenging work (Fiol, Pratt and O'Connor). As suggested by scholars, the key of turning disagreement to coexistence is to develop "dual identities", where group members are aware of the fact that, although they are different from the outgroups, they still share some similarities with others (Fiol, Pratt and O'Connor, 2009; Hornsey and

Hogg, 2000). To integrate diverse subunit identities by building up “dual identities”, it seems a strong KB identity is in need. In order to build up a shared identity, the first step is to allow the two groups to see similarities that they have with each other. Common goals or to work on same work tasks are typical measurements applied by organizations (Fiol, Pratt and O’Connor, 2009). By working on the same tasks or working towards the same goals, the relationship can be evolved into cooperation, where responsibility is shared.

7.3 Discussion

7.3.1 Academic contributions

7.3.1.1 *Methodological contributions*

This study, taking Lahden Autokori and Higer as two cases, aims to analyze and illustrate problems existing in Scania’s bus operations when performing outsourcing strategy to produce complete coach products. Due to the abductive nature, the three most relevant theoretical areas were identified to facilitate analyses. Those are operations management, supply chain management and organizational identity. Instead of developing an in-depth kind of analysis, this study is characterized by its width of studied questions. This is partly defined by Scania, as the client of this study, and partly requested by the nature of the empirical material itself. All the three chosen theoretical areas are needed in order to give a full analysis of the empirical material, and without any, there would be a piece of absent truth. By marrying the theories with corresponding empirical material illustrating existing problems by demonstrating what happened in the history, problems have been well identified. Furthermore, by conducting a comprehensive analysis on the empirical material that is characterized by its historical width and context complexity, this study has contributed to the study field of Industrial Engineering and Management with its novel methodology.

7.3.1.2 *Theoretical contributions*

The Scania way of utilizing supply chain to achieve mass customization is relative unique, due to the large part of the product development and production outsourced. The current outsourcing theories range highest to system and module (Alford, et al., 2000). Therefore, this study might shed a new light in the study field of large-scale collaboration among automakers. A “buyer-supplier” relationship can be possibly extended to an even higher level than a system or a module, but it can involve an even larger scale of the outsourced part of the product, for example to outsource the complete body building of a vehicle.

Subunit identity issues widely exist in organizations. However, the studied organizational identity issues are mostly the ones that are resulted by internal static conditions, such as gender, ethical groups and work division (Watson, 2008; Turner, 1975; Turner, Brown and Tajfel, 1979; Wilder, 1981). Furthermore, beside of the fact that the studies done on the subunit identities caused by dynamic conditions are few, they are mostly identity issues led by mergers and acquisitions (Blake and Mounon, 1985; Buono and Bowditch, 1989; Haunschild, et al., 1994; Hogg and Terry, 2000). However, reorganization is by nature not exactly identical with mergers and acquisitions, considering the fact of the already existing mutual organizational identity shared by the groups/departments to be fused. Therefore, this study serves as a good theoretical supplement for the field of subunit identity study, in terms of long-lasting subunit identities created by internal reorganization.

7.3.1.3 *Empirical contributions*

Because of the lack of earlier studies of Scania's bus business and the outsourcing strategy towards external partners, this empirical study of the relationship between Scania and the external bus body builders, Lahden Autokori and Higer, gives a better understanding of how Scania's bus business operates and how they cooperate with external partners. This study complements previous studies of Scania such as the one Giertz (1991) did about people within Scania through hundred years.

7.3.2 *Research credibility*

There are, as mentioned in the beginning of this article, some limitations, such as the brief study conducted on Scania truck operations and the few interviews done with the partners, Lahden Autokori and Higer. With the focus on Scania's management strategy for complete coach products, a better understanding of Scania truck operations would certainly enhance the precision of the empirical material. However, the obtained information, although in some cases could be more concrete, is sufficient for the performance of the analyses. For example, for the operations output 4V analysis, the complete truck sales volume was not obtained, but the fact that it is much higher than complete coach is sufficient for this analysis. Furthermore, information regarding the partner companies' operations strategy and experience of the cooperation, would contribute to an all-rounded view of the context. However, with Scania's management strategy towards the supplier partners as the study focus, the obtained information is sufficient to illustrate current problems. On the other hand, such information would be in better need when suggestions on concrete "action plans" are to be developed.

The accuracy of information gained by empirical studies has been largely validated during interview studies, by different informants repeating the same events. Moreover, the analyses of this study are based mainly on general facts than detailed pieces of information, whose credibility is therefore better grounded.

7.3.3 Suggestions on future studies

The article serves as a start for the study on Scania's operations for coach products. The current operations performance is evaluated and problems and possibilities for improvements are identified. To continue, both Scania's and the partners' internal work processes that are involved in the cooperation can be studied in detail, so as to produce an in-depth understanding of the advantages and disadvantages of the current operations system. For example, possibilities and problems can be studied from the aspects such as the operations processes' dependability, flexibility, cost, quality and speed. Thereafter, even detailed suggestions for improvements can be developed.

Moreover, the study on supply chain management can be further developed. By looking into the supplier partners' company culture, goals, competence and development strategies, new dimensions of "interpreting" current problems and possibilities can be possibly made. A buyer-supplier relationship is by nature mutual and equally responsible by both partners. In Higer's case, this partner's long-term plan and strategy towards the cooperation is of much interest, so as to foresee the future of this collaboration.

After May 1st, 2014, Lahden Autokori has become one subsidiary company of Scania CV. This buy-out is therefore a very interesting study object for both the field of organizational identity and operations management. Based on the current research on mergers and acquisition, the chance of success lies very much in the integration of organizational identities. How is Lahden Autokori's identity to be integrated into Scania CV? How is Scania going to invite Lahden Autokori and to fuse its competence into the bus operations? Just because of the fact that Scania bus operations are still unestablished, compared to the well-developed operations for truck, changes within the bus organization are highly interesting. Only by tracing changes, learning from mistakes, ways to development can be identified, which are also desirable research topics for the academy.

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Appendix

Appendix 1 – Organizational map over Scania CV

Appendix 2 – Scania bus operations and truck operations

Appendix 3 – List of informants

Appendix 1 - Organizational map over Scania CV

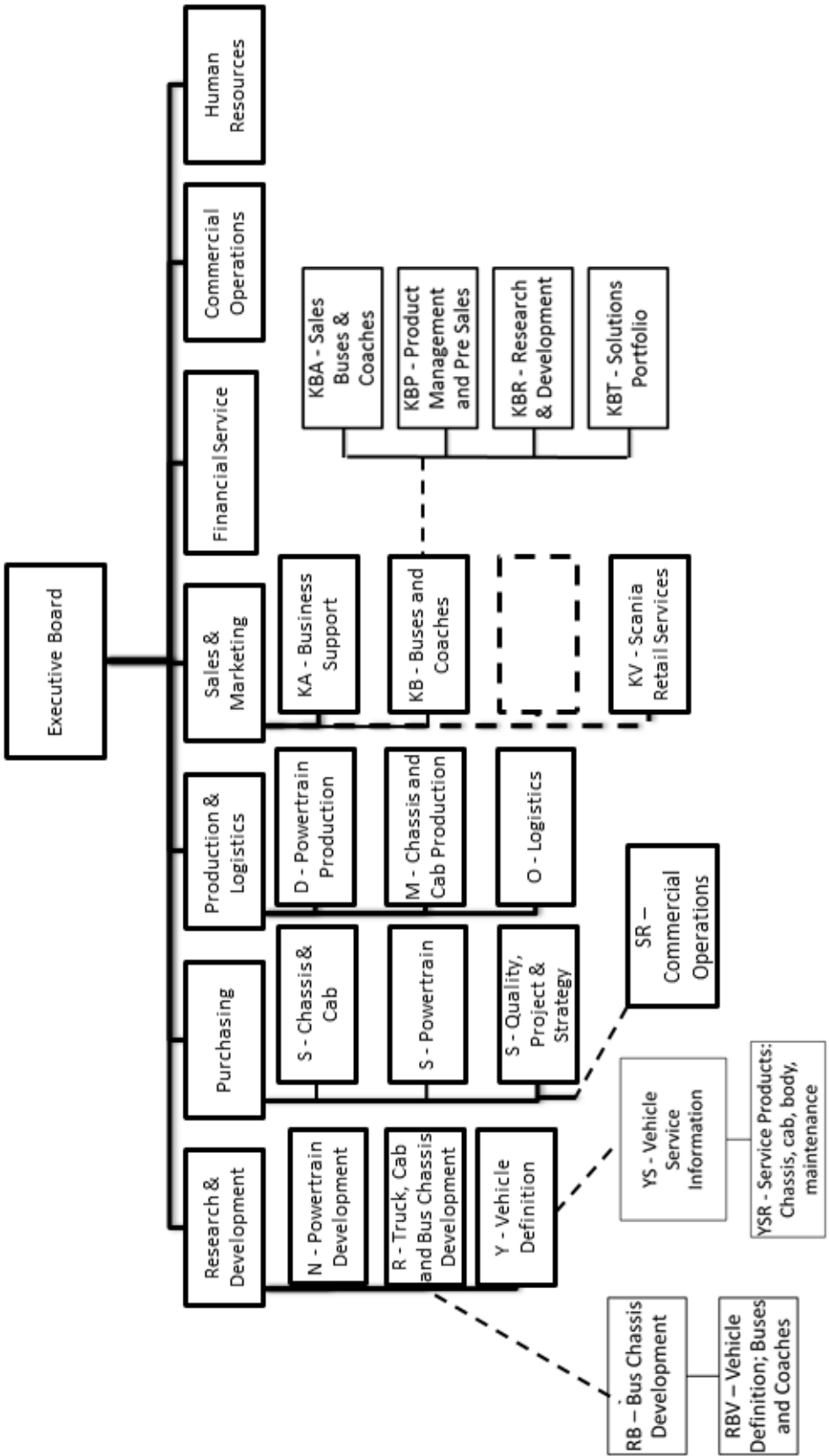


Figure 18 Scania CV organization map

Scania matrix organization

The information comes from scania.com [2] and scania internal material.

Scania's matrix organization structure is divided into sectors (see Figure 18)

- Research & development
- Purchasing
- Production & Logistics
- Sales & Marketing
- Financial Service
- Commercial Operations
- Human Resources

Under each sector there are a number of departments. These departments are divided into sections, which are divided into groups.

Research and development

It includes the whole chain from research, construction and testing, to quality checks in production and of customer vehicle on the road. R&D work with every detail in design, construction and systems is continuously improved to meet market needs and customer demands.

R&D is responsible for developing trucks, bus chassis, engines and associated products. They also have to ensure that the development process is efficient and cross-functional.

The departments from R&D that are involved in Scania's bus business are RB – Bus Chassis Development and YS – Vehicle service information.

The sections that this study has been focusing on are RBV – Vehicle definition buses & Coaches and YSR – Service products Chassis, Cab, body and maintenance.

RBV has an overall technical complete bus responsibility, from city bus to coach.

RBVB develops and updates BBM and BBMQA according to design introductions from green arrow to red arrow. RBVB is the support function for bus body builders and they educate them how to build buses according to BBM and to the workshops, in how to perform BBMMQA inspections.

RBVS works with the Scania-Higer products, the body for Touring, A30 and A80, and technical sales support for buses and coaches. RBVS was put together when the cooperation with Higer was progressing, in 2010

YSR's works with: driver's manual, spare part catalogue, work shop manual and maintenance solutions for chassis, cab and bus body.

YSR has seven groups that each work to give a full level of commitment to the customers.

YSRA – Driver's and bodywork manual

YSRC – Methods and parts, chassis, cab

YSRE – Diagnostics, chassis, cab, body

YSRI – Technical information Chassis, cab, body

YSRM – Maintenance, Information for drivers, Bodybuilders and FMS

YSRP – Parts information Chassis, cab, body

YSRT – Methods and parts Maintenance, body complete vehicle

Purchasing

The purchasing organization has a lot of departments that involve Scania as a global company.

The job of the purchasing department is to draw up strategic plans, run activities to improve quality, delivery precision and the overall costs for all of Scania's products and services.

Purchasing has the mission to provide value to internal and external customers by supplying the required material, equipment and services with the right quality, delivery and cost.

The purchasing department that is involved in the cooperation with Higer is SR. SR is a separate department and does not exist under any of the sectors

Production and Logistics

Production works with the production of trucks, buses and engines, both manufacturing and assembly. They also distribute them to the sales and service organization.

Logistics works to manage the inbound logistics and components from suppliers and the outbound logistics of vehicles.

Production and logistics is guided by the Scania Production System (SPS)

Production and logistics consists of three different areas:

D – Powertrain production

M – Chassis and Cab Production

O – Logistics

Sales and Marketing

Sales and marketing works to develop ways to reach current customers and prospects with information about Scania's products and latest news and they have a relationship with the customer throughout the total lifecycle of the vehicle.

Sales and marketing is responsible for entering new markets, branding of all of Scania's products, the trucks, buses, engines, parts & service and connected services & solutions portfolios.

KB is the department within the sales and marketing sector that works with buses and coaches.

Financial Service

Financial services has a global responsibility for financing and insurance solutions for Scania's customers.

Financial service consists of three different areas:

F – Financial Services

G – Corporate Legal Affairs and Risk Management

J – Corporate Control

Commercial Operations

Commercial operations has a global responsibility for strategies, operations and control of the Scania-owned sales and services companies and dealers. The commercial operations consists of the business units or the distributors.

Human Resources

Human resources supplies Scania with qualified and dedicated employees that can grow with the company.

Appendix 2 - Scania bus operations and truck operations

Scania Product Development Process (PD process)

The product development operation is defined by three major processes, according to Scania’s PD process. These three sub processes are called yellow arrow, green arrow and red arrow (Scania internal material) (Figure 19 and 20).



Figure 19 Scania Product Development Process (Scania internal material)

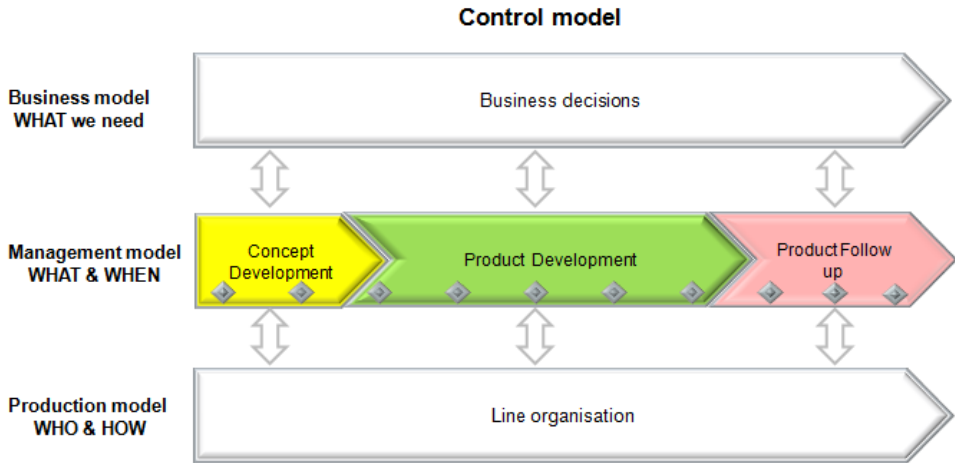


Figure 20 Scania Product Development Process (Scania internal material)

Yellow arrow process is the predevelopment process. It is usually taken on in the form of project, with input from the customers, sales persons, distributors, suppliers, internal customers and authorities, etc. Yellow arrow projects are relatively small, led by engineers and the aim is to prepare a well-defined product concept that is to be further developed.

Green arrow process is the official product development process. Once a product concept is developed and selected, a green arrow PD project will be started to further develop the new product. A green arrow project is led by a project manager with a cross-functional team. The team members are representatives from all the involved functions, from marketing to design, from aftermarket service to production, etc. By working cross-functionally can a new project fulfill the needs from different customers, both internally and externally. A green arrow PD project is usually much larger projects than yellow arrow projects that demands large input of both material and human resources.

The last phase of a green arrow project is to prepare for the market launch. Once the new product is officially produced for the market, a green arrow project is finished, while the red arrow process starts. The red arrow process, also named product follow-up, is to maintain and update the launched products, mainly in term of product quality. To enhance the quality, red arrow organization receives feedback from both the customers and the distributors, together with feedback from the repair workshops, changes are introduced regularly throughout the year.

Scania organizational structure -matrix organization

Scania’s organizational structure is matrix organization (Figure 21), where functions are divided and each of the functions is defined as a line organization (Figure 22). The major functions are Research and Development (R&D), Purchasing, Production and Logistics, Sales and Marketing, Financial Services, Commercial Operations and Human Resources (Scania.com/Organizational structure). Within each of the functions, responsibilities are further defined and divided into smaller units. For examples, within the R&D organization, there are subunits for powertrain, chassis, truck cab and bus body, etc.

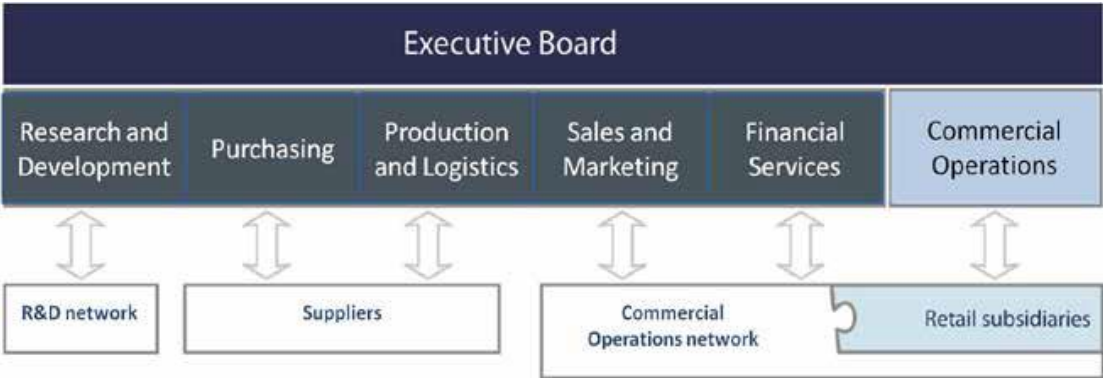


Figure 21 Scania governance structure (Scania internal material)

A cross-functional team is formed by people from different line organizations. A green arrow PD project, as mentioned above, consists of representatives from different line organizations. Once the product development project is finished, the configuration of the new product is owned by a “product manager” who is usually from the R&D department.



Figure 22 Scania matrix organization and cross-functional teams (Scania internal material)

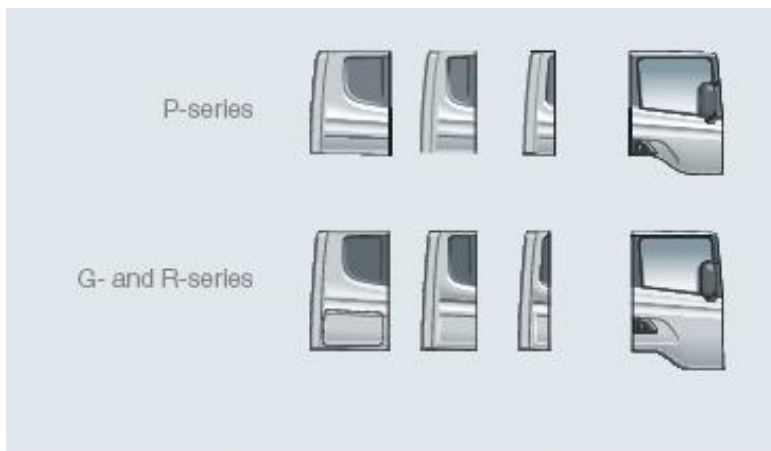
Scania’s production system for trucks – modular design

Scania has a well-developed modular design system for its, mainly, truck products. The development of the modular thinking has been over many decades. The modular design enables the company to offer the customer a tailored vehicle with a limited number of components. The basis for modularization is the standard interfaces. The common interfaces make it possible to install new components without changing the surrounding components, and enables different combination of modules. By modular design, Scania manages to offer the market a big variety of truck products.

Take Scania’s cab system as an example, the modular design can be demonstrated clearly. As shown in Picture 6, all the cabs consist of a common body and common outer panels. With different heights, the cabs allow different applications based on the customers’ requests on space and comfort. Picture 7 shows the modular design systems for doors.



Picture 6 Scania modular designed cabs (Scania Annual Report 2013)



Picture 7 Modular design for doors

Appendix 3 - List of informants

Department and section	Number of informants interviewed
<u>Scania - Higer team in China</u>	7
<u>Higer employee</u>	1
<u>KB – Buses & coaches marketing and sales</u> - KBA - KBI - KBP - KBR - KBX	11
<u>KED – Market developing and support</u>	1
<u>Lahden Autokori</u>	3
<u>RB - Bus Chassis development</u> - RBP - RBV	7
<u>SRB – Commercial operations</u>	1
<u>SGC – Commodity Parts</u>	1
<u>YP – Project office</u>	2
<u>YS – Vehicle definition</u> - YSA - YSE - YSR	15
<u>YQ – Field quality</u> - <u>YQR</u>	2
<u>Others (used to work with Lahden Autokori/Higer)</u>	2