Succeeding in Supplier Development
A Qualitative Case Study of Scania CV AB Suppliers

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Quality and Management

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A Qualitative Case Study of Scania CV AB Suppliers

Att lyckas med leverantörsutveckling
En kvalitativ fallstudie av leverantörer till Scania CV AB

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With this said, we now look forward to new challenges and hope you will enjoy reading our work!

Tobias Granman & Magnus Helgosson

Södertälje, 2012-12-13
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ABSTRACT

Title Succeeding in Supplier Development:
*A Qualitative Case Study of Scania CV AB Suppliers*

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Purpose To investigate under which conditions SCD’s work with implementing a lean mindset and behaviour at key suppliers is successful. To help fulfilling the purpose this thesis aims to answer the question:
*What affects how the production unit of a Scania key supplier adopts a lean mindset and behaviour with focus on continuous improvements?*

Methodology An exploratory multiple case study with a qualitative data analysis and inductive approach. The cases consist of five Swedish first-tier suppliers to Scania CV AB, and a pilot case study conducted at Scania, Södertälje.

Result The case study resulted in a categorisation of suppliers into three groups based on their characteristics and ability to adopt a lean mindset and behaviour:

**Group I:** Lack of direction, inconsistent management culture, no deeper understanding or interest in lean, no involvement or responsibility of operators in improvement work, a tendency to copy tools and methods given by external help directly into the organisation.

**Group II:** Strong sense of direction, strong management culture, a personal interest in lean and improvements, an “us and them” culture between managers and operators, and a strong sense to develop tools and working methods in-house and be very restrictive with applying external thoughts in the organisation.

**Group III:** Clear long-term direction; primarily evident among managers, clear targets on an operational level to guide the rest of the organisation, a supportive management culture, an expectation on operators to perform improvement work, and openness to external help but a strong sense of filtering and adapting to the own organisation.

Conclusion Our conclusion is that SCD is variously successful due to that the same approach has been used despite different needs of the suppliers. The recommendation is to analyse suppliers with tools provided in this research and adapt the development approach to specific supplier needs:

**Group I:** No prioritisation of long-term development of this group.

**Group II:** Provide guiding from experience to management team, focus workshop on operators and their nearest contact points.

**Group III:** Provide possible solutions to specific problems.
SAMMANFATTNING

Titel Att lyckas med leverantörsutveckling:
En kvalitativ fallstudie av leverantörer till Scania CV AB

Uppdragsgivare Scania CV AB, Södertälje, Sverige

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Syfte Att undersöka under vilka förutsättningar SCD är framgångsrikt i arbetet med att införa ett Lean tankesätt och beteende hos Scanias leverantörer. För att uppfylla syftet är målet att besvara följande fråga:
Vad påverkar hur produktionsenheten hos en av Scanias leverantörer tar till sig ett Lean tankesätt och beteende med fokus på ständiga förbättringar?

Metod För att besvara syftet har en explorativ flerfallstudie gjorts med en kvalitativ dataanalys och ett induktivt tillvägagångssätt. Fallföretagen består av fem svenska leverantörer till Scania CV AB samt ett pilotfall som undersöks vid Scania, Södertälje.

Resultat Fallstudien resulterade i en kategorisering av leverantörerna i tre grupper baserat på deras förmåga att ta till sig ett Lean tankesätt och beteende. Grupperna karaktäriseras av följande:

Grupp I: Saknar riktning, otydlig ledningskultur, ingen djupare förståelse eller intresse av Lean, ingen delaktighet eller ansvar hos operatörerna i förbättringsarbetet, en tendens att kopiera verktyg och metoder som ges av extern hjälp direkt in i organisationen

Grupp II: Tydlig riktning, en stark gemensam ledningskultur, personligt intresse i Lean och förbättringsarbete, en ”vi och dom”-kultur mellan chefjer och operatörer, utvecklar verktyg och arbetsmetoder internt med en restriktiv inställning för att tillämpa externa tankar i organisationen.

Grupp III: Tydlig långsiktig riktning, tydliga operativa mål för att styra organisationen, stödjande ledningskultur, operatörerna förvänstas utföra förbättringsarbete, organisationen är mottaglig för externa tankar men filtrerar och anpassar till sin egen situation.

Slutsats Vår slutsats är att på grund av att samma tillvägagångssätt har använts oberoende av leverantörens behov så har SCD varit varierande framgångsrikt med sin utbildning. Recommedationen är att analysera leverantören med de verktyg som presenterats i denna rapport och utifrån detta anpassa utbildningen efter leverantörens specifika behov:

Grupp I: Ingen prioritering av långsiktig utveckling av denna grupp

Grupp II: Ge vägledning och delge erfarenheter till ledningen. Fokus på operatörerna och deras närmsta kontaktperson vid utbildningen

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1 Introduction

The opening chapter is intended to give a basic understanding of the underlying problem for this thesis. Further the purpose of the research is presented as well as its delimitations.

1.1 Corporate Overview – Scania CV AB

Scania was founded in 1891 and is one of the world’s leading manufacturers of heavy trucks, buses and engines for industrial and marine use. Worldwide, Scania is represented in over 100 countries with production units in Europe and Latin America. The company has approximately 37,500 employees and in 2011 the turnover was 87,686 MSEK with an operating margin of 14%. In the last seven decades Scania has managed to report a profit each year and in order to achieve the pronounced goal of maintaining a strong, sustainable competitiveness and profitable growth, Scania has a clear focus on continuous improvements to become more efficient. The foundation for this, is the Scania Production System, henceforth SPS (see figure 1), first introduced by former CEO Leif Östling in the early 1990’s. Since the introduction, SPS has been constantly enhanced and is now deeply rooted and seen as a natural part of the daily work. (Scania.com, 2012)

Scania’s three core values; customer first, respect for the individual and elimination of waste provides a foundation for the four basic SPS principles; standardised working methods, right from me, consumption controlled production and continuous improvement. Together, the core values and principles form a compass that helps all employees work in a common direction, and also make decisions to make the company better. Within Scania, each individual is now encouraged to continuously improve her own workplace and improvement work is performed by the very person working at the improvement area. This has led to both a higher productivity and also less absence due to illness. Because of the resemblance with the Toyota Production System, SPS has helped contribute to the public opinion of Scania as one of Sweden’s most successful cases of implementing Lean Production (Scania Produktionssystem, 2007; Carrick, 2012)

Figure 1: The Scania House, a visualisation of SPS (Scania Produktionssystem 2007)
1.2 Problem background

The automotive industry is characterised by high global competition and tough demands on quality and safety. Due to this, companies face a great challenge of constantly developing their business to improve or even keep their competitive position. From a focus on improving machine and operator specific chores in the early twentieth century, through a development of internal factory flow efficiency in the latter part of the century, companies have now begun to put greater effort into developing the efficiency of their supply chain. (Cao et. al., 2010) The sought after benefits from this are higher quality and delivery precision as well as lower costs. This derives partly from the increasing popularity of Just-In-Time production (Gadde and Håkansson, 1998) as well as a higher tendency to focus on core competences and to outsource an increasing proportion of the value adding production process to suppliers. Supply chain management has therefore come to play an increasingly important part in modern companies. (Bergman and Klefsjö, 2002)

According to Bergman and Klefsjö (2002), high quality on products delivered from suppliers is essential to fully benefit from high internal production efficiency. Scania has since the introduction of SPS in the early 1990’s come a long way in improving both their internal quality and making their production processes less resource intensive. In most cases, the company lies far ahead of its suppliers concerning these aspects and has therefore started to pay greater attention to how to fill the gap. An explicit strategy within Scania is to primarily focus on small and medium sized suppliers and engage in a long-term commitment to achieve benefits for both parts. This creates a large supplier base and hence a large purchasing unit; Scania Global Purchasing. Within this unit a sub-unit called Supply Chain Development, henceforth SCD, consisting of four senior consultants, is assigned with the primary objective to develop key suppliers to achieve higher quality, higher delivery precision and lower costs on a long-term basis.

In order to reach their long-term goals and at the same time retain sustainable cooperation with key suppliers, SCD has opted for an approach with the desire to implement a lean mindset and behaviour focused on continuous improvements (Appendix 1). This approach mainly consists of two training blocks exercised during a three day workshop in the suppliers’ own environment and is intended to work as a catalyst to change the behaviour and mindset to make the suppliers more self-propelled in improving their own business. The workshop consists of a small portion of theoretical briefing, but the main part is practical execution of certain improvement tools, applied by the participants to chosen areas of their factory. The origin of the two training blocks is Scania’s internal education in their own production system, mainly executed during the recession in 2008 and 2009. However, SCD has made changes in the training blocks to better serve their own purpose, and has used the same approach during all supplier workshops.
1.3 Problem definition
Although SCD has used the same approach in each of their supplier workshops, the result in implementing a lean mindset and behaviour with focus on continuous improvements varies between cases. SCD has made no official follow-up on what impact their workshops have had on changing the mindset and behaviour of the supplier, but based on frequent communication and visits by Scania, it is evident that their message has been received and utilised in different ways. SCD has therefore expressed a need to understand why their workshops are more successful in some cases than in others.

1.4 Research purpose
The purpose of this master’s thesis is to investigate under which conditions SCD’s work with implementing a lean mindset and behaviour at key suppliers is successful. To fulfil this purpose this thesis aims to answer the following question:

What affects how the production unit of a Scania key supplier adopts a lean mindset and behaviour with focus on continuous improvements?

1.5 Research delimitations
The research is delimited to include five first-tier suppliers located in Sweden and a production unit at Scania, Södertälje, which has served as a pilot study. This is due to the limited amount of time allocated for the research and also to avoid an enhanced complexity of the problem from vast cultural work differences in different countries. The case suppliers chosen for this investigation are picked out by Scania and the criteria for included cases are:

- SCD has conducted the two training block workshop.
- First-tier supplier of direct material.
- 50-200 employees.
- Supplier has agreed to be a part of the research.

The researchers have also had the opportunity to evaluate whether a supplier is suitable for the research, although the evaluation has been limited to include a Scania chosen case or not, and not to suggest other cases suitable for the research.

Another delimitation of the research is that the workshop held by SCD is seen as constant for each case. Although the same methodology and presentation material have been used, there has been some variation in which SCD employees that has participated in each workshop. This is a possible source for the varying result that will not be taken in consideration during the research, mainly because of the complexity to investigate this variable but also since SCD is a small unit with similar experience and close communication, and the variation from this is believed to have a small impact on the result.
2 Theoretical frame of reference

This chapter will present existing theory regarding the issue being investigated, and provide the reader with knowledge necessary to follow the methodology chapter, interpret the result and better understand the forthcoming analysis.

2.1 Key areas regarding a lean mindset and behaviour

Based on an extensive study of literature, guided by gained educational knowledge, consultation and discussion with SCD and the university supervisor, key areas regarding the investigated problem have been singled out. The purpose of this frame of reference is to gain enough of a theoretical knowledge to structure the case studies, and use the time given in an as efficient manner as possible. Although the references give an indication of what to look for, they are merely supposed to equip the researchers with research goggles strong enough to recognise possible areas of interest, but not so strong as to only focus on specific details and miss the overall picture.

2.1.1 The individual

The role of the individual organisation member is emphasised both when it comes to continuous improvements (e.g. Bergman and Klefsjö, 2002; Liker and Meier, 2006), and succeeding with change initiatives (e.g. Hughes, 2006; Poksinska and Swartling, working paper). Searcy (2012) refers to the implementers, workers and support workers as the heart and muscles of a lean effort. They are responsible for converting the existing system into a lean one, and without them lean are merely words on a paper. The high level of failure in change initiatives has lately put focus on the fact that how to manage a change is not the only factor that affects the outcome. More and more researchers have pointed at changing the individual’s thinking and behaviour as the core of change programs. (Shin et al., 2012)

Al-Jawazneh and Smadi (2011) stress the fact that continuous improvement depends on the involvement and motivation of employees to eliminate waste. Further they state that detailed problems at individual process steps requires the knowledge of for instance a skilled operator to be improved, but in order for continuous improvement programs to be overall successful improvements must be made with a common goal in mind and by motivated members. For any long-lasting, successful work with continuous improvement, commitment and motivation of the people involved is a prerequisite.

In his article: One more time: How do you motivate employees? Originally published in the Harvard Business review in 1968, Frederick Herzberg describes motivation as follows:

“If I kick my dog (in the front or in the back), he will move. And when I want him to move again, what must I do? I must kick him again. Similarly, I can charge a person’s battery, and then recharge it, and then recharge it again. But it is only when one has a generator of one’s own that we can talk about motivation. One then needs no outside stimulation. One wants to do it.”

(Herzberg, 1987, p. 110)
In his book *The motivation to work* (1959), Herzberg presented his famous two-factor theory, dividing the influences affecting people at work into hygiene factors and motivational factors. He stated that hygiene factors, including salary, benefits, and supervision etc., are necessary not to cause job dissatisfaction, but on the other hand they do not create any motivation or job satisfaction when fulfilled. Instead, this is created by motivational factors such as recognition, responsibility and personal growth. Along with Maslow’s (1943) basic needs for human satisfaction (i.e. physiological, safety, love, esteem and self-actualization) and the pursuit of fulfilling a higher level of needs when basic ones are achieved, motivational theory plays a central role in understanding the commitment of employees.

### 2.1.2 Management and leadership

Clear management and strong leadership are two key ingredients for becoming a successful organisation. They also play a great part in getting better each day and distinguish an organisation’s chances of succeeding on a long-term basis. (Liker and Meier, 2006) However, the meaning of the two terms can be somewhat unclear. Bertocci (2009) describes the manager’s role as to set, plan, organise and structure accomplishable goals, whereas a leader instead tend to visualise and communicate what has to be done, and also empower people to reach the same goals. Further, a manager ensures plan adherence and focus on how the company is doing, where instead a leader places great emphasis on developing, mentoring and encouraging people towards continuous improvements both in thinking and action (Bertocci, 2009; Liker and Meier, 2006). Bertocci (2009), further states that leadership can be present on all levels of an organisation and do not need to be related to a certain position or profession.

Kotter (1995) stresses the importance for managers to establish an initial vision for the company that can be easily communicated and appeals to every employee. In order to be successful in reaching this future state, leaders will then have to practically convert this vision into reality (Bertocci, 2009). Further, managers need to set up clear and reachable goals, both short-term and long-term, that set the direction for the entire organisation. Particularly important are the short-term goals for showing the employees that the changes being made produces the expected results. A successful leader can then use these wins to motivate people to go further and solve even bigger problems or go to the next phase in the change programme. (Kotter, 1995) Herold and Fedor (2008) agree, but emphasise the importance of the managers and leaders to be fully committed to the change and the goals that have been set. Striving for an organisational commitment to change, Shin et al. (2012) suggest that before the change can start, high levels of inducement should be provided. To maintain change, managers should ensure possibilities to communicate the current progress and reward on success. Shin et al. (2012) further point at the importance of providing adequate training concerning new working methods included in the change. Banas and Wanberg (2000), support these findings and add that training strengthen employees’ confidence regarding their ability to change.

According to Herold and Fedor (2008), it is crucial that managers honestly believe in the need for change, and Kotter (1995) further states that managers have to be convinced that business as usual is not an option and then set an example to others. Ventris (2004) agrees, saying that the most effective way of communicating the urgency of change is through action. However,
to be successful in the long run, this has to be translated into organisational beliefs, where the manager works as a catalyst to make it happen (Herold and Fedor, 2008). The need for change and even more important; *what’s it in for us?* has to be clearly communicated to the employees by the manager (Ventris, 2004). Even when this has been well anchored, there are still many other characteristics that have an impact on the change success. For example managers have to believe in the personnel and encourage risk taking and non-traditional ideas (Kotter, 1995), and sufficient resources must be provided (Ventris, 2004).

Some findings imply that the manager’s actions can reduce the resistance to change. Dam et al. (2008), stress that to achieve this, providing necessary information, building up trust in those managing the change, and ensuring opportunities for participation making the change happen are key factors.

### 2.1.3 Company culture

While many companies have tried to adopt lean in their own organisations, far from everyone succeed (Badurdeen and Gregory, 2012). Many authors have addressed this subject and pointed at the company culture as the most important factor to be successful in lean production (e.g. Badurdeen and Gregory, 2012; Liker and Meier 2006; Mann, 2010; Searcy, 2012). Badurdeen and Gregory (2012), state that to successfully achieve a lean change, a culture must be adopted where spotting problems and flaws is promoted as valuable and a natural part of work. Searcy (2012) emphasises the importance of a changed mindset and company culture to succeed with lean change and also the involvement of every employee within the organisation.

Edgar Schein (2009) defines culture as:

“... a pattern of shared basic assumptions learned by a group as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.”

*(Schein, 2010, p. 18)*

Kotter (1995), states that a successful and lasting change depends on a change of company culture. He further states that culture is behaviour, rooted in social norms and shared values, seen as; “the way we do things around here”. Mann (2010) explains culture as the sum of people’s habits related to how they get their work done. While stating that culture is critical, he argues that it is very abstract and an idea rising from experience, and to change it you have to focus on changing more concrete targets like leader’s behaviour, bad habits and expectations. Hughes (2006) acknowledges the fact that all organisational change programs have a common cultural element in trying to change the mindset of employees. In order to achieve a cultural change, he states that the common ingredients are identifying the current shared values and norms, stating what the culture should be, identifying the differences between the two and then developing a plan to close the gap. This recipe lies close to the unfreeze-change-freeze change model presented by Lewin in 1947. However, a strong present culture might act as a barrier against successfully changing (Hughes, 2006).
Poksinska and Swartling (Working paper), present a model of forces affecting the individual in a change situation. They stress that culture, if clear and well established within the company, can help guide changes in the right direction and ease the process of introducing new thoughts. However, in the case of an unclear culture or poorly established company values, a culture will still exist, much based on group dynamics of separate groups within the organisation. This is in line with Schein’s (2010) definition of culture presented above, but Poksinska and Swartling (Working paper) further identify four types of groups affecting individual change behaviour in different ways. Work groups, professional groups and political groups were, when highly influential, creating strong resistance to change, while an influential improvement group reduced the resistance to change. (Poksinska and Swartling, working paper)

2.1.4 Contextual factors

To understand specific changes in specific organisations, there are a number of contextual factors, such as environment and historical context, to take into account (Hughes, 2006). Dawson (2003), states that the contextual dimension refers to both past and present external and internal operating environment. External contextual factors affecting change are for example: changes in competitor’s strategies, level of internal competition, government legislation, changing social expectations, technological innovations and changes in the level of business activity (Dawson, 2003). Worthington and Britton (2009), further expand the view on an organisation’s general environment by dividing it into macro-environmental factors and the immediate environment. Macro-environmental factors include economic, political, socio-cultural, technological and legal influences on business, while the immediate environment consists of suppliers, competitors, labour markets, financial institutions and customers etc. (Worthington and Britton, 2009)

According to Amburgey et al. (1993), an organisation is more likely to repeat a change it has previously experienced. Previous co-operation between customer and supplier might also cause both parts to put more effort into changing (Gadde and Håkansson, 1998). Hughes (2006), states that an organisation has its own unique context, which is a result of historical and present development, and therefore it is impossible to single out contextual factors prior to empirical research that might be of particular interest.

2.1.5 Change agent

To be successful in change, whether it concerns individual or organisational change, planned or not, the change has to be managed (Burnes, 2009; Kaila, 2006; Lunenburg, 2010). Change agents are commonly mentioned in the literature as the individual or group that has the responsibility and undertakes the task of introducing and managing change (Burnes, 2009; Ford et al., 2008; Lunenburg, 2010; Sims, 2002). In addition, Lunenburg (2010) explains change agents as those who have the skill and power to stimulate, facilitate, and coordinate the change effort. Ford et al. (2008), also suggest that change agents include those who call for and sponsor the change. Change agents can be internal, e.g. managers or employees, or external, e.g. consultants (Burnes, 2009; Kaila, 2006; Sims, 2002)

According to Sims (2002), the internal agent should have good knowledge and take advantage of the organisation’s past history, political system, and culture to successfully lead changes.
Further, access to information (Paton and McCalman, 2008), an understanding of the operating procedures, and a good relationship with personnel are advantageous (Lunenburg, 2010). However, an objective view and possibly being a part of the problem (Sims, 2002), and paradoxically, a personal relationship with employees may have a negative impact on leading change (Jain, 2005). An external agent on the other hand is much less affected by organisational norms (Kaila, 2006), and not bounded by culture or traditions due to a more holistic view and a fresh outside perspective (Lunenburg, 2010).

The benefits of an internal agent are to a great extent the disadvantages of an external, and vice versa. Therefore, some literature suggests a combination of both to be successful when dealing with changes within an organisation (Jain, 2005; Lunenburg, 2010; Sims, 2002). Jain (2005) emphasises that when an external agent contributes with an outsider’s objectivity and professional knowledge, and combines this with the organisational knowledge of the internal agent, it results in a highly beneficial approach. Kaila (2006) agrees, but also stresses the importance that the external agent adopts a consultation and initial training role, and leaves the rest of the change programme to the organisation itself. However, Paton and McCalman (2008) point out the importance of that the internal agent does not lead changes within his own working area, and to avoid this, the manager should choose internal agents from different departments. Lunenburg (2010) believes that the relationship between the change agent and the key decision makers is of great importance for whether any change effort is successful or not.

2.1.6 Improvement tools

According to Liker and Meier (2006), standardised tasks and processes are prerequisites to both captivate the present competence as well as to make lasting improvements. Standard procedure tools such as: kanban rules, 5S procedures, colour coding and standard work in processes are all examples of how to control and standardise a process to create a platform for further improvement (Liker and Meier 2006). Modig and Åhlström (2011) however, stress that many companies focus too much on the means of Lean production instead of the goal. They emphasise that the means of reaching one’s goal cannot be standardised and must be formed from the specific need of the organisation. However, there are many tools that can help a company to work with continuous improvements, and without a standardised approach most of them will be in vain (Liker and Meier 2006).

Common tools to solve problems and find improvements are root cause analysis (5 why) and quality approaches like Plan-Do-Check-Act (Liker and Meier 2006). In order to get a basis for decisions it may also be necessary to collect data. However, the data must highlight the current issue and to collect data should not be an end in itself. (Bergman and Klefsjö, 2002) Collected data can be presented with a various number of tools, e.g. “the seven improvement tools” presented by Bergman and Klefsjö (2002), including histograms, Pareto charts and Ishikawa charts to name a few. Liker and Meier (2006), stress the importance of visual controls in the working area to help members of the organisation to easily access information and see the big picture. Further they state that this will make problems more present and get more people involved in improvements.
Other common tools for continuous improvements includes kaizen events (improvement circles), daily control meetings, mistake proofing or setup reduction (Searcy, 2012), but as stated above by Modig and Åhlström (2011), and supported by many (e.g. Liker and Meier, 2006; Sugimori et al., 1977), tools for continuous improvement must be adjusted to the problem they are supposed to solve.

2.1.7 Technical system

Technology is a central part of work for most employees of today. In many cases it can also be a source of resentment, conflict and opposition in workplaces. A possible reason for this is the fact that technological solutions are often chosen, designed and implemented by others than the ones supposed to use it. (Watson, 2008) When describing technology, Hughes (2006) emphasises that it should not only be seen as hardware or equipment, but as a wider term ranging from computer systems to organisational structures for information. Further he states that no transformations in work or organisation can be fully understood “without considering both the technological changes and their institutional contexts” (Hughes, 2006, p.99).

In order to find the best solutions for improvement, technology must be used in an appropriate manner to support the current lean system. A common mistake among companies striving to become lean is to rely too much on technology to solve their problems instead of using their own minds. It is important not to find suitable problems for existing technology, but to instead consider if technology might be a suitable solution for existing problems. (Liker and Meier, 2006) Rosenbrock (1989) put it as: “People should not be subordinate to machines; machines should be subordinate to people.”

Another aspect of technology in the context of continuous improvements is that a technological system should support people trying to improve (Liker and Meier, 2006). In accordance with Hughes (2006) broader view on the term technology presented above, this means that aids to for instance understand collected data as well as the organisational structure for improvement propositions should be customised to encourage employees to continuously improve.

2.1.8 Working with processes

Process orientation is a key feature of lean philosophy and to look at processes as connected in a unanimous system is important to achieve a learning organisation (Bergman and Klefsjö, 2002; Morgan, 2005). Modig and Åhlström (2011) point out that processes exist everywhere in an organisation, whether it’s a production process, sales process or procurement process. A company has many supportive functions, which must be improved as well (Modig and Åhlström, 2011), and system thinking is crucial to see the whole picture. Further they state that in order for an organisation to be lean, it has to be focused on flow efficiency rather than resource efficiency. Flow efficiency exists in a company’s processes, and therefore, in order to improve the flow, there must be an understanding of how the processes work (Modig and Åhlström, 2011).

Customer focus is another key feature of lean (Modig and Åhlström, 2011; Morgan, 2005). When improving processes, it should always be done to add customer value. Therefore, opti-
mising individual tasks or components might not be an actual improvement unless the final output of the process creates higher customer satisfaction. (Morgan, 2005) Clear roles and responsibilities within a process, as well as a good understanding of how every process fits in the bigger picture, will therefore help to find improvements to increase customer value, as well as to create a common goal for everyone involved. Also, knowing who your internal customer is within the process, and what his or her demands are, are of most essence to create an effective process. (Bergman and Klefsjö, 2002)
3 Methodology

The following chapter is intended to create an audit trail to allow the reader to follow the path of the conducted research and key decisions taken from conception to conclusions.

3.1 Research method

According to Yin (2008), a research question based on a “what” question can lead to either a descriptive or an exploratory type of research purpose. In cases where “what” can be interpreted as “how much” or “how many”, Yin (2008) proposes a descriptive purpose and that this in many cases is most suitably conducted through a survey. Although the research question for this thesis could be interpreted as to identify a number of factors for success, a study of literature and previous research cases implies that the problem is of a more complex nature. The aim of the thesis is to give a better understanding to why SDC’s work is variously successful, and the specific nature of both the workshops held by SCD and the context at each supplier reduces the possibility of relying on previous research to explain this. According to Yin (2008), an exploratory research question of this kind is a justifiable basis for conducting an exploratory study, which will constitute the starting point for this thesis. Further he states that an exploratory study could be conducted through any research method presented in table 1 below.

Table 1: Three conditions from which to decide a research method. (Yin, 2008, p. 8)

<table>
<thead>
<tr>
<th>METHOD</th>
<th>Form of Research Question</th>
<th>Requires Control of Behavioural Events?</th>
<th>Focuses on Contemporary Events?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>How, why?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Survey</td>
<td>Who, what, where, how many, how much?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Archival Analysis</td>
<td>Who, what, where, how many, how much?</td>
<td>No</td>
<td>Yes/No</td>
</tr>
<tr>
<td>History</td>
<td>How, why?</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Case Study</td>
<td>How, why?</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

When choosing a research method for conducting an exploratory study, the three columns in the table presented above can be used as guidance. However, Yin (2008) states that these methods might be more or less overlapping, and the goal is mainly to avoid choosing one method when another one would be more advantageous. Denscombe (2007) describes a case study approach as being characterised by its focus on one instance of the thing that is to be investigated. One of the benefits of a case study over a survey is the ability to conduct an in-depth and detailed study to find things that might not have appeared in a more superficial research (Denscombe, 2007; Lekvall and Wahlbin, 2007). An archival analysis in the table above also lacks of the possibility to go deep in detail (Yin, 2008). A case study is therefore advantageous when trying to understand relationships and processes within social settings, as its in-depth approach gives an opportunity to unravel complexities of a given situation and on the same time deal with the entirety of a case and give a holistic view (Cassell & Symon,
To do this, a case study encourages the researcher to use multiple sources and a variety of data. These include observation of events, collection of documents and informal interviews of people involved (Denscombe, 2007). According to Yin (2008), the use of multiple sources is a way to increase the construct validity of a case study.

The basis of a case study, the very case being studied, is a naturally occurring phenomenon. In contradiction to an experiment, this is nothing that is artificially generated for the purposes of the research, but instead something that exists prior to, and will continue to exist after the research is done. (Denscombe, 2007) Since the input to this research; SDC’s workshop, is held as a constant, there is neither a need for nor resources available to conduct an experiment where this workshop is altered and the outcome of this is studied. In that sense, the “experiment” has already been conducted but no one has analysed the results.

The benefits of a case study have been discussed above. However, in order to understand what affects how a Scania key supplier adopts a lean mindset and behaviour with focus on continuous improvements, an element of historical research is necessary to investigate mindset and behaviour rooted in previous events. This will not play a major part in the research, since the possibility of retrieving sufficient data is restricted. Instead, this will be a part of the case study, partly by investigating documents but also by interviewing regarding attitudes and behaviour of change activities in the past. Multiple cases studied simultaneously give a wider understanding of the investigated problem. This also allows for the use of replication logic in order to increase the external validity of the study. (Yin, 2008) This thesis is based on five Scania suppliers that have all participated in SCD’s workshop. In addition, there is a need to investigate mindset and behaviour, which calls for an in-depth understanding of the bigger picture at each supplier. Therefore, a multiple case study is chosen as a research method, where each supplier is seen as a unit of analysis and will be studied separately.

Yin (2008) states that a case study benefits from prior development of theoretical propositions to guide data collection and analysis. However, he also states that some studies may have a legitimate reason for not having propositions, i.e. when the research method is a subject of an exploratory study. An exploratory study should however be preceded by statements of what is to be explored, the purpose of exploration and the criteria by which the exploration will be judged successful (Yin, 2008). Eriksson and Wiedersheim-Paul (2008), distinguish scientific research in two categories of approaches depending on whether the research has empirical findings or theoretical models as a starting point. When literature and previous theories does not provide a sufficient base to create theoretical hypotheses, as in this research, an inductive approach where empirical data is first collected and then used to create possible propositions is preferable. The opposite is called a deductive approach, and serves the purpose to prove or reject a previously stated hypothesis. (Eriksson and Wiedersheim-Paul, 2008)
3.2 Research design

As discussed in the previous chapter, the study of this thesis will conduct an exploratory multiple case study with an inductive approach. In order to draw valid conclusions from the collected data, the design of the research provides a logical plan to connect research questions, empirical data and conclusions (Yin, 2008). Yin (2008) has identified five components of a research design that are especially important:

1. A study’s questions;
2. Its propositions, if any;
3. Its unit(s) of analysis;
4. The logic linking the data to the propositions; and
5. The criteria for interpreting the findings. (Yin, 2008, p. 27)

3.2.1 Underlying problem investigation

The question and initial problem for this study is presented in the first chapter. What led up to this was based on a discussion with Scania regarding their problem, a discussion with the university supervisor for this thesis, followed by an extensive study of literature regarding the issue. Additionally, the underlying education leading up to this master’s thesis has provided knowledge about which areas that might be of interest to examine. As stated earlier, the exploratory purpose of this study eliminates the need to develop theoretical propositions. However, in order to gain structure to the collection of empirical data a theoretical frame of reference was developed which was presented earlier in this report. Its content derives partly from discussions with the university supervisor, the initial study of literature and gathered educational knowledge.

3.2.2 Discussion regarding empirical data

Denscombe (2007), states that the options concerning empirical data are commonly divided into either qualitative or quantitative data. However, he also claims that there is not always a clear distinction between the two, and that they are best separated in how the data is to be treated and analysed. Eriksson and Wiedersheim-Paul (2008) categorise quantitative data as to be focused on numbers as the unit of analysis, with a purpose to find distinct properties, and often collected through a survey or structured interview. Qualitative data on the other hand, is associated with words and images to get a deeper understanding of meaning and behaviour, often collected through informal interviews and observations (Eriksson and Wiedersheim-Paul, 2008). Denscombe (2007) describes a qualitative research as an umbrella that covers a variety of approaches, all connected by their common interest in cultural norms, activities of social groups such as relationships and rituals, and foremost the use of text rather than numbers. As discussed earlier, this study implies a need to understand mindset and behaviour, and thus studying social interactions is deemed necessary. Hirschman (1986) states that no quantitative score can be assigned to a humanistic interpretation and that assigning it with a number will not make the research better. As a result this study will conduct research to collect qualitative data to be treated in a qualitative analysis, which will be explained later in section 3.2.5.
3.2.3 Preparation and development of an outcome variable

Scania initially selected the participating suppliers in this study. In order to confirm that these cases were relevant for the study, interviews were conducted with members of SCD to confirm that all suppliers fulfilled the criteria presented under research delimitations in chapter one. A set of questions (Appendix 2) was then developed based on the theoretical frame of reference. These were not the direct questions asked at each supplier, but according to Yin (2008), a *level two* kind of questions, which are the underlying questions a researcher wants to find answers to in a specific case. These allow the researcher to adapt the direct questions asked; *level one*, depending on the specific situation (Yin, 2008). The set of *level two* questions were then handed over to members of SCD to get an outside opinion and possibility to make adjustments, and according to Yin (2008), this also increases the construct validity of a research. A set of *level one* questions was developed prior to the case studies, however this is not included in the report since the actual questions differed vastly and was adjusted due to each specific situation.

The theoretical frame of reference, supported by the set of questions, was then used to develop a tool for collecting and structuring empirical data (Figure 2). The inductive approach of this study calls for a need to collect as much data as possible (Denscombe, 2007). However, due to the limitation in time and scope, this tool is used as a guidance to increase time efficiency of the study at the expense of entering each case without preconceptions. The structural tool takes inspiration of an Ishikawa-diagram, which is described by Bergman and Klefsö (2002) as a tool to single out possible causes for a quality problem. By roughly describing possible causes and dividing them into separate categories, the problem can be investigated systematically. Instead of finding causes for a quality problem, the Ishikawa-diagram used for this study is focused on the research question; What affects how the production unit of a Scania key supplier adopts a lean mindset and behaviour with focus on continuous improvements? This question is represented by the phrase “getting better each day”.

![Diagram](Image)

Figure 2: Tool for structuring collected data.
In order to further strengthen the validity of this tool, a pilot case study was conducted at a Scania “master production line”. This line is within Scania regarded as the very frontier of SPS and considerable resources are used to constantly improve quality and efficiency, which also have shown in lower lead-time and higher production efficiency rate. Based on this, and the general opinion of Scania as a good practitioner of lean production, this pilot study was conducted to evaluate the structural tool and benchmark theory against reality, as well as to give valuable research experience. According to Yin (2008), a pilot case study is a good preparation for the actual data collection, and can contribute with improvement and fine tuning of the structuring of data as well as the case study procedure.

In his fourth component presented earlier, Yin (2008) stresses the need for a logic linking of data and propositions. The explorative purpose and lack of propositions in this study instead calls for a link between data and results, which is given in the Ishikawa-diagram. However, Yin’s fifth component of establishing criteria for interpreting the findings calls for a sharper definition of what the result actually is, for this an outcome variable specific for this study was developed and presented below.
3.2.3.1 Outcome variable
A breakdown of the stated research question is the foundation for the definition of the outcome variable (Figure 3). In order to investigate what affects how the production unit of a Scania key supplier adopts a lean mindset and behaviour with focus on continuous improvements, the terms mindset and behaviour serves as the basic parameters that forms the outcome variable. These are defined based on the theoretical framework, but are not hard and objective parameters, and instead subjects of what Eriksson and Wiedersheim-Paul (2008) call social constructivism. This implies that the result is a case of interpretation of the reality that is created by interaction between human beings, which according to Eriksson and Wiedersheim-Paul (2008) also serves well to an inductive approach and qualitative data as discussed earlier. The outcome variable provides a momentary picture of which level of lean mindset and behaviour that is present at each supplier, and provides the basis for the later analysis to investigate what have affected this state.

![Figure 3: Outcome variable to present the result of each case study.](image)

3.2.3.2 Definition of mindset parameter
"There is always more than one way to achieve the desired result. The important thing is to learn, to think about what you have learned, to apply it, and to reflect on the process and continuously improve in such a way as to strengthen your organization for the long term."

(Liker and Meier, 2006, p. 6)

This quote sums up many of the important aspects that characterise a high value on the mindset parameter:

- Awareness of what desired result that is to be achieved.
- Actively working towards this result.
- An understanding of why improvement work is performed and how it helps reach the desired result; “Talking lean does not always mean you are lean”.

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• Constantly evaluating and improving work to reach the desired result as effectively as possible.

However, there is no predestined way of right or wrong regarding this parameter, and a portion of subjectivity as discussed earlier, forms the result. The line of distinction between low and high mindset, should however be interpreted as the level where talk is replaced by action in form of strategies or time-set plans.

3.2.3.3 Definition of behaviour parameter
The behavioural parameter is in a way more complex. It consists partly of the mere scope of the mindset parameter, in terms of homogeneity among different hierarchical levels within the organisation. But it also contains a level of self-propellment regarding whether the mindset is put into action and adopted in the daily work. As a result, the behavioural parameter is dependent of the mindset parameter in the sense that a clear mindset must be present in order for it to be anchored and practised in larger parts of the organisation. Hence, one cannot have a high score on the behaviour parameter without a certain level of mindset. The distinction between low and high regarding the behavioural parameter should be interpreted as the level where a common mindset is shared by and put into action on an operational production level.

3.2.3.4 Positioning of cases
The result is based on qualitative data, and thus it makes it difficult to present a detailed scale on the outcome parameters. The result may consist of several factors that together creates an impression larger than just the sum of the factors, and specifying criteria for steps in a more detailed scale might therefore be difficult beforehand. The results will instead be positioned by making a distinction between high and low values in mindset and behaviour, as described in the definitions above. Though in order to leave room for the subjective interpretation made there will be a floating scale to represent relative differences between cases. These differences for cases in the same quadrant will not however, be taken in consideration for the forthcoming analysis, as they are not believed to be large enough to generate credible conclusions.

3.2.3.5 Criticism regarding the outcome variable
The high level of subjectivity included in the outcome variable implies that the result to a great extent is dependent on the researchers’ ability to interpret social signals and interaction during each case study. This decreases the possibility for other researchers to conduct the same investigation and getting the same result. In order to get results including mindset and behaviour, the choice of using numbers, such as delivery precision or quality deviations, to measure the result have been deliberately rejected. To increase the reliability, the theoretical frame of reference serves as a foundation of knowledge necessary to conduct the research. Also, the outcome variable and its definition have been discussed with both the university supervisor and members of SCD in order to make it as general as possible. The result will also be presented together with relevant data from our structural tool, to give the reader a possibility to directly form their own opinion of whether the result is substantiated or not.
3.2.4 Conducting the case studies

An initial contact with each case supplier regarding the purpose of the study was taken at least one month before the visit should take place. This was followed by an e-mail conversation regarding an agenda for the two days that the visit would last. The agenda was designed to interview and observe individuals, from operator to top management, under natural working conditions, but also included participation in daily meetings and improvement activities. In accordance with Yin (2008), multiple sources strengthens the validity of a case study, and further he states that there are six main sources of evidence normally used in case studies; documentation, archival records, interviews, direct observation, participant-observation and physical artefacts. He also maintains that none of these sources has a complete advantage over the others, and instead they are highly complementary and preferably used together. A crucial aspect affecting the choice of sources is how to relate to cost, quality and availability. It is often a compromise of these three where a rapid information collection method often gives a lower quality, and where a good quality often has a high cost etc. How the retrieving of these sources is conducted depends largely on the researcher’s purpose. (Eriksson and Wiedersheim-Paul, 2008)

The data sources used for this study are mainly interviews and direct observation, although documentation and archival records are used as a complement when possible. This is due to the limited amount of time available, but also to the restricted possibility of retrieving enough documentation and archival records to fully cover the purpose of this thesis.

3.2.4.1 Interviews

When conducting case study interviews, Yin (2008) claims that the interview should be more like a guided conversation than a structured query. He states that the interviewer has two jobs during the interview; follow his own line of inquiry and ask the actual questions in an unbiased manner. As a result, a case interview operates on two levels and the researcher has to satisfy the needs of his line of inquiry, and at the same time put forth friendly and non-threatening questions of an open-ended kind (Yin, 2008). This implies, as earlier discussed, that the set of questions developed for this study will serve as guidance and not necessarily be the direct questions asked during an interview. This place high demand on the researchers to be able to ask good questions and at the same time be flexible and adaptable to the present situation. For this, the pilot case study serves as an excellent opportunity to get valuable experience prior to the following case studies.

The set of level two questions developed for this study has served as a guideline for all interviews. When selecting interviewees, the main concern has been to cover as many hierarchical levels of the organisation as possible. Although an agenda was designed for each case, this was not set in stone and contained a certain amount of freedom for the researchers to follow up interesting leads. As a way to use the time given at each supplier in an as efficient manner as possible, what Yin (2008) refers to as a key informant has been a critical factor. A key informant is an interviewee, asked about facts of the matter, his or her opinion about events, and in some situations also insights into certain occurrences that can assist with suggesting other persons to interview, as well as other sources of evidence. (Yin, 2008) The key informant has in each of the cases been the contact person for this study at each supplier, typically the pro-
duction manager or of similar dignity, with extensive knowledge about the organisation. With the help of the key informant, interviewees have been selected to cover manager, middle manager and operator positions. In order to increase the validity (also referred to as credibility by some authors, e.g. Denscombe, 2007; Hirschman, 1986), several persons at each level has been interviewed, also completely chosen by the researchers and unbiased of the key informant’s opinion. In all personal interviews, the interviewee was informed that collected data and information would be kept confidential, such as the company name and the interviewee’s name, which according to De Vaus (2002), encourages participation and increases the quality and honesty of the response. In addition, interviews were held in a non-formal fashion in the interviewees’ natural working environment at such a great extent as possible, taking into account loud noise and potentially dangerous areas as an obvious exception. In general, 7-8 interviews were held in each case study.

3.2.4.2 Direct observation
In order to investigate behaviour in the natural setting of each case, direct observation serves as a good source of data. Further, direct observation of the condition of for instance buildings and machines can give an indication about the climate and impoverishment of an organisation. (Yin, 2008) For this study, direct observation of meetings and improvement activities has played a central part. This has given a chance to investigate actions and behaviour and led to new areas of interest, and at least one type of meeting has been directly observed at each case. These have typically been daily planning meetings located in the production area, and the possibility to control the number of meetings observed has been primarily limited by the tight schedule within which the case studies have been conducted. In addition to meetings, direct observation has been used in combination with interviews taking place in the interviewee’s natural working environment. This has allowed to directly combining the two data sources by asking questions regarding observations being made. Both Eisenhardt (1989) and Yin (2008) emphasise the use of several observers as a way to increase the reliability of the result. The two researchers of this study has therefore actively chosen to avoid individually interviewing or observing, and instead conducted the study as a pair. This has given an opportunity to better take advantage of the possibility to both interact and observe, and thus take in more information from a given situation.

A participant-observation is a mode of observation that allows the researcher to take on a more active part than in direct observation. Yin (2008), states that the most distinctive advantage of this is the possibility of gaining access to events or groups that are otherwise inaccessible. This way, the researcher can access the viewpoint of someone inside the study rather than just external to it. However, Yin (2008) also emphasises a number of major problems regarding this approach, including a lesser ability to work as an external observer due to the risk of having to assume advocacy roles. This, together with the limited time span of each study has led to the exclusion of this data source from this study.

3.2.4.3 Documentation and archival records
Documents are most likely a relevant source of evidence for most case studies, and can be found in several types, such as website pages, records of meetings and performance reports (Denscombe, 2007). Yin (2008) emphasises that some weaknesses of documents as a case
study source of data have to be acknowledged, i.e. they can be difficult to find, suffer from a biased selectivity, unknown bias of the author can occur and they may be deliberately withheld from the researchers. However, he further states that if caution regarding these issues is taken, documents can be useful even though they are not always accurate or unbiased. The most important use of documents in case studies is to augment and corroborate other sources of data. One aspect is to verify spelling of phrases or names that may have come up in interviews. Another is to provide specific details to confirm information from other sources, and when information is contradictory, this is an incentive for further investigation. (Yin, 2008) Documents in this study consist of information retrieved from case supplier web pages, and internal, official documents at each supplier, such as employee booklets and financial reports. These serve mainly as leads for further inquiry, and are not in themselves seen as direct evidence of mindset and behaviour.

Archival records suffer from the same weaknesses as documentation, as discussed above (Yin, 2008). In this study archival records consist of presentations used by SCD during their workshops and also records of participating persons to the extent such records exist. This is mainly part of the background study to each case and will, much like documents mentioned above, not be seen as direct evidence of mindset or behaviour but as a way to triangulate data sources in find further areas of interest.

3.2.4.4 Storing retrieved data
As discussed earlier, when conducting the case studies, the researchers have worked closely together. This has been highly beneficial to secure that collected case data could be stored directly when retrieved. Both researchers have had notebooks constantly available, which allowed for one person to observe and take notes while the other could interact. According to Eisenhardt (1989), field notes of this kind are an important means of frequent overlap of data analysis with data collection, necessary for an inductive research approach. Further she states that the key to useful field notes is to write down whatever impressions occur, to react instinctively rather than to sift out what may be important. This is due to the fact that it is difficult to know what data will be useful or not in the future (Eisenhardt, 1989). At the end of each day, these field notes were reviewed and discussed by the researchers to get different perspectives regarding observations and strengthen the reliability of the result (Eisenhardt, 1989). After this discussion, the structural tool was used to store all retrieved data with an endeavour to omit as little data as possible to benefit the subsequent analysis. The possibility of including all received impressions in the data is limited by the human factor and memory of the researchers. However, by constantly taking notes and directly storing data after each day, this possible source of error is minimised.
3.2.5 Analysing the results

As discussed earlier, the data collected in this study is of a qualitative nature, and thus it demands a qualitative tool for analysis. Denscombe (2007) has identified five main stages of data analysis, applicable for both qualitative and quantitative data, presented in table 2 below and this will be used as guidance during the data analysis of this study.

Table 2: The five main stages of data analysis (Denscombe, 2007, p. 252)

<table>
<thead>
<tr>
<th>The five main stages of data analysis</th>
<th>Quantitative data</th>
<th>Qualitative data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Data Preparation</strong></td>
<td>Coding (which normally takes place before data collection)</td>
<td>Transcribing the text</td>
</tr>
<tr>
<td></td>
<td>Categorising the data</td>
<td>Cataloguing the text or visual data</td>
</tr>
<tr>
<td></td>
<td>Checking the data</td>
<td>Preparation of data and loading to software (if applicable)</td>
</tr>
<tr>
<td><strong>2. Initial exploration of the data</strong></td>
<td>Look for obvious trends or correlations</td>
<td>Look for obvious recurrent themes or issues</td>
</tr>
<tr>
<td></td>
<td>Add notes to the data</td>
<td>Write memos to capture ideas</td>
</tr>
<tr>
<td><strong>3. Analysis of the data</strong></td>
<td>Use of statistical test, e.g. descriptive statistics, factor analysis, cluster analysis</td>
<td>Code of the data</td>
</tr>
<tr>
<td></td>
<td>Link to research questions or hypotheses</td>
<td>Group the codes into categories or themes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Comparison of categories and themes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quest for concepts (or fewer, more abstract categories) that encapsulate the categories</td>
</tr>
<tr>
<td><strong>4. Representation and display of the data</strong></td>
<td>Tables</td>
<td>Written interpretation of the findings</td>
</tr>
<tr>
<td></td>
<td>Figures</td>
<td>Illustration of points by quotes and pictures</td>
</tr>
<tr>
<td></td>
<td>Written interpretation of the statistical findings</td>
<td>Usage of visual models, figures and tables</td>
</tr>
<tr>
<td><strong>5. Validation of the data</strong></td>
<td>External benchmarks</td>
<td>Data and method triangulation</td>
</tr>
<tr>
<td></td>
<td>Internal consistency</td>
<td>Member validation</td>
</tr>
<tr>
<td></td>
<td>Comparison with alternative explanations</td>
<td>Comparison with alternative explanations</td>
</tr>
</tbody>
</table>

3.2.5.1 Data preparation and initial exploration of the data

In preparing collected data for analysis, the structural tool developed for this study has served as means for cataloguing and transcribing data sources. As discussed earlier, field notes and direct impressions have served as initial sources for storing data directly after each day of study. This material has then been reviewed after the finishing of each case study, and once again reviewed after all case studies had been conducted. Eisenhardt (1989) states that a key to successful field notes is to push thinking regarding for instance; what is being learnt? and what differs this case from the last? This will give an overlap of data analysis with data collection, necessary for an inductive approach, and besides giving a head start of data analysis, also let the researchers take advantage of flexible data collection (Eisenhardt, 1989). Hirschman (1986), states that no single interpretation of a complex social phenomenon can be complete or fully satisfactory. Further, she states that all scientific endeavours will either be believed or not believed, and there will always be a discussion regarding the credibility of how the research has been conducted. Regarding the preparation of data in this study, an important
aspect of increasing the credibility, is that no data has been deleted during a review, but instead merely otherwise categorised or further explained due to new impressions gained.

Since collected data has been constantly reviewed, this has also served as an initial exploration of it. Denscombe (2007) claims that it is important for the researcher to become thoroughly familiar with the data, this is for instance done by reading and re-reading text data. In addition to the reviews conducted during and in between each case, data has been thoroughly reviewed afterwards. This review has provided a good foundation for in-case analysis, which according to Eisenhardt (1989), is a necessity to cope with the large amounts of data associated with case studies. Familiarising with data from cases as stand-alone entities allows the unique pattern of each case to emerge before a potential generalisation of patterns across cases is made (Eisenhardt, 1989).

3.2.5.2 Analysis of the data

The first step of analysis has, as discussed above, consisted of an in-case analysis. According to Eisenhardt (1989), this typically involves detailed case write-ups, often in the form of pure descriptions, central to the generation of insight. The many recurring reviews of data and final familiarisation has resulted in progressed data, categorised in the structural tool, which in itself has provided the result of the in-case analysis. Eisenhardt (1989), states that cross-case search for patterns is coupled with an in-case analysis. The idea behind cross-case comparison is to force the researchers to dig deeper than the initial impression, and increase the probability of finding any solution to the initial problem, which may exist in the data. If this is not achieved, one obvious risk is to reach premature or even false conclusions. In order to decrease this risk, Eisenhardt (1989) further suggests a tactic of cross-comparison, which consists of selecting categories or dimensions in order to group cases together. Following this, an analysis of within-group similarities is conducted followed by an analysis of intergroup differences.

![Figure 4: Tool for analysis of the data.](image)
Based on the design of the outcome variable for this study, this is seen as a suitable approach for conducting the data analysis in order to find out what affects how the production unit of a Scania key supplier adopts a lean mindset and behaviour with focus on continuous improvements. The categorisation of cases derives from the 2x2 cell design of the outcome variable, where each cell is seen as a category for analysis of within-group similarities. Since the outcome variable is not an exact result, there is a risk of vague categorisation limits having an impact on the quality of the analysis. However, in order to avoid premature or false conclusions as discussed above, this tool of analysis will be used to conduct an as objective analysis as possible.
4 Result

This chapter will present the result from the case study, based on the outcome variable presented in the methodology chapter, and will be the starting point for the forthcoming analysis.

The result of each case is presented in figure 5 below, and is complemented with selected data from the full data set. A sixth case has been added to the result, which represents the pilot case study conducted. Yin (2008) states that a pilot study is mainly conducted for the sake of the researchers to refine data collection plans and possibly adjust the research design before investigating the real cases. However, since the pilot case study did not render any larger shifts in the approach used, and the same methodology was followed during the rest of the cases, the pilot study will be included to benefit the forthcoming analysis.

4.1 Case A

Before SCD carried out the workshop in 2010, they followed and helped the supplier during a one-year period with solving capacity issues. This gave SCD a better understanding of the organisation and its personnel, and the supplier had from the start a good trust in those leading the training program. Only members from the management team and a few team leaders from the production participated in the workshop, most of them are still working at the supplier today. For the case study, the supplier had prepared a few people for interviews in advance but the agenda was aside from this free and the researchers had a lot of opportunity to observe and interview without any restrictions.

**Mindset**

There is a common view that improvement work is something to work with during spare times, and not as a natural part of the daily work. However, opinions regarding how prioritised improvement work is differ between managers and operators.
“If everything goes as planned, the operator has up to two hours of free time to work with improvements while the machine is running.” – Manager

“We don’t have resources for improvement work when times are bad, and when times are good we don’t have time.” – Operator

Managers are aware of challenges regarding improvement work, but there is no clear strategy how to overcome them. Managers describe their initiative with weekly improvement meetings as one approach to call for improvements, but in reality this is not anchored and understood within the organisation.

“We used to have improvement groups, but it has faded away. It’s not demanded either from the top or from down below. If not, at least it was a good opportunity to talk some bullshit.” – Middle manager

“I’ve never heard of improvement groups, neither that it is demanded.” – Operator

No one takes responsibility for, or demands improvements, neither in the top nor from the bottom of the organisation. Even within the management, there is blame on the CEO who has not set up a plan or direction for the improvement work and neither seems to ask for it. The CEO addresses the responsibility to every employee, but the employees don’t feel it is prioritised.

“Top management doesn’t spend any resources on improvement work, it’s like they don’t want it.” – Operator

At the daily control meeting, management is represented and the focus is on several key ratios. The purpose with these is somewhat unclear among people. It is more used as a check of the current situation but not for further analysing or seen as indication for improvement work. There are some improvement suggestions discussed during these meetings but these regard maintenance of machines or missing equipment rather than how to improve the daily work.

**Behaviour**

Apart from a few people in the organisation, the lean understanding is vague. There are a lot of people that can talk about lean and its benefits, but there are no signs of action. As described earlier, there is no one who feels a genuine responsibility to drive the organisation forward, instead they put their trust on each other without demanding a change.

“No one drives the improvement work, neither from the top nor from the bottom.” – Middle manager

Even though the CEO has communicated to every employee regarding their responsibility to work with improvements, work as instruction says or clean up their work place, there is a vague response.

“I have never seen an operator read any of the routines on the computer.” – Middle manager
Additionally, the behaviour among employees regarding internal deviation handling has the same unenthusiastic response and there is nearly no sign of interest to learn from mistakes.

4.2 Case B
A cross-functional team, from top management to operator participated in SCD’s workshop in 2009. Since then, a new CEO and production manager are leading the supplier, none of them directly involved in the workshop. The case study followed a strict agenda and the supplier chose all interviewees in advance. The researchers were not able to walk around freely and there was always someone from the management team nearby, a fact that must be taken in consideration as a possible source of misguiding results.

Mindset
What is apparent in this organisation is that there is a line of arguments from CEO to the level nearest above operators that is mutual and close to lean philosophy. For example, the CEO expresses a clear vision, values and principles, which are shared and understood by the rest of the management team. When visiting different functions within the organisation, their work and communicated beliefs had all been translated from the CEO’s to their situation. When the CEO explains their way of work, he doesn’t mention the word lean, instead he uses his own words.

“We haven’t adopted SCD’s training methods here directly as you can see, but rather it gave us a good understanding. It is for us to translate these thoughts and adapt them to suit our own organisation, in our own words” – Manager

Improvement is the core of the vision and the CEO expresses the importance of constantly changing to keep up with customers and competition. And for this to succeed, he expresses that the management role and responsibility is to give the right condition to all employees to improve their work. For this to be communicated, a clear plan for how to educate and spread the vision within the organisation has been developed. The first step has been to make sure the level closest beneath the CEO fully understands the vision, and then let them educate the level closest beneath them, i.e. a clear top-down approach.

“I have never worked as structured as this, with such a clear plan of how to manage and what should be accomplished.” – Middle manager

However, the work has not yet reached the operators in the same extension, but they can feel a change since the new CEO was appointed.

“The vision is somewhat unclear for me.” – Operator

“The new CEO has a more personal touch; he’s often down here on the factory floor and talks with us operators.” – Operator

Behaviour
There is a significant cultural difference between management and operators. As mentioned earlier, beliefs expressed by the management team is not present at the factory floor. Management wants the operator to raise problems directly and take action, whether it is an internal
deviation or a possible improvement in their own work. Instead, management implies that operators try to find excuses when confronted, often with reasons like these:

“The guy after me sees if I’ve done right or wrong so I don’t have to measure.” – Operator

“It only happens every six months or so anyway.” – Operator

Another reason is expressed by a middle manager as:

“I know that some people, mostly the old ones, want to keep everything to themselves to feel indispensable.”

However, there appears to be a strong feeling of “us and them”, both regarding management and other work groups.

“When we have a quality deviation, management comes down here to find someone to blame.” – Operator

“We have a strong connection within this group, but there is much rivalry between groups in general.” – Operator

Overall, there is varying interest for improvement work among employees. Some individuals express high enthusiasm, but the general impression is that most employees do not share this state of mind.

4.3 Case C

The workshop was carried out in 2009 and personnel from operators up to CEO participated. After the workshop, SCD has visited the supplier for further input, mostly focused on how to handle quality issues. The supplier selected nearly all people and places included in the case study. However, there were some opportunities to interview and observe operators without management present.

Mindset

In this organisation, improvements are seen as an important action to survive in the competitive market through waste elimination on a daily basis. To be sure of that resources are used properly, all improvement suggestions are prioritised in regard to the expected profit it will generate and all changes are therefore based on facts. The organisation is willing to invest in improvements, and as long as you can show it gives a good result, there is no problem to get needed resources. The overall objectives are not clear at the shop floor and are almost exclusively known by management. One of these objectives is to reduce the cost through improvement implementations, with a certain amount, each month. For each level, the overall objectives have been translated to specific targets and are followed up on a weekly basis. There is a clear monitoring of each objective and they are updated to new levels continuously. What is apparent is that health and safety always are imperative.

What is evident is that deviation is highly prioritised and seen as an important indication of improvement areas. The organisation follows up internal and external deviation on a daily meeting where one person from every production team is present. With pictures visualising
the deviation and by mapping where in the production the deviation has occurred, operators together with support from middle managers works with activities that hopefully will solve the problem.

“There has been a change in the past few years on how to report deviation. Before operators asked: “What happens if I say it was me?” now people are more open minded and directly says: “It was me”. It is widely communicated from top management that it is ok to make a mistake once, but it is not ok to be quiet about it and not say anything.” – Middle manager

“If you have an internal deviation, you don’t send it to the next person in the process. If you do so, you only get it back.” – Operator

However, there is no clear focus on monitoring if the change really led to an improvement when there has not been any noteworthy investment.

On a daily basis, there is an evaluation considering if the method used are beneficial. During the years, a number of methods to follow up the production status have been used, showing that business as usual is not seen as the right way to do work here.

**Behaviour**

At all levels, there is a mutual belief that improvements are the key to succeed with reaching the stated objectives. However, what is noticeable is that there is a difference between functions how enthusiastic operators are to improve their daily work and why they do it. Some operators express their initiatives without mentioning the word lean or using fancy words. They just explain their natural way of working.

“Improvements are made for our own good so we can stay healthy and be able to work for a long time.” – Operator

“Improvements are made together as a team and if we need to stop our work, we do so.” – Operator

Each department has its own improvement group where activities are monitored and there are plenty of improvement examples evident. But, there are some areas that haven’t really embraced the lean thinking and improvement work is still not considered as a part of the daily work. What is common for these groups is that they seem interested and have no problem with change. Instead, they don’t see their problems as possible improvement areas, they don’t question how work is done since it’s done like it always has.

### 4.4 Case D

A cross-functional team, from top management to operator, participated in SCD’s workshop in late 2009. Since then, SCD has had a further visit to follow up. For the case study, the supplier had in advance prepared an agenda with selected interviewees. However, there was some time where the researchers had the chance of freely choosing persons for interviewing as well.

**Mindset**

In this organisation, no one seems able to explain what the overall goals are, not even the manager. This permeates the entire organisation at all levels and there is no direct link be-
 tween objectives on different levels, although it is intended to be so. Some of these objectives are followed through some key ratios at the daily control meeting. Even though, mostly of these ratios repeatedly haven’t reached the target, there is no sign of further notice or action.

“We have these goals concerning the number of items we should run each day, but there is almost never we reach them, and when we don’t, they are happy as long as we have an excuse.” – Operator

What is obvious is that there is no one who disputes why the goals are set as they are or why there is no strategy to reach them.

Within the organisation, there is a goal set of coming up with eight improvements each month per working group. These improvements are not related to an overall goal and there is no clear follow-up or demand that improvements should provide some results back. What is considered as an improvement is evaluated each time by the middle manager and there are no communicated criteria for this.

“It’s better to be generous; otherwise you will kill the motivation.” – Middle manager

There have been some improvements lately, a handful of these concern changes for better flow in the process or activities that reduce the chance of deviations. However, what is apparent is that these changes have occurred mainly where SCD have focused their efforts or where external deviations have occurred. Another initiative initiated by SCD is a 5S workshop, which according to operators made a major improvement. Nevertheless, this has not continued and there is no sign of demand or that it is prioritised from above.

“To succeed with 5S it must be recurrent, we did it six month ago and since then we have only cleaned our workstations, and they seem happy about it.” – Operator

“Sure, you ought to push more on this but there are so many other things that also should be done in parallel”... “Improvement work is something to do when there is time over.” – Manager

“Lean initiatives are carried out in project form and are not considered as a natural part in the daily work. In between these, nothing happens.” – Manager

What excels is the view among the managers of the operator’s role within the organisation. Operators are seen as a resource, which should mainly stand by the machine, and middle managers are those who make the rest happen. When asking about who form the instruction for the employees, one manager says:

"It is middle managers job, operators can’t do it."

From the employees’ perspective, there is a mutual opinion that improvements are not prioritised and the feedback is not sufficient.
“As soon as there is an investment involved, they are a bit stingy. I’ve had this suggestion for several years now and I really don’t know why nothing happens. Eventually, you get tired of giving suggestions.” – Operator

“If you give five suggestions and nothing happens, it is difficult to give more.” – Operator

**Behaviour**

There is no clear continuous lean initiative at any level within the company, nor in the top or from the beneath. Improvement meetings are held every once a week, led by one middle manager. Before, all suggestions from operators were sent to middle manager with the consequence of them being fully booked. Now, the aim is for the operators to raise suggestions they can do by themselves. However, most of the responsibility and activities are still put on the middle managers. Most of the operators seems unconcerned and are sitting in the silence during the meeting, just a few who really contribute.

“I don’t contribute with so many suggestions, most of the others just whine”...”if not, it’s a fifteen minute break.” – Operator

“They are a bit lazy and say: Do we need to do this as well?” – Middle manager

All incoming external deviation is handled by middle managers with little or no feedback at all to the operator. When it concerns internal deviation operator gets the opportunity to solve the problem. But, operators have not received any training in how to solve problems, and therefore the first best solution is usually used without any reflect on various options. In general, there is a vague understanding of internal deviation and reporting these among employees within the organisation.

“If I notice a defect on the product, I throw it. But if I find the defects repeatedly, then I tell my middle manager.” – Operator

“If the item is outside its specification, you can’t stop the ongoing production, you just can’t.” – Manager

**4.5 Case E**

In the late of 2009, managers and middle managers participated in SCD’s workshop. For the case study, most meetings and interviews were pre-arranged. However, the researchers had the chance to observe and interview freely without management nearby.

**Mindset**

To guide all work within this organisation, the management has developed their own production system that is based on the values and principles that should prevail. When the system was formed, they focused on *what is best for the company* without copying or using terms that is not anchored within the organisation. During the past years, several tools have been used within the organisation without significant results. Now, all methods should be supported by the production system.

“We need to figure out by ourselves how we want to work.” – Manager
What is apparent is the focus on the overall objectives and a well thought-out strategy to reach them through a number of activities. The plan is to from a management level decide which changes that should be done, and then let operators get involved in the improvement work. One of these activities is to get a better flow in the process, and several changes and investment in regard of these have been made. However, operators feel they have no chance to contribute.

“When they built the new warehouse, the two people working there were the last persons that got involved.” – Operator

“Without asking us who work here, they did a change that really made it less comfortable for us to work.” – Operator

What is obvious is the focus on process efficiency rather than resource efficiency. As stated above, there has been a lot of investment for changes initiated by the management, but the daily improvements initiated by the operators are not prioritised equally.

“It is easy to implement a change as long as the improvement is free, but as soon it cost some money it is tough.” – Operator

Apart from the improvement work initiated on a management level, the structure for capture suggestions and implement them on resource level is somewhat unclear. There are no improvement meetings or visual monitoring control over the on-going improvements, not even allocated time for improvement. However, there is a strategy for this expressed by a middle manager.

“We want ideas to pop up naturally during the daily work and not be forced to pop up during a fifteen minute break”...”Then when there is a suggestion, we make time available for the operator to carry out the activity.”

“The responsibility for the improvements, should as far as possible, remain with the one who came up with the idea.” – Manager

However, operators instead feel the lack of structure as if improvements are not prioritised.

“Improvements are the last thing they ask about.” – Operator

“There is no structure for improvement work. Perhaps that would make it work better.” – Operator

Within the management, there is a discussion regarding deviation handling on a daily basis, and it is clear that it is prioritised. To communicate and create awareness among the rest of the employees, all external deviations is visualised on a production map. For each, the group responsible for the deviation gather and solve it as a team. The same procedure concerns the internal deviation but the instruction is not followed equally strict. However, there is more internal deviation between production units reported than external, showing understanding for the importance of deviation handling. But, deviations that are caused during one’s own operation are not reported and there is no sign of deviation handling at all.
“If I do something wrong, I fix it or throw it away.” – Operator

**Behaviour**
Apart from the management, there is no clear process thinking among operators where they see each other as internal customers. There is no sign of internal communication and the operators do not consider this important.

“I do my job without concerning how everyone else are doing.” – Operator

There are a lot of examples when operators have recognised a problem, found a solution and then implemented it. However, operators don’t follow any standardised procedures or telling other about it.

“I do a lot of improvements without any notice to the managers, like this instruction here...” – Operator

There is some sign of self-driven employees but the manager still believes that without nagging, nothing would happen.

“If I stop asking for improvements, there is a risk that improvement work will end.” – Manager

“If I have a lot of stuff to do, I don’t prioritise improvement work.” – Operator

### 4.6 Case F
We had the chance to walk around freely and all employees, independent of role, were open and proud to describe their work.

**Mindset**
What is apparent in this organisation is the view of the operator as the most valuable source for improvement work. The work performed by the operators is seen as the only value added work within the organisation and therefore leaders and manager always put the operator in the first place and have a great respect for their knowledge.

“They know the machines better than the rest of us.” – Manager

“The leader’s role is to enable the operator to succeed with improvements.” – Manager

To support the operators in their work in real time, all leaders are committed and spend most of their time close to the production with the ambition to be constantly updated and be able to act quickly without waiting.

“As a result of the managers’ constant presence in production, they obtain a high detailed information of the situation and can therefore focus on ‘What are you doing about it?’ instead of asking ‘What has happened?’” – Operator

Striving to respond quickly to e.g. deviations, all employees are encouraged to stop the ongoing process and start an investigation in order to find a solution. In any circumstances, the operator is the one who leads and is responsible for all work related to their machine. Howev-
er, to achieve a great result, it is seen as important that all involved support processes are nearby and take part in the improvement process. As long as the group agrees and the change is based on real facts, the opportunity and the options lie with the individual to drive his or her own improvements. In order to ensure the change is based on facts, the organisation use different kind of visual control where measured data is the input. When a decision needs to be made or if a prioritisation has to be done, the measured data always is the base of the decision.

“When measuring the result, the whole process is in mind and therefore all improvements must improve the process, if not, it is not the right position to improve for the moment.”
– Manager

“Our focus is to improve right things, we ask ourselves: Which is our current bottleneck? “
– Manager

What is observable is the focus on reaching goals and clear reasonable activities how to accomplish them. All employees are involved in defining goals and what has to be done to reach them. When conducting a strategic plan, all came together and from the overall goals, interim targets were developed, and for each a certain amount of activities were suggested and how much each would provide for reaching the target. There is a mutual belief within the management that goal needs to be fully understood and accepted. On a daily basis, all goals and running activities are followed with each person responsible reporting the status and any possible problems. The leader’s role is not to solve any problem other than to give support and raise the problem higher up in the organisation if needed.

To find inspiration, in addition to their workers, the organisation is open for external help, but have always in mind what is best for the organisation.

”It is important to adapt methods and thoughts after one’s own situation, you can’t copy what others are doing.” – Manager

**Behaviour**
What is apparent is that improvement work is constantly vivid and a natural part of the daily work. One operator expresses it like this:

”Improving my situation and always challenge current state is nothing beyond my work and responsibilities; it is a part of it.” – Operator

Further, with frequent meetings, every two hours, the operator is leading the meeting and the agenda concerns what has happened since the last meeting. At the meeting attended during the research, it had been a deviation and the operator reported why it had happened and what they had done as a short-term solution. The manager praised the great achievement and gave further feedback.
5 Analysis

The analysis section uses the tool of analysis, described in the methodology chapter, to combine the obtained result with the theoretical frame of reference in order to find well-grounded connections.

Based on the in-case analysis, provided by reviewing data in the structural tool, the first part of the analysis implies finding within-group similarities among the cases in the same cell of the outcome variable. These similarities are identified and verified by comparison to the theoretical frame of reference to gain credibility. The second part of analysis is a cross group comparison of differences. In this part, the categorisation of data in the structural tool is somewhat dissolved and focus will lie on analysing direct and detailed data regarding the found differences. This is due to minimise the risk of sorting out valuable data in the first step that might be of importance in understanding differences.

![Model for data analysis approach](image)

Figure 6: Model for data analysis approach, with included cases in each group.

5.1 Within-group similarities

The analysis of within-group similarities is conducted to find characterising features in common for each group. This is an independent analysis, which will serve as the foundation for the forthcoming analysis of intergroup differences. By looking at within-group similarities independently, the risk of making premature conclusions regarding the result is minimised.

5.1.1 Group I

Cases in this group are characterised by low mindset and low behaviour.

5.1.1.1 The individual

Most individuals are not motivated and show no willingness or action of improving neither theirs nor the company’s situation. With no motivation among employees, Al-Jawazneh and
Smadi (2011) stress there will not be any continuous improvement. In particular, there is a vague understanding among personnel of the purpose with improvement work, and this is clearly shown at improvement meetings where employees lean back and use the time as a break from the ordinary work. With no feedback or attention from managers, employees within these organisations have lost their motivation and with no chance to really be involved in the improvement work, they express that their own thoughts are not prioritised. Most improvement suggestions concern purchases to replace broken or missing equipment or lack of supplies. The individual seems not to have the confidence to take a decision or make a change, even small ones, without asking or handing it over to a middle manager.

5.1.1.2 Management and leadership
There is no direction or future state for the organisation to strive for, neither any supportive values nor principles for employees to follow and base their decision on. Kotter (1995) points at the importance of the manager to establish an initial vision, and later Bertocci (2009) stresses that converting this vision to reality through a set of activities is important to be successful. However, none of this has been made within these cases. Another similarity within the group is how production targets are set. None of these are clear and understood among employees and not even linked with other goals in the organisation. This way of not managing goals is contradictory to the notion of Kotter (1995), who stresses the importance of clear and reachable goals.

Management teams are committed to the daily work and possess good knowledge of processes. The team consists mainly of people who have worked their way up within the organisation with little or no experience from other companies. The conviction of how to manage the company is somewhat vague and there is no set agenda of what is important and how to reach it. Improvements are not prioritised and seen as something to work with during spare time. Management emphasises and are proud of the importance of a good working environment regarding working floor and lighting. However, this is not applied to the machines. The overall picture is that there is no sign of any initiative that a change is necessary which, according to Kotter (1995) is a very important step for successful management.

5.1.1.3 Company culture
In this group, the operator has no responsibility or mandate to do anything without the approval from managers above, not even stop the on-going process if a deviation occurs. Apart from that, the operator is seen as someone who may suggest an improvement, but not the one who should manage or implement it. There is no culture of direct action as stressed by Badurdeen and Gregory (2012) as an important ingredient in a lean organisation, neither in management nor among operators.

5.1.1.4 Contextual factors
The organisation has recently gone through a change in ownership; however there has been no obvious change in management style or direction. There is a history of earlier failed change initiatives, present in the mind of both management and operators. Amburgey et al. (1993), stress that a company that has gone through a certain change is more likely to do it again. In
this group however, the impression is that once not having gone through a change serves as a barrier for trying again.

5.1.1.5 Change agent
Openness to external help is a characterising feature of this group, and through the years several lean methods have been used, given by external change agents. Each of them has to some extent been successful for a short period of time however, after a while work has returned to its previous state. These initiatives have been carried out in project form, and when the project ended, the demand for it stopped.

There exists no internal agent that is driven or responsible for change initiatives, and therefore no receiver who can filter what the external agent propose and adjust it to best fit the organisation. In comparison with the theory in this area, neither Burns’s (2009), Ford et al. (2008), Lunenburg’s (2010) nor Sims’s (2002) definition of a good internal agent fits into this organisation. As a result, most changes made can be traced to directions or help from SCD without any significant adoption or development.

5.1.1.6 Improvement tools
Tools used today are to great extent copies of other companies, taken without any major changes or adjustment to fit the organisation’s situation. Moreover, the reason for using them serves more as a status check of the situation and has no connection with how to improve the organisation. There is no evaluation of the tools used or if these are still relevant or how to improve them. Employees generally have a vague understanding of how to use the tools and the purpose of it. The focus is on using a certain tool, rather than solving a certain problem or reaching a certain goal, which according to Modig and Åhlström (2011) is a common mistake.

Liker and Meier (2006) stress the importance of standardised tasks and processes to make lasting improvements, however, there is a small glimpse of written working methods but no sign of these being applied or updated when changes have been made. There are no established targets for improvement that are directly linked to the long-term goals. Targets are primarily at operational level to evaluate good or bad production results on a daily basis, and not used as a basis for improvement. A lean tool focused on is 5S, but this was seen as a project among employees and now no one is requesting it.

5.1.1.7 Technical system
There exist opportunities for employees to suggest improvements by noting them on a white board. However, what is noticeable is that these improvements are not prioritised and if they concern an investment, it is very hard to implement them. Among employees, this creates a frustration that not even cheap improvements are considered when the management invest large amounts of money on new fancy machines. Another similarity is that there exist no feedback to the individual who have raised the suggestion, and no system that can catch these and support the individual in the improvement work which, according to Liker and Meier (2006) is an important factor.
5.1.1.8 Working with processes
There is no mindset of considering the entire process when investigating interesting improvement areas, and with poor track of sub-processes, it is difficult for them to know which one is the bottleneck. As well, there is no clear connection or communication between different processes due to a culture of “us and them”. The view of processes within the group differs significantly to how both Bergman and Klefsjö (2002) and Morgan (2005) believe it should be, and they express that process orientation is a key feature within a lean organisation.

The importance of customer focus, including both external and internal are commonly mentioned in literature e.g. Bergman and Klefsjö (2002), Modig and Åhlström (2011), and Morgan (2005), as an important factor when improving. However, in both these organisations there exist no indication or thought of the internal customer or internal deviations. Regarding the external deviations, operators get information of them, but are not the ones who get the chance to solve them.

5.1.2 Group II
Cases in this group are characterised by high mindset and low behaviour.

5.1.2.1 The individual
Personnel see improvement work as something beyond the ordinary job and therefore not a prioritised chore. When asked, individuals express that improvement work is something they do to satisfy the management or that it is important, but only done when time is available. Management needs to constantly request improvements for them to happen and contrary, employees believe that as long as the improvement is free it is easy to implement, but as soon as an investment is necessary, nothing happens. However, those who are motivated within these organisations make a lot of improvements, but what is clear is that there is no common goal in mind when these are implemented, which is stressed by Al-Jawazneh and Smadi (2011) as important to be successful.

5.1.2.2 Management and leadership
There is a clear and strong management who possess an extensive experience from leading organisations. This is reflected in how they have established and communicated a clear vision, values and principles within the management team. However, this has not been anchored among the rest in the organisation, but there is a common view that it is necessary to establish it at management level first. In the literature, e.g. Kotter (1995) and Liker and Meier (2006), a clear management and communicated vision are both an important factor for success. Another similarity within the group, and supported by Bertocci (2009) as an important action, is how the vision and the overall goal have been converted to fit the reality, however, still on a management level. Anyway, management has set a plan and places great emphasis concerning how to communicate this which is consistent with what Bertocci (2009) and Ventris (2004) advocates.

Management has a good track of details and close relationship with personnel. Further, they encourage people towards continuous improvement and constantly call for it. To inspire people, the organisation has given the operators an opportunity to meet external customers and
get a broader understanding of the final product. Nevertheless, practical training in how to find and solve problem, which is essential according to Shin et al. (2012), is not present in this group.

5.1.2.3 Company culture
There is a cultural difference between the management and the rest of the organisation. At management level, there is a common belief that problems should be dealt with immediately, and how to resolve or handle them should be managed in a structured way, though primarily by the management team. However, at lower levels within this group, employees prioritise delivery, and improvements are carried out in a non-structural approach. On the other hand, there is a mutual view of external deviation as highly prioritised within the whole organisation, and to solve these quickly is important. However, the understanding of the internal deviation is not that widespread and mostly there is a lot of rustle up without any reporting. The unison culture of reacting to deviations and stop to fix problems mentioned by Badurdeen and Gregory (2012) is therefore not fully present in this group but only rooted in the management team.

5.1.2.4 Contextual factors
Historically, this group has gone through a lot of changes both in management and how to deal with the organisation, mainly concerning different work methods. In broad terms, these initiatives have not been successful and mostly consisted of copying improvement tools without adaptation. However, after strategically recruiting people for key roles, there is now an understanding of the importance to not copy methods without adjusting them to fit the organisation. The historical context mentioned by (Hughes, 2006), has in this group been taken in advantage as a lesson being learnt, and now serves as knowledge to find a different approach to be successful.

5.1.2.5 Change agent
This group is characterised of some degree of restriction to allow external thoughts and ideas influence how they should run their business. This contradicts how Jain (2002) expresses the importance of allowing external help influence with an outsider’s view and professional knowledge. However, the organisation strongly believes in the importance of developing their methods in-house and customised to their own work.

5.1.2.6 Improvement tools
In both these cases, management has clearly considered how the organisation should be managed and this is mutually shared within the management team. However, this is not reflected in how the rest of the organisation acts. Another similarity within this group is how decisions are made without any proper attention to facts, i.e. collected data. Instead, middle managers take decisions after their own beliefs and not as Bergman and Klefsjö (2002) suggest, with collected data as the basis for decisions.

5.1.2.7 Technical system
The organisation has a strategy to encourage and inspire people of good improvements through highlighting them. This approach requires a lot of time for the middle managers, however, finally this is expected to provide an understanding among the personnel and even-
tually get all employees self-propelled. But, in the meantime there is a lack of support for those trying to improve and the feedback is vague. According to Liker and Meier (2006), a technical system should be built around the work to support and benefit it. In this group the technical system is not fully developed and instead largely dependent on key persons and their individual efforts.

5.1.2.8 Working with processes
At management level, the entire process is considered when improvement discussions take place, and there is less focus on details. Process efficiency is by Modig and Åhlström (2011) seen as a prerequisite for a lean organisation. However, they add the importance of understanding how the processes work, which is not completely present within these two cases. The mindset of considering the entire process when improving is not understood and applied at lower levels within the organisation, and it is all up to the middle manager to ensure that a change do not affect the entire process negative. Also simple improvements to benefit daily work are somewhat forgotten when simply focusing on larger areas. Thoughts regarding internal customers are not present at the shop floor and the communication between processes are almost none. When asked, the relationship between processes are described as vague and mostly expressed as “us and them”. This is in contrast to what Bergman and Klefsjö (2002) consider to be of most essence to create an effective process.

5.1.3 Group III
Cases in this group are characterised by high mindset and high behaviour.

5.1.3.1 The individual
Employees are motivated and committed to work with improvements as a natural part of their daily routine. For them, improvement work is nothing beyond the ordinary work, which is expressed by Shin et al. (2012) as the core achievement for all change programs. When asking, employees feel a responsibility for their machine and are dedicated to produce good results for accomplishing a set of targets. However, the profound reason for their motivation to improve is to enhance their own situation. Further, all responsibility and the one who carries on with the improvement work is the individual himself with the support from leaders above. This is considered by both Searcy (2012) and Al-Jawazneh and Smadi (2011) to be an important part of a successful lean organisation.

5.1.3.2 Management and leadership
According to Bertocci (2009) and Liker and Meier (2006), managers need to be fully committed in order to achieve a successful organisation. This fits well into how the managers within this group spend most of their time in the production area to encourage their employees to succeed. For guidance and direction within these organisations, managers have set up both short-term and long-term goals, which are considered clear, accepted and reachable among all employees. In comparison, this is how Kotter (2007) believes a successful manager needs to act. Further, these goals are then clearly linked at different levels and shared ideas about how to achieve them through different activities are well anchored among employees. Another similarity is how managers really prioritise improvement work both through communication, action and by providing sufficient resources, which are supported by both Kotter (2007) and
Ventris (2004) as important. This group further believes in the individual’s ability and managers empower them responsibility and are willing to make fact-based investments without questioning their thoughts or suggestions. How managers lead their organisation, by letting all participate in improvement work and praise good performance, is how Dam et al. (2012) and Kotter (2007) suggest a good manager should be.

5.1.3.3 Company Culture
There is a view of everyone’s participation as an important and highly sought after behaviour. Everyone is part of the improvement work and on a daily basis strives to get better. This is seen and supported by Searcy (2012) as an important factor for a lean change. A natural behaviour, and seen as valuable within this group, is to always search for and have attention on problems and possible improvement areas, which also are promoted by Badurdeen and Gregory (2012). When something occurs, every employee has the mandate to stop the production and search for the failure. Even if the employees cause it, managers demand continuous reporting, without giving any blame.

5.1.3.4 Contextual factors
In this group people are open and willing towards change and historically they have gone through a lot of changes continuously. Nothing is seen as constant and continuous improvement is needed to survive in the competitive market.

5.1.3.5 Change agent
Cases within this group are characterised by openness to external help, and the external agent is seen as an important asset for contributing with an outsider’s objectivity and professional knowledge. However, the internal agent is aware of that the change has to be made and driven in-house and the contributions of the external agent must be filtered to match the organisation’s best. This combination is also supported by Lunenburg (2010), Jain (2005) and Sims (2002) as an important success factor. The internal agent is near the production and supports without controlling details. In addition, the internal agent has a good relationship with the personnel and has gained a trust which according to Lunenburg (2010) is very important.

5.1.3.6 Improvement tools
Within this group, the organisations never stop questioning their methods and how they are used. There is constant evaluation and the tools are adjusted to the problem it is supposed to solve according to the opinion of Liker and Meier (2006) and Sugimori et al. (1977). Another similarity within these two organisations is how collected data is selected and linked to the objectives with the purpose to find improvement areas and base decision on facts and not a feeling.

5.1.3.7 Technical system
On a daily basis, the production status concerning e.g. deviations, productivity, incidents etc. are followed and monitored. This information is used to get attention and focus on the right things, i.e. what are the main problems. This is the base for further priorities and investments. Organisations in this group have created a system that provides feedback and makes it easy for anyone to raise issues. Liker and Meier (2006) express that the system must support people who is trying to improve, and that is what these two organisations have achieved.
5.1.3.8 Working with processes
Within this group there is a clear process thinking where every individual has its specific role and responsibility for improving the output with the whole process and with both internal and external customer in mind. To achieve this, all improvements are raised within the group before any changes occurs to ensure there is a win for the entire process. This is what Bergman and Klefsjö (2002) believe is an important factor for a successful organisation. In addition, supporting groups around the process are involved in the improvement work within these two companies.

5.2 Intergroup differences
The analysis of within-group similarities lays the foundation for examining what the main differences are for the success of adopting a lean mindset and behaviour. The analysis of intergroup differences will go further in detail in data in order to find underlying mechanisms to explain why the groups differ.

5.2.1 Organisational foundation
A distinctive difference between group I and group II, is the value top management puts in improving. In group I, the goal is of course to run a successful company, however there is no connection between how the company is doing and working with improvements. In group II, to constantly improve and get better is seen as success in itself. In this matter, group II and III share similar characteristics, though management teams in group III tends to focus on improving the actual production process instead of focusing on developing a shared vision amongst managers. In group III, the management team has taken a step back to act as a support to the production process, but nevertheless they give the overall impression to work as a coherent unit. The lack of coherence and direction is one of the most distinctive impressions noted from group I management, and therefore the strong emphasis on a unified management team in group II might be a natural step before further focus can be put on the production.

In order to investigate this further, the source of direction and what is seen as successful is worth more attention. Group I has recently gone through a change in ownership. However, there has been no change in top management style or stronger pressure from owners to work with improvements. Another characteristic for group I is that top management mainly consists of persons with long history from within the company, often with a past as operators, and little or no experience from other organisations or managerial positions. Group II has owners well acquainted with the importance of improvement work, and the management team consists of people with obvious influences and experience from managing other organisations that have dealt with similar problems. The main difference between group II and III is the support of a larger organisation supporting the own company, with already set directions regarding long-term goals and with a clear focus on quality and improvement. The lack of support from the outside puts greater pressure on the management of group I to form their own vision of how to run the company, a great challenge even without lacking experience. The lack of external support with setting the direction in group II, combined with the thorough experience of its leaders might be one explanation to why so much emphasis is put on creating a common vision.
5.2.2 Setting the direction

The incoherence mentioned about group I above show itself in the lack of a common direction. There is no clear statement of what the company wants to achieve, and thus no obvious announcement of what is important. In group I, working with improvements and lean is seen as something to do when there is extra time, both by management and operators. In group II and III, a central statement for the direction of the company is to become more competitive by continuously improving. Management of group II and III also share a belief that improvements should be implemented instantly. In difference to group III, operators in group II however doesn’t experience that this is the case.

As mentioned above, management of group I has much experience from actual production work in the organisation, hence they have detailed knowledge of how production work is conducted. Group II is characterised by managers with experience in leading people and they put greater emphasis on the vision and direction of the company. Group III management has a larger focus on supporting work in the right direction rather than performing the work itself. These differences are interesting to compare with the fact that group I is characterised by lack in participation and responsibility of operators, and instead most improvements are implemented by someone in a managerial position. In group II, operators are participating in implementing improvement work; however they are not part of making any decisions. Operators of group III, feel involved in both taking decisions and implementing.

5.2.3 Working with improvements

The opinion of working with improvements when there is time left over, evident in group I, compared with the strive to implement improvements as soon as possible, shown in group II and III, coincide with the value management place on improving. One other aspect that is interesting to emphasise, besides the differing managerial experience mentioned above, is the personal interest in improvement work by key individuals. In common for both group II and III are an interest and willingness regarding deeper theoretical knowledge about lean or quality work. In group I, lean is seen as a set of tools and not a way of running the company. Neither is there an interest from any manager to get a deeper understanding regarding the subject. A notable observation regarding this is that managers of group I are proud to demonstrate bright and clean floors, well-lit production areas, and in general put great emphasis in working environment when talking about lean. In group II, more focus lies on first setting the right foundation in form of mindset regarding company values and improve overall processes before handling details regarding aesthetics. In group III, a general orderliness is already present but most emphasis is put on safety and clear regulation regarding e.g. forklifts and walking inside the factory, i.e. function over design.

As mentioned above, improvement work in group I almost exclusively involve people in managerial positions. Operators have no explicit responsibility to conduct improvement work; it is more of a wish from the managers’ side. Managers wish for operators to come up with improvement suggestions, however as soon as a suggestion has come up it is evaluated by managers or middle managers and no feedback or task is given to the operator who came with it. In group II more emphasis is put on the operator actually implementing improvements.
however, here the operator feel that free improvements are implemented instantly while as soon an improvement concerns an investment, it is handled by managers without any feedback regarding status. There is also no natural expectation that operators should perform improvements as part of the daily work, instead it is seen as a special occasion. In group III operators are more indulgent with improvements not implemented directly. Group III both have a clear way of prioritising improvement suggestions and are careful to explain why an improvement lingers. There is a natural expectation on the operator to perform improvement work, and the result of improvements is constantly followed-up and compared to the set targets. Also, in group III supporting functions regarding improvements work close to the operators and their function is well known. Supporting functions such as incident handling, technicians and improvement audit are more transparent than in group II, where they exist but often are combined with other functions that are prioritised over improvements.

Another difference between the groups is the character of improvements suggested, and how they are received. In group I, most suggestions regard fixing broken machines or buying new equipment. These are to be written down and then handled by the management. However, during improvement meetings or similar, more obvious improvements like new instructions or ways of better communication often comes up orally, but instead of assigning them to a person directly, they are also to be written down and treated as any of the other suggestions. This leads to that improvements and regular maintenance issues are treated through the same pipeline. In group II however, there is a more distinct separation of the two suggestion types, mainly due to management’s more active preaching of the difference. However, in group II there is also little separation between functions treating e.g. maintenance and improvements, though as stated above, operators are given more responsibility in implementing free improvements.

5.2.4 Leadership within the organisation

As stated above, group I is characterised by little or no interest of a deeper knowledge regarding lean. There is also a lack of direction within the company, which is reflected in no direct sense of what the management wants. Middle managers are chosen on experience within the company rather than on engagement or commitment in driving the company forward. And the general impression is that leaders do not know where to lead. In group II there is a strong commitment to helping the company achieve its goals among the management team. Managers and middle managers are to great extent chosen by commitment and interest regarding the company vision. Informal leaders are chosen as improvement group leaders and team leaders to help getting on with improvements. However, the strong sense of unity among the management team is creating a culture of “us and them” from the operators’ perspective. There is a clear strategy to first making sure the management team share the same values before anything is spread to operators, leaving them outside the process of driving the company forward. In group III, the same strategy of appointing unofficial leaders as leaders of improvement work is used however, there is not the same sense of excluding the operators to first focus on management. Instead there is a clear statement that managers’ role are to support the operators in their work since they are the ones creating the value for the customer.
5.2.5 View on external help

Regarding their views on external help with improvement work, all three groups show obvious differences. Group I gladly accepts as much help as possible and to great extent copy what has been told directly to the own organisation. Group II is very restrictive regarding outside help and strives to form all their work and methods on their own. An external opinion on whether they are on the right track is however appreciated. Group III is open to help, however they are very restrictive regarding what is implemented in the own organisation and it is never copied right off but instead adapted to fit the right purpose. Another aspect that differs is who is internally responsible to drive the improvement work. In group one, no one as the explicit responsibility and instead the management addresses an implicit responsibility to all employees. In group II the management team takes on full responsibility for the success of the improvement work with a clear managerial strategy to involve every employee. In group III, the implicit responsibility lies on the management team. However, personal responsibility is put on the individual that is to implement a specific improvement.
6 Conclusions

In this chapter, conclusions based on the foregoing analysis are made and recommendations for how to approach supplier development initiatives in the future are given.

6.1 Supplier differences

The purpose of this master’s thesis is to investigate under which conditions SCD’s work with implementing a lean mindset and behaviour at Scania key suppliers is successful. Our conclusion based on the result from the multiple case study is that the conditions for success are specific for specific suppliers, and the varying results derive from the use of the same SCD method on all suppliers. When trying to answer the research question; What affects how the production unit of a Scania key supplier adopts a lean mindset and behaviour with focus on continuous improvements? three different groups of suppliers have been identified, thus at least three different strategies for supplier development might be called for. The nature of the SCD workshop is a short and intensive education in thinking and acting to eliminate waste and finding improvements. The result of this workshop has not in any of the cases been a drastic change in mindset and behaviour, but instead there has been an obvious difference in how the workshop was perceived and the knowledge from it used. We draw two general conclusions from this that forms the foundation for further discussion:

- The SCD workshop is too brief to learn or get an in-depth interest of lean or continuous improvements.
- The SCD workshop is not enough to affect the direction of a supplier’s organisation or the prioritising of continuous improvements.

Therefore, a supplier development initiative calls for an analysis of the relevant supplier to match the development effort to its specific needs.

6.2 Different group approaches

In the analysis, three groups of suppliers were identified. Group I was characterised by lack of direction, inconsistent management culture, no deeper understanding or interest in lean, no involvement or responsibility of operators in improvement work, and a tendency to copy tools and methods given by external help directly into the organisation. In this group there was no evident receiver with mandate or passion to continue working with the knowledge gained from the workshop. Also, there was no foundation for integrating the new knowledge in the organisation, but instead it was seen as something that should be done on the side of the usual work. Our conclusion is that suppliers in this group are not ready to start working with improvements since they do not know in what direction they should improve. Therefore, conducting the SCD workshop in this group will not give any long lasting results. This is also the most difficult group for SCD to approach since they, as representing a customer, have no right to set the direction and values of the supplier organisation. Our recommendation is therefore not to prioritise this group regarding long-term supplier development.

Group II was characterised by a strong sense of direction, strong management culture, a personal interest in lean and improvements, an “us and them” culture between managers and operators, and a strong sense to develop tools and working methods in-house and be very restric-
tive with applying external thoughts in the organisation. Organisations in this group emphasise a unified management team and strongly believe in forming their own working methods to move in the right direction. This strong belief in knowing what is best for the own organisation leads to a certain amount of scepticism regarding adopting the mindset and behaviour presented by SCD. However, due to SCD’s long experience and Scania’s reputation as a successful lean adopter, the input given is highly valued. Guiding and sharing experience from similar situations is much appreciated and used as a valuable source for forming own methods. Another note well worth considering is the present culture of “us and them”, the risk of focusing too much on unifying the management team may lead to further the distance between management and operators. Therefore, focusing the SCD workshop on operators and their closest contact points seems as a more appropriate approach than to involve top management. Our recommendation for group II supplier development is therefore to put less focus on implementing a mindset and behaviour in the top management, and instead work as a guiding consultant. However, in order to strengthen the bond between managers and operators, the current SCD workshop should be applied with larger participation from operators and their closest contacts.

Group III was characterised by a clear long-term direction; primarily evident among managers, clear targets on an operational level to guide the rest of the organisation, a supportive management culture, an expectation on operators to perform improvement work, and openness to external help but a strong sense of filtering and adapting to the own organisation. In this group improvements and changes are seen as a natural occurrence and the involvement of operators is seen as an obvious part. There is little need for changing mindset and behaviour and therefore the SCD workshop in its present state is rendered somewhat obsolete. Instead, an outsider’s perspective is highly regarded and input for solutions to specific problems might be more effective. The high level of filtering and adapting external methods calls for an understanding of which kind of problem that is present so that a relevant solution can be presented. Our recommendation for group III supplier development is to provide suggestions and experience to solve specific problems instead of a standardised workshop.

6.3 Identifying supplier needs
The approach used in this research has given a holistic view with in-depth information regarding key areas of the organisation of each investigated supplier. Each case study was conducted during a relatively short amount of time and by two relatively inexperienced researchers regarding the investigated area of business. Despite this, the results obtained have been deemed sufficient for analysis and given support to SCD’s opinion of whether the supplier is successful or not. Therefore, the structural tool and outcome variable seems as a reasonable method for SCD to conduct similar studies in order to identify which kind of needs a supplier has and adjust their developing effort according to this. The qualitative approach used in this study however, should be applied in order to find specific needs for specific suppliers, and using a standardised method decreases the possibility of getting the most out of a supplier development initiative.
7 Further discussion

This chapter presents a discussion of the scientific contribution and possibility to apply the findings of this thesis in other environments. Further, a discussion regarding how to proceed from this study to test the tools and theories given concludes this report.

7.1 Scientific contribution

This research has identified the need of understanding how receptive a supplier is for development initiatives before choosing a development approach. Three categories of suppliers have been found, with distinct characteristics that affect how they adopt a lean mindset and behaviour. From these three different approaches have been suggested. However, details of how to approach a supplier should be specific to each supplier’s need and there are many areas one must take in consideration. The categorisation gives an indication of which are the critical areas and what a potential development effort should focus on. The structural tool together with the outcome variable is a useful model to apply in order to concretise otherwise abstract and soft factors to evaluate the long-term development potential of a supplier.

7.2 Generalisability

With the intention to create a new model rather than testing an existing one, the credibility and the generalisability could consequently be a matter of discussion. With support from Yin (2008) and Eisenhardt and Graebner (2007), a model can be built inductively from just a few cases, by allowing it to emerge by identifying relationships within and between cases and their underlying mechanisms. In the discussion of our model’s credibility, the authors believe it to be high, with support from Yin (2008), due to a clear descriptive approach throughout the study with on-going discussion why certain choices have been made. This permits the reader to follow the approach of building the model and from this determine its credibility.

When studying multiple cases that have certain characteristics in common, Denscombe (2007) believes that findings can be extended to other similar cases. With support from this, other first-tier suppliers within the automotive industry would apply to the theory. However, it is debatable whether this generalisation is too narrow to include other industries. The reason for not including non-manufacturing industries depends on the researcher’s focus on improvement work in production. To sum up, the authors of this thesis believe that the model built from the multiple-cases can be generalised to similar supplier development initiatives within the automotive industry.

7.3 Future research

First and foremost, the authors believe it would be valuable to conduct further research by following the same methodology on an increased number of companies in the automotive industry to validate the outcome variable and to test the model. Another continuation of this would be to include different sizes of companies to examine if the model can be applied to a larger mass of characteristics. Further, the result would be interesting to compare with the long-term quantitative results Scania aims to achieve, i.e. higher quality, higher delivery precision and lower costs, to find any plausible correlation. Exclusively examining companies that have not so far received external help, to get a reliable source of data from before external
help was applied, would make it possible to investigate how much external help really affected the company. This was not possible in this research but could help to distinguish the importance of external versus internal factors during supplier development. Finally, an investigation of whether the theory can be applied within other industries would be interesting.
8 References

8.1 Articles


Poksinska B., Swartling D. (Working paper) *Forces affecting the Individual in a Lean Implementation*. Department of Quality and Management, University of Linköping, Sweden


### 8.2 Books


### 8.3 Web references

[www.scania.com](http://www.scania.com) (2012-10-10)

### 8.4 Interviews

Carrick, Bo. (2012-09-20) Södertälje, Sweden
8.5 Other references
Appendix 1: The SCD Workshop

The objective with Scania’s supplier training initiative is to strengthen their suppliers for a long-term relationship. This implies ensuring the right conditions for the supplier to deliver cost effective items to Scania in the right quantity, with good quality at the right time. To reach this stage over time, Scania believes that the supplier needs a lean mindset and behaviour, which is what the training program is aimed to achieve.

The training program is divided into two blocks, normally exercised during a three-day workshop. The common goal with these training blocks is to get the supplier to master certain tools and apply a mindset, which makes it easier to see and act on capacity problems. At least two trainers from Scania are leading the workshop, which include both theory and practical sessions. The learning material used is standardised and originates from Scania’s internal training program. Scania believes in the importance of an organisational commitment regarding change, and therefore they are keen that the participants represent a cross-functional group, from high-level managers to shop floor workers. A preferable size of the group is between 10-15 persons.

The workshop starts with a short theory presentation regarding the method that will be used during the first practical element. This part lasts between 20-30 minutes, and is focused on giving the participants enough knowledge about the method to be able to perform it practically. After the theory presentation the participants are divided into small groups, usually 2-3 persons per group, and deployed at a specific workstation to exercise the method. The trainers are coaching the groups during the whole exercise, and later all groups come together and compile their findings.

The objective with block one is to learn how to find and react on waste. The first part contains theory and practice regarding different kinds of waste and how to reduce them. A method used here is called go and see, where the groups should identify and take notes of waste in the assigned area. The second part of block one, is called frequency analysis and contains both a theoretical review and a practical exercise. All groups will then return to their previously assigned workstation with the assignment to identify and document all tasks being done, specifically focusing on risks for human and equipment, quality deviations and ergonomic issues.

Block two consists of a two-day workshop where the aim is to learn 5S, which is the name of a workplace organisation method. The purpose with this workshop is to gain knowledge of how to organise and maintain one’s workspace to increase efficiency and effectiveness. Throughout the workshop, each of the 5S’s is practiced and supported by theory and guidance. First, the group are assigned to eliminate all items that are not necessary and obtain what is missing to be able to perform the daily tasks. Thereafter, they should place the necessary items in the best possible location. At the third S, the participants learn the benefits of a clean workstation and how to maintain it over time. The next step is to standardise the workstation to make it possible for everyone to find needed tools and equipment. Finally, all previous S should be made into a routine and continuously improved.
The workshop ends by summarising what has been done and what has been learned during the three-day workshop. All material, including theory and the compiled findings, are handed over to the supplier as a support to teach the rest of the organisation and Scania occasionally gives recommendations regarding what to do next. However, the basic idea is to let the supplier decide how to proceed with the knowledge gained from the training.
Appendix 2: Level two question set

8.5.1.1 Individual
- Do organisation members feel appreciated and respected?
- Are opinions from employees regarded and given appropriate feedback?
  - Regarding improvements?
  - Working conditions?
  - In general?
- Are employees involved in creating goals and following up results?
- Are employees motivated to work for the company and its leaders?

8.5.1.2 Management & Leadership
- How has the vision of the company been communicated and received?
- Do managers believe in the change and how has this been shown to the employees?
- Do the members of the organisation believe that set goals are achievable?
- Are managers interacting with and involving leaders in the change?
- Do leaders share the common beliefs and understand the importance of change?

8.5.1.3 Culture
- Are there any stated company values?
- Do the members of the organisation know the company values?
- What aspects are seen as important and what kind of behaviour is rewarded within the company?
- Has there been a change in company culture?
- Do the company values coincide with the perceived culture; does the company live as they learn?
- Is there a clear and unanimous company culture present on all levels in the organisation?

8.5.1.4 Contextual factors
- Are working with improvements highly prioritised?
- What are the current market conditions?
- What are the greatest obstacles against working with improvements?

8.5.1.5 Change agent
- What relation is there between the internal agent and the position where the change effort has been applied?
- How has the change agent been chosen in the specific situation, with regard to the change agent’s role in the organisation, relation to employees and managers, and knowledge of the organisation?
- How do the personnel view the internal agent’s role, and have they even noticed who it is?
- Is there any guidance for the internal agent and how is the distribution of responsibilities between them and the managers?
- What impact has the external change agent had on the internal?
- How well has the internal agent understood the message from the external?
- Are there any opportunities for the internal and external agent to interact?
8.5.1.6 **Improvement tools**
- Are improvement tools used to solve existing problems?
- Are the tools adjusted for the organisation and improved themselves?
- Are the tools seen as a natural part of work?

8.5.1.7 **Technical system**
- Are machines adapted to fit the current process?
- What technological aids are used for improvements?
- Why were these aids chosen?
- Are all employees educated and capable of using these aids?
- What are the common procedure for reporting deviations and giving suggestions for improvements?
- How are improvement suggestions handled?

8.5.1.8 **Working with processes**
- Are processes defined within the organisation?
- Are processes defined with the customer in mind?
- Are members of the organisation aware of their part in the process, and who their internal suppliers and customers are?
- Are improvements made with a system approach?
- Are supportive processes connected and involved in the daily work?
There is a significant difference in walking pace between production managers in group III and the rest. Whether or not this can be scientifically proven as a sign of Lean behaviour we leave as a challenge for more experienced researchers...