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Contributions of lean production to the development of sustainable business practices in the food industry

- The case of Arla Foods

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Fredrik Engström

Abstract

Corporations in the food industry are under pressure from stakeholders to take responsibility for their social and environmental impact (Garnett, 2013). In the struggle, several initiatives have been implemented where the aim is to find a balance between financial, social as well as environmental aspects (Amani *et al.,* 2015). Lean production is an initiative where the aim is to increase productivity and efficiency by the elimination of waste (Kovach & Cho, 2011). One of the cornerstones of lean production is to focus on a long term philosophy where value should be created for society as well as for the corporation (Liker, 2004). This means that if lean production is used as intended, it could lead to the creation of shared value. Shared value implicates that corporations take into account social, environmental and financial aspects when building strategies, and that focus should be on creating value in these three aspects (Porter & Kramer, 2011). Therefore, the aim in this study is to explain the role of lean production in developing sustainable business practices in the food industry.

The study is based on a qualitative approach where Arla Foods, a global dairy cooperative, poses as case company. Managers at Arla Foods have been interviewed and their perceptions from working with lean production makes the foundation for the analysis. The material is analyzed using a theoretical framework that builds on lean production as described by Liker (2004) and shared value by Porter and Kramer (2011).

The theoretical framework suggests that lean production could lead to the creation of shared value. This is also supported by the empirical evidence that shows that shared value is created because a long term philosophy is implemented where values in social, environmental and financial aspects are created. The empirical evidence also shows that the main incentive with lean production is to lower corporate costs and increase productivity and efficiency, why the values created for society seems to be spin-offs from the financial benefits. However, when striving to minimize corporate costs, benefits for society are created as well. More specifically, lean production leads to lowered use of energy and water as well as lowered levels of food waste and emission. Lean production also increases the well-being, motivation, health and work safety among employees.

This study contributes to a growing number of research focusing on the relation between lean production and sustainable development in the food industry. It makes a theoretical contribution by showing that a corporation can generate benefits for society when applying lean production. Empirically it contributes by showing how managers in the food industry perceive the work on lean in relation to sustainable development. The results of the study could be used to create strategies for managing sustainability issues in the food industry.

Sammanfattning

Företag inom livsmedelsindustrin är under press från intressenter att ta ansvar för de sociala och miljömässiga konsekvenserna som deras aktiviteter ger upphov till (garnett, 2013). Flera initiativ har genomförts med syftet att hitta en balans mellan ekonomiska, sociala och miljömässiga aspekter (Amani *et al.,* 2015). Lean production är ett initiativ där syftet är att öka produktiviteten och effektiviteten inom företag genom eliminering av olika typer av slöseri (Kovach & Cho*,* 2011). En av hörnstenara i lean production är att skapa en långsiktig filosofi där värde inte bara ska skapas för företaget, utan även för samhället som det verkar i (Liker, 2004). Om lean production används som Liker (2004) förespråkar skulle det därför kunna användas för att skapa shared value. Shared value är ett begrepp som utvecklats av Porter och Kramer (2011) och innebär att företag ska ta hänsyn till sociala, miljömässiga och ekonomiska aspekter när de bygger sina strategier. Fokus ska vara att skapa värde i dessa tre aspekter. Syftet med studien är därför att förklara betydelsen av lean i utvecklingen av hållbara affärsmetoder inom livsmedelsindustrin.

Studien genomförs med en kvalitativ ansats där Arla Foods, ett globalt mejerikooperativ, står som fallföretag. Personer med ansvar för lean production inom Arla Foods har intervjuats och deras uppfattningar av att arbeta på lean i förhållande till en hållbar utveckling utgör grunden för analysen. Materialet analyseras med hjälp av ett teoretisk ramverk bestående av lean production så som beskrivits av Liker (2004) och shared value av Porter and Kramer (2011).

Den teoretiska referensramen föreslår att lean kan leda till skapandet av shared value. Detta stöds också av de empiriska bevisen som visar att shared value skapas eftersom en långsiktig filosofi är tillämpad där värden i sociala, miljömässiga och ekonomiska aspekter skapas. De empiriska bevisen visar också att det primära incitamentet med lean production är att sänka företagskostnader och öka produktiviteten och effektiviteten, varför de värden som skapas för samhället verkar vara bieffekter av de ekonomiska värdena som skapas. När företaget strävar efter att minimera kostnader skapas fördelar för samhället också. Mer specifikt leder lean produktion till sänkt användning av energi och vatten samt sänkta nivåer av matavfall och utsläpp. Lean production ökar också välbefinnande, motivation, hälsa och arbetssäkerhet bland de anställda.

Denna studie bidrar till den växande litteratur av forskning som fokuserar på förhållandet mellan lean production och hållbar utveckling inom livsmedelsindustrin. Den ger ett teoretisk bidrag genom att visa att ett företag kan skapa fördelar för samhället genom att tillämpa lean production. Empiriskt bidrar studien genom att visa hur managers inom livsmedelsindustrin uppfattar arbetet med lean production. Resultatet av studien kan användas för att skapa strategier för att hantera hållbarhetsfrågor inom livsmedelsindustrin.

Table of Contents

List of figures

List of tables

1 Introduction

The chapter begins with a background to the topic chosen for this thesis. This subsequently leads to a theoretical and empirical problem, followed by the aim and research questions. The chapter ends with a presentation of the unit of analysis, delimitations and the outline of the thesis.

1.1 Background

The food industry is under pressure from stakeholders to implement more sustainable processes and offer products with sustainability in mind (Garnett, 2013). Several scandals have striked the industry in recent years and the trust from customers has dropped (*ibid*.). Policy makers have responded by investigating whether stricter legislation is needed (*ibid*.). This has led to a situation where corporations in the industry must act. In the struggle to find new paths to meet the situation, several methods, techniques and systems have been carried out with mixed results (Amani *et al.*, 2015). Resent research suggests that a part of the solutions might lie in an old management system from the car manufacturing industry, most often referred to as *lean production*. This study sets out to shed light upon lean production and how it contributes to the development of sustainable business practices in the food industry.

1.2 Problem background

Corporations have in recent decades acknowledged the importance of social responsibility and realized the potential benefits of engaging in such efforts (Amaladoss & Manohar, 2013). It is no longer beneficial to solely focus on profit maximization, but environmental, social as well as financial aspects must be considered (*ibid*.). Stakeholders such as customers, non-governmental organizations, media, suppliers and governments are increasingly putting pressure on corporations to become more sustainable (*ibid*.). In the long run it is in the interest of corporations themselves to make sure utilization of resources are done with sustainability in mind (*ibid*.). Corporations that focus on sustainable development strive to address issues in the triple bottom line (Elkington, 1997). This means that environmental, social as well as financial apsects should be considered. This is especially important in the food industry where corporations are in high degree dependent on natural resources for production.

The food industry is especially exposed to the pressure due to its high environmental and social impact - from agricultural production through processing, distribution, retailing and all the way to the consumer (Garnett, 2013). Transparency when it comes to the origin of products, food safety and the sustainability of the processes and products is now a consumer demand that corporations must take into account (Wognum *et al.,* 2011). Long transportation of goods, high use of energy and high levels of food waste are further examples of issues that the industry struggles to manage (*ibid*.). Long transportations of goods implicate emissions of carbon dioxide that foster the greenhouse effect and high use of energy often implicates that non-renewable resources are consumed (*ibid.*). In recent years, high levels of food waste in the industry have been widely debated and criticized (Garnett, 2013). The total production of food in the industrialized world is about 900 kg per person and year (Jordbruksverket, 2011,

p. 8). However, about 30 percent of the total food production turns out as waste along the chain (Tscharntke *et al.,* 2012, pp 55). About 40 percent of the waste can be derived to the consumption and retailing stage while the remaining 60 percent can be derived to production and processing (Jordbruksverket, 2011, p. 8). This wasteful use of resources puts unnecessary high pressure on an already strained environment (Jordbruksverket, 2011). In order to manage these kind of issues, several initiatives have been implemented.

Lean production (also refered to as "Toyota Production System") is such an initiative that has gained interest in recent years. The overall purpose of lean production is to increase productivity and efficiency in a corporation while maintaining a certain level of quality, reducing variations, increasing profits, decreasing costs, eliminating defects as well as minimizing waste (Kovach & Cho, 2011). Historically, lean production originates from the car manufacturing industry where Toyota Motors developed a management system on how to produce higher quantities using less resources without renouncing on quality (Holweg, 2007). Values and costs where seen as synergies of each other, where minimizing costs would increase value (*ibid*.). The system proved successful and has then gradually been transferred to other industries (Hines *et al.,* 2004).

The most used and widely accepted definition of lean production is held by Liker (2004). It builds on 14 management principles divided into four categories (philosophy, processes, people and partners, and problem solving). By working according to these principles, a corporation should be able to eliminate waste and increase productivity and efficiency. Waste are considered as activities that does not add value to the customer (Melton, 2005). One of the cornerstones in lean production is to focus on a long term philosophy (Liker, 2004). This implicates that a corporation working according to lean production should not focus on short term financial goals, but should also strive to create value for the society.

If lean production is used as suggested by Liker (2004), a corporation should be able to create shared value. Shared value is a concept that was first coined by Porter and Kramer (2006) and is viewed as a method for corporations to address issues in the triple bottom line and therefore improve sustainability. Shared value puts financial, social as well as environmental aspects at the core of the business, where the corporation should always strive to create value in these three aspects (Porter & Kramer, 2011). By doing so, long term competitiveness can be achieved while simultaneously providing social and environmental benefits for the societies in which they operate. Shared value has gained a lot of interest from both practitioners and researchers and several initiatives focusing on the creation of shared value have been implemented in a wide section of industries.

1.3 Problem

Finding resources to manage sustainability issues is a difficult task, especially in the food industry that is characterized by a high degree of competitiveness and low margins (Gustafsson *et al.,* 2011). If lean production is used as intended, it could lead to the creation of shared value as described by Porter and Kramer (2011). However, as lean production in the food industry still is relatively uncommon, the literature has not yet fully covered the linkage between industry specific sustainability issues and lean production (Amani *et al.,* 2015; Dües *et al.,* 2013). More deep going studies need to be done in order to understand this linkage (Amani *et al.,* 2015). Further, to the best of my knowledge, no previous studies have focused on explaining the relation between lean production and the creation of shared value. This

study more specifically contributes to the understanding of the linkage by explaining how managers at a corporation in the industry perceive the work on lean production in relation to the creation of shared value.

Studies indicate that whether an implementation of lean production is successful or not is in high degree depending on the specific context, why it has been difficult to create a general practice that can be implemented at any firm (Scherrer-Rathje *et al.,* 2009). Lean production is viewed as a broad mindset and differently constructed at each corporation. It would be interesting for corporations in the food industry to gain a better understanding of how lean production is constructed in practice in the food industry and how it relates to the creation of shared value. This is especially useful knowledge for managers of corporations in the food industry that are considering an implementation of lean production.

1.4 Aim and research questions

The aim of this study is to explain the role of lean production in developing sustainable business practices in the food industry. To achieve this aim, the following research questions are posed:

1. How does lean production contribute to the creation of shared value?
2. What are the perceived benefits for society from working with lean?

1.5 Unit of analysis

The unit of analysis is according to Yin (2013) the major entity that is studied and analyzed. Arla Foods is the unit of analysis in this study. Arla Foods is a global producer and processor of dairy products and a major actor in the Swedish food industry. In 2009, Arla Foods started the process of implementing lean production globally. Now, in 2016, lean production is up and running att all the dairies in Sweden. Because of Arla Food's work with lean production in an industry that is exposed to stakeholder pressure to become more sustainable, their experiences from working with lean production make a valuable contribution for this study.

1.6 Delimitations

This study is focused on lean production in the food industry, an industry associated with several industry specific issues. Conditions in other industries have not been considered in this study.

There are many theoretical approaches of describing lean (lean production, lean management, lean retail, lean manufacturing) which over time has become a broad term (Shah & Ward, 2007). This study is limited to focus on lean production as described by Liker (2004). Sustainable deveopment is also a broad term where many different approaches have been presented. In this study, shared value by Porter and Kramer (2011) is used as a concept of addressing issues in the triple bottom line and improve sustainability. Lean production and shared value thus constitute the two major theoretical concepts. Both are further presented in the literature review.

1.7 Outline of the thesis

The first chapter of the thesis introduces the reader to the topic with a problem background which leads to an empirical and theoretical problem. This is followed by the aim and research questions as well as a presentation of the unit of analysis and delimitations of the study. In the second chapter, a literature review and relevant terms are presented. This chapter ends with a theoretical framework, that is, how the concepts are used in this specific study. The third chapter presents the method used to reach the aim and how certain methodological choices that have been made may have an effect on the result. The fourth chapter is a summary on the collected empirical data and in the fifth chapter, the empirical data is analyzed according to the theoretical framework. Chapter six presents the conslusions of the study and includes a discussion of the results and draws upon some suggestions for further research. Figure 1 schematically illustrates the outline of the thesis.

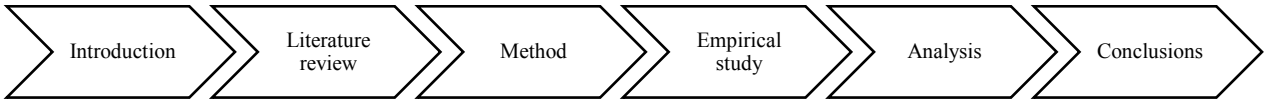

Figure 1. Schematic illustration of the outline of the thesis.

2 Literature review

The chapter begins by defining the terms "sustainable development" and "Corporate Social Responsibility" that are central to the study. These definitions subsequently lead to a concept called "shared value", as introduced by Porter and Kramer (2011). Shared value constitutes one of two major parts of this literature review. The second is "lean production" as described by Liker (2004) in 14 characterizing principles. The chapter ends with a theoretical framework where the two major parts are linked together, showing how they are used in this specific study.

2.1 Sustainable development

In the beginning of the 20th century, the world's natural resources faced an exploitation never seen in history before (Heady *et al.* 1965). Material consumption increased rapidly during this period, playing a major role in driving economic growth. Much of this can be explained by technological development and the discovery of oil. However, material consumption is in high degree dependent on the exploitation of natural resources, leading to several socio-ecological problems (Belz & Peattie, 2012).

Towards the end of the 20th century, these issues gained interest in the academic world as well as by the public who responded by putting increased pressure on corporations to take responsibility for their actions (Amaladoss & Manohar, 2013). Corporations were often accused for creating the problems and a new way of perceiving responsibility emerged. The general and widely accepted idea was at the time that corporations only had one responsibility: to increase profits (Friedman, 1970). However, the development lead to a cry to better manage natural resources and take responsibility for corporate actions creating societal problems, which lead to the rise of the term sustainable development. The most used and cited definition of sustainable development is held by the United Nations through the Brundtland report which defines sustainable development as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (United Nations General Assembly, 1987, p. 43). Building on this definition, Elkington (1997) argues that corporations must find a balance between environmental, social as well as financial aspects in order to reach long term sustainability. This principle is often referred to as the triple bottom line. Through the rise of sustainable development and the triple bottom line, Corporate Social Responsibility (CSR) has evolved as a concept on how corporations can engage in social responsibility and improve sustainable development (Rainey, 2006).

2.2 Corporate Social Responsibility

Corporations can engage in social responsibility in many different ways. The idea is that corporations do not solely focus on profit maximization, but also strive to create value for the society in which they operate. This can for instance be done by giving away part of the revenue for charity, decreasing its environmental impact or applying certain ethical codes of conduct. One of the most used definitions of CSR is according to Dahlsrud (2008) made by the European Commission in 2002. In the report, CSR is defined as *"A concept whereby*

companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis" (COM 2002:347, p. 5).

The development of CSR has led to a new view on the relation between business and society (Porter & Kramer, 2011). Business and society should be seen as mutually dependent on eachother rather than working against each other. Upon this idea, Porter and Kramer (2011) have build their idea of creating shared value as the future way for corporations to manage environmental and social issues while also creating long term competitiveness for the corporation.

2.3 Creating shared value

Porter & Kramer (2011, p. 6) defines shared value as *"policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates. Shared value creation focuses on identifying and expanding the connections between societal and economic progress."*. The idea of creating shared value was first mentioned by Porter and Kramer (2006), and then further developed and more structured in Porter and Kramer (2011). The concept is closely related to CSR. However, Porter and Kramer (2011) are critical towards CSR as it is applied in practice today. They argue that corporations get stuck in a mindset where responsibility is at the periphery and not at the core of the business itself. They argue that CSR is often viewed as a trade off from profit rather than admitting that corporations and society are mutually dependent on each other, and that the competitiveness of corporations and the health of the surrounding communities are closely bound together. Shared value should therefore be viewed as a business model where generating value in environmental, social as well as financial aspects is at the core of the corporation (Porter & Kramer, 2011). Corporations are dependent on successful communities, partial because they create a demand for the corporations' products, but more important, they depend on the society to "*provide critical public assets and a supportive environment*" (Porter & Kramer, 2011, p.6). The foundation for creating shared value is that firms by creating societal value also can create economic value. Shared value opportunities can be created in three key ways: 1. Reconceiving products and markets, 2. Redefining productivity in the value chain or 3. Enabling local cluster development (Porter & Kramer, 2011). These three ways are illustrated in figure 2.

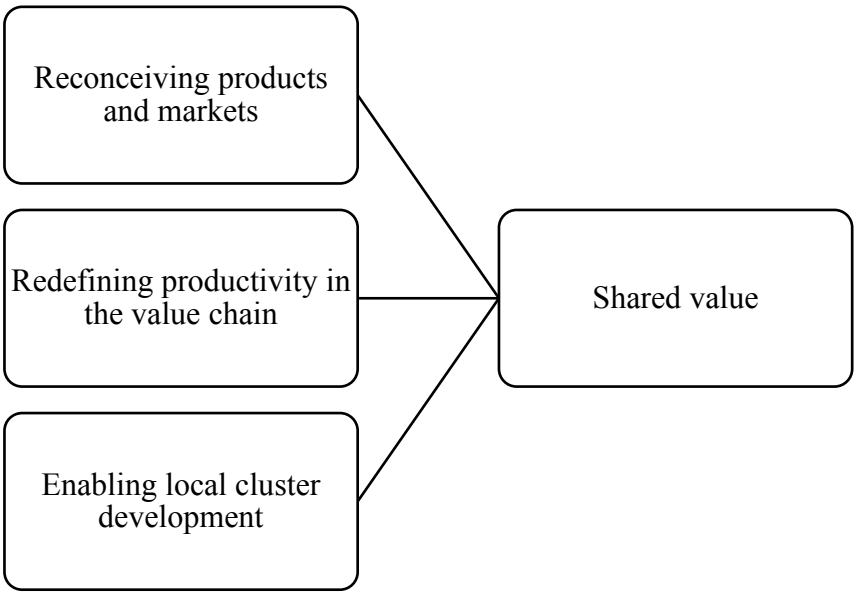

Figure 2. Schematic illustration of how shared value is created. Own modification.

Improving value in one aspect opens up for opportunities in the other aspects, why these three key ways should be seen as closely connected that gives fuel for each other. If corporations can improve the health of societies, many new ways of serving new needs, increase efficiency, differentiate from competitors and enter new markets are opened up (Porter & Kramer, 2011).

2.3.1 Reconceiving products and markets

Instead of focusing on traditional markets in developed countries, corporations can aim at serving markets that are often overlooked due to them not being financially attractive (Porter & Kramer, 2011). These markets are often referred to as "the bottom of the pyramid", a term first coined by Pralahad and Hart (2001). They often exist in urging countries that are less developed, but can also be found in poorer areas in developed countries. Due to these markets not being financially strong, corporations often argue that it is not worth entering them. However, Porter and Kramer (2011) argue that there are substantial profits for corporations that can offer products for these consumers while simultaneously serving social needs. This is because the need for social development are often more pressing at these markets (*ibid*.).

When creating shared value by reconceiving products and markets, corporations must first identify the societal needs that a specific product could bring to consumers on these markets (Porter & Kramer, 2011). The societal needs are not static but change constantly. However, by continuously exploring social needs, new products can be developed or existing products can be adjusted to be sold in these markets (*ibid*.). Doing so often implicates that products must be redesigned or distributed differently. This often lead to innovations that traditional markets can benefit from as well. A classic example is microfinance that was developed to serve the bottom of the pyramid. From its entrance, it has been spread even to developed countries.

2.3.2 Redefining productivity in the value chain

Redefining productivity in the value chain builds upon the notion that externalities can lead to internal costs for corporations (Porter & Kramer, 2011). An externality is a cost that arise for a third part because of something the first part does (*ibid*.). For instance, emissions from a factory lead to pollutions that become a cost for society. Porter and Kramer (2011) argue that when these externalities arise, internal costs for the corporation arise as well. Corporations can therefore strive to minimize the external costs and simultaneously lower its internal. This could be explained using a simple example: a distributor can create shared value by innovating a system on how to drive less miles while delivering its goods to customers. Doing so would implicate lowered emissions which is an externality for society. However, internal costs would also be lowered as petrol and labor are costs for the corporation. Both society and the corporation would in this case lower their costs: shared value is created. Typical areas where corporations can create opportunities for shared value are: energy use, logistics, resource use, procurement, distribution, employee productivity and location (Porter & Kramer, 2011).

Energy and logistics make significant costs for many corporations (Porter & Kramer, 2011). By decreasing the amount of energy that is used in production, processing, logistics and distribution, shared value can be created as internal costs are cut while also decreasing external costs. As energy prices often are volatile and uncertain, striving for decreased energy use is something every corporation should do. This could lead to new innovative ways for recycling and cogeneration in order to make the most out of the energy. A distributing corporation that for instance can shorten its driving routes will save money in terms time, labor and energy, while also reducing its emissions. The same logic goes for any kind of resource. A corporation that can increase its efficiency of using water and raw materials will lower internal costs as well as external.

The traditional way of dealing with suppliers is to drive down prices as far as possible. However, a growing number of corporations have realized that doing so leads to lowered productivity and quality due to the suppliers are pushed towards marginalization (Porter & Kramer, 2011). By supporting suppliers with finance and sharing knowledge and technology, increased productivity as well as quantity may be seen as a result. For instance, there is a growing interest in the food industry for a concept called “direct trade” (Borella *et al.,* 2015). Direct trade implicates buying directly from the farmers instead of using middlemen such as distributers, exporters and importers. The price often goes up, but by buying directly from the farmers, the corporations that have applied direct trade perceive that both quantity, quality and delivery reliability have improved as the farmers get input in terms of knowledge and finance from the buying corporation. Direct trade could also be a way of lowering transaction costs and create a stronger bond of trust in the buyer-supplier dimension.

The workforce is for many corporations its most important asset (Porter & Kramer, 2011). However, instead of striving to hold down wages, reduce benefits and move the production abroad in order to decrease labor costs, corporations that want to create share value should focus on improving the well-being of the workforce (*ibid*.). Employees that feel safe, secure and motivated are much more likely to be productive at work. Many corporations have learned that poor employee health is much more expensive than providing employees with benefits. Employees who get fair treatment at work are also less costly for society.

The location of a corporation is important (Porter & Kramer, 2011). It has for long been a trend that a corporation should be located to where it is cheap to produce and process, a reason why many corporations in developed countries chose to off-shore. However, doing so adds internal costs for transportation, logistics, distribution and dispersed production systems while increasing external costs for emissions etc. Instead, corporations that focus on building strong communities with close contact to stakeholders are more likely to be successful. This gives them a better control over the activities and transaction costs could be lowered.

2.3.3 Enabling local cluster deveopment

Corporations are not working in isolation from each other (Porter & Kramer, 2011). Supporting firms and infrastructure are important factors that drive productivity, competitiveness and innovation. According to Porter and Kramer (2011, p.12): "*corporations can create shared value by building clusters to improve productivity while addressing gaps or failures in the framework conditions surrounding the cluster*". A "*cluster*" in this context is defined as "*a geographic concentration of firms, related businesses, suppliers, service providers and logistical infrastructure in a particular field*" (Porter & Kramer, 2011, p.12). Clusters do not have to be built solely around corporations, but universities and trade organizations are also examples of important actors. Silicon Valley in California, USA, is a classic and well-known example of a cluster.

2.4 Lean production

Lean production (also referred to as "Toyota Production System") is a management system that today is applied in a wide section of industries. The main objective with lean production is to increase productivity and efficiency in an organization by the elimination of waste (Kovach & Cho, 2011), or as Shah and Ward (2007, p. 791) puts it: "*lean production is an integrated socio-technical system whose main objective is to eliminate waste by concurrently reducing or minimizing supplier, customer and internal variability"*.

Waste is central to lean production and defined by Melton (2005, p. 665) as *"any activity in a process which does not add value to the customer"*. There are according to Melton (2005) seven different types of waste:

- Waste of overproduction
- Waste of waiting
- Waste of transport
- Waste of inventory
- Waste of over processing
- Waste of motion
- Waste of defects

There are many different models and explanations of what lean production really is. However, Liker (2004) identified 14 principles in his book "*The Toyota Way: 14 management principles from the world's greatest manufacturer*" that characterize lean production. The principles have become widely accepted as a theoretical framework for lean production and is popular amongst both researchers and practitioners. The principles are often assembled in a model referred to as the 4P-model (philosophy, processes, people & partners and problem solving).

These four categories include the 14 principles that constitute the foundation for lean production as described by Liker (2004). The model illustrated in figure 3 and the following sub-sections present the 14 principles divided into the four categories at a more detailed level, based on Liker (2004).

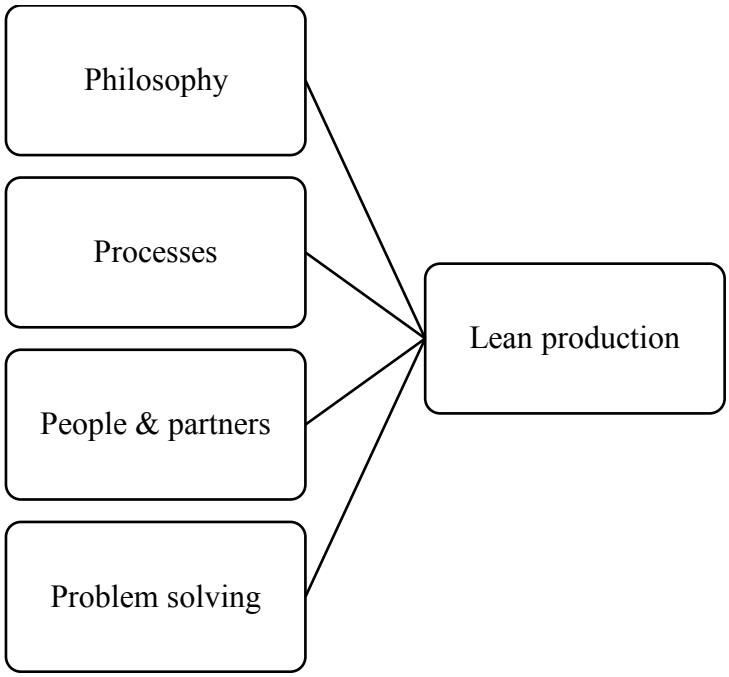

Figure 3. Lean production described in the 4P-model (Liker, 2004). Own modification.

2.4.1 Philosophy

1. Long-term philosophy

Organizations must base their decisions according to a long term philosophy, even if it is at the expense of short-term financial goals. The ambition should be to strive for goals that stretches beyond just making profit. This means that value should be created for the society as well as for the corporation.

2.4.2 Processes

1. Create a continuous flow to bring problems to surface.

When there is a continuous flow of processes, it is easier to detect errors and problems. Creating a flow also implicates that machines and employees should be synchronized so that no time goes to waste. When there is a flow, all types of waste are brought to surface and can be managed.

2. Use “pull” systems to avoid overproduction.

In order to avoid overproduction, the organization should only produce according to customer demand, when demanded. This system is called just-in-time (JIT) and does not only apply to the end consumer. In a production flow, the customer is the next step in the

process. By implementing JIT, a “pulling” effect can be reached as the next step in the flow signals to the precedent step when to produce a new unit.

3. Level out the workload.

Leveling out the workload in the production has several benefits. If employees are not stressed, errors in the production can be decreased. It also becomes easier to detect errors as the batches usually are smaller. Leveling out the workload also facilitates the use of JIT as it becomes easier to produce at customer demand.

4. Build a culture of stopping to fix problems to get quality right the first time.

In order to increase quality, routines for stopping and fixing problems immediately when they occur should be applied. By finding the root cause to a problem, it is possible to prevent the problem from reoccurring. There are many different systems and techniques an organization can apply that enhances this culture. However, some kind of visual system where problems can be announced and the process of finding a solution that sustains is proved successful.

5. Standardized tasks and processes are the foundation for continuous improvement and employee empowerment.

All parts of the organization must act according to the same principles and methods. By doing so it is easier to reach continuous improvements. Employees should be encouraged to bring up suggestions for improvements.

6. Use visual control so no problems are hidden.

Clear indicators on when a performance deviates from expected or wanted result should be applied. Keeping the workplace structured and clean is a condition for detecting practical and visual problems.

7. Use only reliable, thoroughly tested technology that serves your people and processes.

Technology should be used to help employees perform better, not to replace them. If implemented with caution, new technology can lead to considerably improvements. However, new technology can be unreliable and in order not to jeopardize the flow of the production, it should be well tested before implemented.

2.4.3 People and partners

1. Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others.

Leaders should act as role models for employees by living the philosophy of the organization. Instead of searching outside the organization for competent leaders, employees within the organization with leadership qualities should be promoted. By growing leaders instead of recruiting them, it is easier to make them embrace the philosophy and act in line with it.

2. Develop exceptional people and teams who follow your company's philosophy.

Group work should be encouraged in order to achieve best effect when solving problems and working with continues improvements. The organization should have clear and outspoken corporate values for the employees to understand and embrace.

3. Respect your extended network of partners and suppliers by challenging and helping them to improve.

Aim to establish long term partnership with stakeholders and strive to reach common goals by helping each other. View the stakeholders as extensions of the organization and challenge them to perform better.

2.4.4 Problem solving

1. Go and see for yourself to thoroughly understand the situation.

Always base decisions on actual observations. By finding the root to problems, solutions that sustain can be implemented. In order to fully understand a situation, the responsible person should personally engage in the situation. That is always better than hearing about it from others.

2. Make decisions slowly by consensus, thoroughly considering all options.

All possible solutions should be investigated before making a decision. Include all employees and stakeholders that will be affected by the change. When a decision is taken, implement fast.

3. Become a learning organization through relentless reflection and continuous improvements.

Continuously take time for reflection, root cause analysis and investigation of possible solutions and changes. Doing so can prevent problems from reoccurring. Its important to make this a part of the culture. The knowledge that is generated through this process should be kept preserved within the organization.

2.5 Theoretical framework

Shared value opportunities can be created in three key ways (Porter & Kramer, 2011):

- Reconceiving products and markets: by targetting markets that are often overseen due to poor financial conditions (the bottom of the pyramid). Corporations that can adjust their production or processing methods can expect substantial profits on these markets, while simultaneously serving societal needs.
- Redefining productivity in the value chain: eliminating externalities that arise due to corporate actions, for example by lowering energy use, water consumtions, food waste or emissions.
- Enabling local cluster development: support local suppliers and other stakeholders, for example by improving transparency, infrastructure and communication.

When a firm strives to create shared value, it strives to make sure that financial, social as well as environmental aspects are considered and that these aspects are considered as a part of the corporate strategy (Porter & Kramer, 2011). Thereby going away from the common notion that a firm should solely focus on profit maximization. But by creating value for the society, value will also be created within the corporation. In other words, to stay competitive, corporations must create value in social, environmental as well as financial aspects.

By working according to the 14 principles in lean production, a corporation strives to increase productivity, efficiency and eliminate waste (Liker, 2004). One of the cornerstones of lean production is to implement a long term philosophy with goals that increase both corporate and societal value (*ibid*.). A corporation could therefore use lean production as a method of creating shared value as described by Porter and Kramer (2011). If lean production is used as intended by Liker (2004), it should lead to redefining productivity in the value chain as externalities that arise from corporate actions and impact society are eliminated, enhancing societal value. Figure 4 illustrates this relation between lean production and shared value.

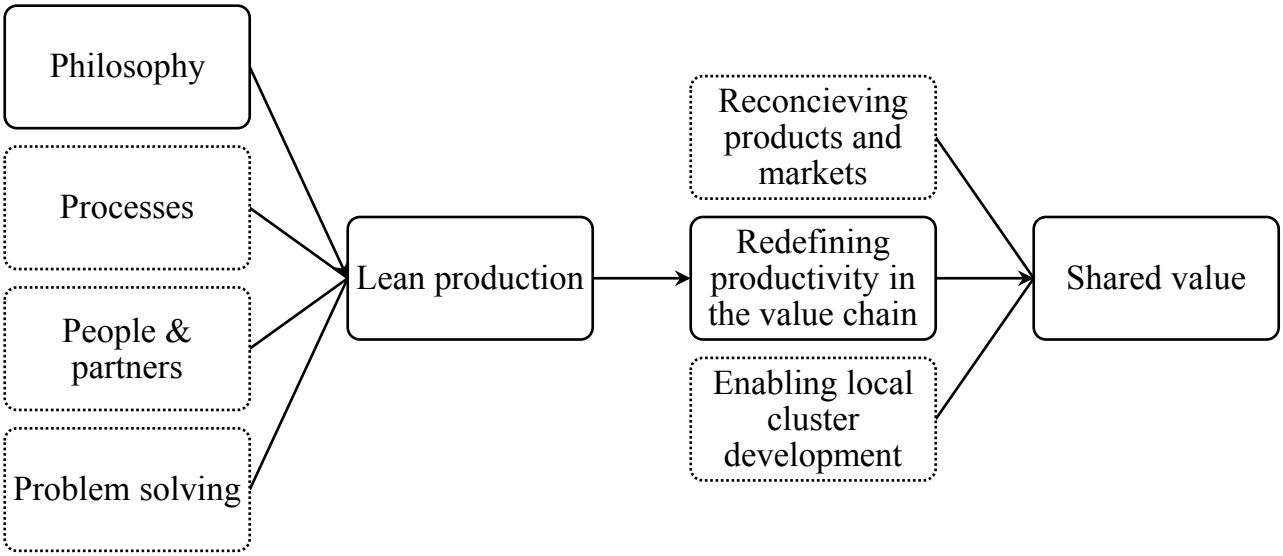

Figure 4. Schematic illustration of how shared value and lean production are used as a theoretical framework in this study.

3 Method

This chapter presents the approach that has been used in order to answer the research questions that were posed in the first chapter. It also includes a discussion about the quality assurance of the study and ethical issues that have arisen when conducting it.

3.1 Literature used in this study

The theoretical literature used in this study is in first hand consisted by peer-reviewed articles. Peer-reviewed implicates that the articles have been reviewed by field-experts before publication and are therefore classified as more reliable and trustworthy (Bryman & Bell, 2011). Databases such as Primo, Google Scholar and Web of science provided by The Swedish University of Agricultural Sciences were used when searching for literature. During the literature search, key words such as "*lean*", "*lean production*", "*sustainability*", "*food industry*" and "*sustainable business strategy*" were used. When deciding which articles to use, factors such as publication date and citing were considered especially important. In excess of peer-reviewed articles, school books, reports and other material have been used.

3.2 Qualitative approach

This study has a qualitative approach. Qualitative studies are more focused on developing understanding of a phenomenon rather than quantifying characteristics of a population (Bryman & Bell, 2011). There are also three specific characterizations of qualitative studies that further differentiates them from quantitative (*ibid*.):

1. An inductive view on the relation between empirics and theory. This means that the theoretical framework emerges from the empirical findings, rather than vice versa.
2. An interpretative standpoint which implicates that it is the subjective perceptions of the respondents that are of interest. The social reality as it is perceived through the lens of the respondents makes the foundation for the empirical chapter.
3. An ontological view that says that the reality is a result of interactions between individuals. The opposite view implies that the reality is "out there", independable of individual interactions.

This study focuses on how the respondents perceive the work on lean in relation to sustainability issues. It is their subjective perceptions that are of interest why a qualitative study is a useful approach.

3.3 Case study format

When conducting qualitative studies, a case study format is often applied. It is done in this study where a single corporation poses as a case. However, a case can in general be constituted by a specific workplace, organization, person or event (Bryman & Bell, 2011). By focusing on a single case, a deeper understanding for the specific context in which the case is operating in can be reached (*ibid*.) It also allows for the researchers to create thick descriptions from the observations (Robson, 2011). The result from the observations is though

in high degree bound to context, why it should be used with caution when applied in other fields and situations (*ibid*.).

A case study format is in this study a useful approach as more deep going studies on lean in relation to sustainability issues in the food industry need to be done. By conducting this study using a case company, it has been possible to generate a thick description on the single case.

3.3.1 Arla Foods as case company

Arla Foods, a global cooperative in the food industry with focus on producing och processing dairy products, poses as case company in this study. Arla Foods made the decision to implement lean production globally at the dairies in 2009, and all the dairies in Sweden have now, in 2016, lean production programs that are up and running. The corporation operates in an industry where the trend is to engage in social responsibility and strive for sustainable development, but low margins and high competetivness makes it difficult to find resources to do so. However, because Arla Foods are working according to lean production which the literature suggests could be used to create shared value, it makes a good case company for this study.

The corporation have been working according to lean production for a few years now and the managers in charge of lean production have experiences that makes a good contribution for this study.

3.4 Collecting empirical material

In order to collect empirical material for this study, interviews were conducted with four respondents at Arla Foods. The criteria were to interview individuals who are well-grounded in the work on lean production and involved at a strategic level. For that reason, one Senior Consultant at the lean office in Gothenburg and three Lean Managers at dairies in Vimmerby, Linköping and Stockholm were interviewed. See table 1 for a more detailed overview on the respondents in this study.

The Senior Consultant was in charge of implementing lean production at the dairies in Sweden. His experience from implementing lean production and educating the employees at the sites made a valuable contribution as he could explain why and how Arla Foods implemented lean production. The Lean Managers at the dairies were chosen as they are well-grounded in the practical work with lean production at the dairies and could answer questions on how they perceive the work with lean production in relation to the creation of shared value.

The Senior Consultant and two of the Lean Managers were interviewed between February 26 and March 14 in 2016. The interviews were held over telephone and lasted for 40 to 60 minutes. Before these interviews, the respondents had received semi-structured interview guides with topics in order to be prepared on what kind of questions that were to be brought up. The interview guides were slightly different constructed depending on who was to be interviewed (See Appendix 1 and 2 for the interview guides). During the interviews, the guides were loosely followed in order to make sure all the questions were brought up. However, due to them being semi-structured, new questions that aroused during the interviews could be followed up. The basic idea was though to let the respondents speak in

their own words as much as possible and not interfere with them. This to make sure their own subjective perceptions were brought up.

The interviews were recorded and later transcribed. This was done to make sure that the entire material was available after the interviews and to be able to retain the respondents own words and phrasings. By doing so it was possible to use citings when writing the empirical study chapter. Transcribing also makes it possible to thoroughly study and analyze the material hindsight (Bryman & Bell, 2011). All the respondents were asked in advance if they approved to be recorded. Non of the responents opposed to this.

Table 1. Table of the respondents

Title	**Location**	**Format**	**Length (min)**	**Validated**	**Date**
Senior Consultant	Lean-office Göteborg	Telephone	50	X	2016-02-26
Lean Manager	Vimmerby milk-powder factory	Telephone	40	X	2016-03-04
Lean Manager	Linköping dairy	Telephone	60	X	2016-03-14
Lean Manager	Stockholm diary	Site visit	90	X	2016-04-08

Table 1 presents a list of all the respondents that have participated in this study. The table also informs about what sight the respondents are stationed at, the format used during the interviews, the duration time of the interviews, whether the interviews have been validated by the specific respondent or not and at what date the interviews took place.

In order to better relate to lean production at Arla Foods, a site visit was conducted at Stockholm dairy on March 8, 2016. The visit lasted for about 90 minutes, where the Lean Manager at the site was interviewed during a tour at the dairy and explained how they work on lean production in practice. This was useful in getting a better understanding of lean in practice and to make a more accurate retelling. However, the interview at the site was not possible to record. Instead, rigourous notes were taken.

When the material from the interviews had been transcribed and/or summarized, it was sent to the respondents. The respondents then got a chance to read and comment on it. This technique is called respondent validation and is a good way of making sure facts and descriptions are interpreted the right way before analyzing the material (Bryman & Bell, 2011).

3.5 The process of the study

When the empirical material had been collected, it was structured and categorized. A literature review was thereafter conducted in order to construct a theoretical framework that could explain the observations and findings.

During the interviews, it appeared that lean production at Arla Foods could be explained using lean production as described by Liker (2004), why this constitutes the theoretical foundation in this study. Liker (2004) has identified 14 principles of lean production where it can be divided into four categories: philosophy, processes, people & partners and problem solving. Shared value by Porter and Kramer (2011) makes the second major theoretical part of this study as there is a connection between lean production and shared value that was of use when explaining the findings and observations.

3.6 Quality assurance

When discussing the quality assurance of a study, the terms validity and reliability are often used (Bryman & Bell, 2011). This is done in order to make a judgment on how well conclusions of a study correspond to reality. In case studies, triangulation, which means that several different sources for data collection is used, is a way of achieving validity (Riege, 2003). In this study, this has been considered by interviewing individuals at different levels of Arla Foods. The Lean Managers are working at the dairies and are in operational charge of lean production while the Senior Manager is working at a strategic level for Arla Foods with all the dairies. Using respondent validation (as described earlier in this chapter) is also a way of achieving validity (Bryman & Bell, 2011). Another way of achieving validity is to use illustrations that assists explanations (Riege, 2003). This is continuously done in this study to make it easier for the reader to follow and understand the process. All the theoretical concepts are described both in text and figures and the analytical summary contains a graphic illustration of the findings.

When striving to reach reliabaility, it is important that the researcher is detailed and rigorous in describing all the steps of the study (Riege, 2003). This is considered in this study by being open and detailed about choices and ideas so that the reader understands exactly how the study has been conducted and why certain choices have been made. For instance, by attaching the interview guides (see appendix 1 & 2) the reader can follow what kind of questions that were raised during the interviews. Also, by structuring the empirical study (chapter 4) according to how the managers at Arla Foods perceive lean production, no parts of the empirical data are left out. As described earlier in this chapter, all interviews were recorded and transcribed, which is also a way of creating reliability (Riege, 2003). Using peer-review or examination can also improve reliability as other individuals then can evaluate and question the study (*ibid*.). This was considered during the seminars when an opponent and the supervisor got a chance to read and comment on the thesis.

When conducting a case study using a qualitative approach, it is not possible to make statistical generalizations from the results which is often the goal with quantitative studies where you want to generalize the findings to a defined population (Yin, 2013). However, analytical generalizations are possible to make (*ibid*.). Analytical generalization means that the findings are generalizable to a theory of a studied phenomenon. This is important as the theory may be applicable in a wider context than the specific case that is being used in a certain study.

3.7 Ethical discussion

As qualitative studies often imply that the researcher is in close contact with the respondents, the ethical aspect is important and need to be discussed (Bryman & Bell, 2011). There is always a risk that questions could lead to uncomfortable situations and cause mental harm in terms of decreased self esteem and stress for the respondents (*ibid*.). In this study, the ethical aspect was considered by not deliberately ask questions that could provoke the respondents. All the respondents in the study have volunteered to participate why no one has been forced to do so. However, it is difficult for the researcher to determine whether the respondents have decided to participate because of genuine interest for the work or if they feel obligated to do so.

Before each interview, the respondents were asked if they allow the conversations to be recorded. The researcher explained that recording the conversation was only done to better recall the interview hindsight, and that no one but the researcher has access to the material.

The questions asked were only related to the professional life of the respondents. No questions regarding their personal life was considered as these can be more sensitive. The respondents always had the possibility to abstain from answering questions if it made them feel uncomfortable. They could also ask the researcher to refrain a question if they did not fell comfortable with it or did not want to answer.

The interviews were conducted for the purpose of a master's thesis at the Swedish University of Agricultural Sciences which was made clear for the respondents when making the first contact.

4 Empirical study

This chapter is divided into two sections. The first section provides an empirical background with focus on the case company Arla Foods as a corporation in the food industry and the process they went through when implementing lean production at the dairies in Sweden. It builds upon information provided by Arla Foods on the web site and the interview that was held with a Senior Consultant. The second section is based on the interviews that were held with Lean Managers at three dairies in Sweden and their perceptions of working on lean.

4.1 Empirical background

This section first presents a background to Arla Foods in order to gain an overall understanding for the corporation. This is followed up by the process Arla Foods went through when lean was implemented at the dairies, based on the interview with a Senior Consultant at the lean office in Sweden who was involved in the implementation process.

4.1.1 Arla Foods

The history of Arla Foods dates back to late 19th century when small dairy farmers in Denmark and Sweden, independent of each other, formed several smaller cooperatives (www, Arla Foods, 1, 2016). By merging into cooperatives, the farmers could invest in joint facilities and make the production more efficient. All the profit made was equally split, a strategy that came to prove successful over the years as the cooperatives became stronger and merged into bigger ones. From being locally anchored in small communities, the cooperatives grew during the 20th century to become national producers of dairy products. In the end of the 20th century, Arla was the biggest dairy cooperative in Sweden and MD Foods was the biggest ditto in Denmark. In order to further grow and claim new market shares, the two giants came to make future plans as one single global cooperative.

Arla Foods was formed in the year of 2000 when MD Foods joined together with Arla (www, Arla Foods, 1, 2016). Ever since, Arla Foods has continued to grow by merging with international cooperatives, acquiring several other dairy companies as well as engaging in partnerships and joint ventures all over the world (www, Arla Foods, 2, 2016). This has led to a great expenditure of the corporation where new markets have been entered and a lot of new products have been added to the range. Table 2 presents a chronological list of important landmarks where companies have been merged, acquired or started joint venture/partnership with Arla Foods since its establishment in 2000.

Table 2. Chronological table of landmarks in the history of Arla Foods

Year	**Company**	**Country**	
2004	National Cheese Company	Canada	Acquired
2005	China Mengniu Company	China	Partnership
2006	White Clover	United States of America	Acquired
2006	Tholstrup Cheese	Denmark	Acquired
2007	Express dairies	United Kingdom	Merged
2007	Artis	Russia	Joint venture

2009	Westbury Dairies Ltd	United Kingdom	Joint venture
2011	Hansa-Milch eG	Germany	Merged
2011	Allgüuland-Käsereien	Germany	Acquired
2012	Milch-union Hocheifel MUH	Germany	Merged
2012	Milk Link	Great Britain	Merged
2012	COFCO Corporation	China	Partnership

Table 2 presents a chronological list of landmarks where companies have been merged, acquired or joined in partnership/joint venture with Arla Foods since its establishment in 2000 (www, Arla Foods, 2, 2016).

The development since 2000 has led to Arla Foods today being the sixth biggest dairy company in the world, owned by approximately 13 000 farmers in Sweden, Denmark, Great Britain, Germany, Belgium and Luxemburg (www, Arla Foods, 3, 2014). The production takes place in eleven countries and the total amount of employees exceeds 19 000. In excess of the already mentioned countries, Arla Foods have sales offices in another 24 and the products are sold all over the world.

4.1.2 The process of implementing lean production at Arla Foods

In 2009, Arla Foods decided to globally implement lean production at all the dairies. The reason was to establish a model that could help the corporation grow over time while at the same time cutting costs and generate savings. A number of earlier cost-cutting projects had been carried out, but these did not seem to generate the long term results that Arla Foods wanted. These programs could often show good results in the beginning, but after a few years', costs seemed to rise again and it was all for nothing. According to the Senior Consultant, this is where lean production comes in as a handy approach to long term growth while also cutting costs and generating savings. He says that "*lean production shouldn't be seen as a cost-cutting project, but rather a growth model. However, in order to grow over time, we want to generate savings, it is obvious that it is the incentive with lean production. Arla Foods has rather ambitious objectives when it comes to savings and a major part of that is supposed to come from working on lean production*".

When Arla Foods had taken the decision to implement lean production, a specific concept was developed together with the consultancy firm McKinsey. The plan was to implement lean production at the dairies and then later on move towards other areas of the organization such as administration and sales offices. Lean production was first implemented at dairies in Denmark followed by Sweden, Germany and Great Britain in 2011. The same concept was implemented in all the countries, but with small adjustments in each country to make it fit specific contexts. Therefore, each country started up a "lean-team" responsible for the implementation and a Lean Manager was appointed to each dairy. This person is in operational charge of lean production at each dairy and is supposed to coordinate when implemented.

Establishing lean production at the dairies was a long and time-consuming process, but now, in 2016, all the dairies in Sweden have lean production programs that are up and running. The implementations that took place at the dairies can be divided into four phases:

1. Receive business goals and educate managers on lean production tools and techniques.

2. Analyze the current situation at the dairy.
3. Define a future state and construct a tactical implementation plan.
4. Educate co-workers on lean production tools and techniques and coach the dairy management team as they go along.

The first phase of implementing lean production at a dairy is about educating the management team at the dairy. This is done during a three-day camp that includes background of lean production and how the concept is planned to work in practice at the site. The lean-team educates the management team at the dairy on how to work with the tools and techniques within the lean production concept and what challenges and obstacles that may arise along the way. This camp is called "boot-camp 1" and is held only with managers at the dairy. During these first days of the implementation, the lean-team receives specific objectives that the dairy wants to achieve by working with lean production. These objectives are set by the dairy director and the aim of setting specific objectives is to get a focus, something to work towards. The objectives are supposed to be measurable and can be anything from lowering food waste or decreasing energy use to cutting conversion-costs. However, the objectives are not to be seen as pure lean-objectives, but instead as overall business objectives where lean production should be seen as a resource to help the dairy reach these.

The second phase goes on for about three to six weeks and includes a rigorous analyze from the lean-team of the current situation at the specific dairy. The lean-team analyzes all areas of the dairy, from the weigh-in of the milk to the loading and distribution. They also analyze how the management team work and study the sites staff-surveys in order to gain a better understanding for how the dairy works in practice. The analyzing phase results in a current-state presentation. It covers all areas of the dairy with focus on the relation to the objectives set at the first phase of the implementation. The lean-team here points at the strengths and weaknesses of the organization and where they see potential improvements.

When the current-state presentation is completed, which is held for the management team, the lean-team goes into the third phase. It includes workshops with the management team, executives and key people at the dairy. The future-state phase is about what the dairy defines as important and how to achieve the objectives. The lean-team has in the current-state phase put forward their opinion, but it is the responsibility of the dairy managers to decide how to achieve the objectives. The lean-team here act as coaches of the process and a number of activities are prioritized along with the management team at the dairy on how to achieve the objectives. This culminates in a future-state presentation, that is, a state the dairy wants to reach in one and a half year from that point. Once the future-state is set, the lean-team and the management team at the dairy construct a plan on how to reach this state. The plan is called "TIP" (tactical implementation plan) and is basically a plan on how to achieve the objectives. The TIP is not directly related to lean production, but is a way for Arla Foods to set objectives and plan on how to reach them. Lean production should be seen as a system that can help reaching these objectives.

When the TIP is defined and set, the lean-team move into the fourth phase which is about educating the co-workers on how to use the different tools and techniques that lean production imply. Work-shops are also held in order to better involve the co-workers on how to proceed.

When these four phases are fulfilled, the dairy basically has a lean production program up and running. After a year and a half, a new TIP is defined with new objectives for the dairy to reach. The tools and techniques in lean production are seen as a valuable resource to fulfill

these objectives. The lean-team continuously act as coaches and support for the management team as they go along with lean production. Once a year the lean-team conduct an audit to make sure everything works as intended and that the dairy is working towards the objectives.

4.2 Interviews with Lean Managers at Arla Foods

This section is based on the interviews that were held with Lean Managers at three dairies in Sweden. It is structured according to how lean production is constructed at the dairies.

4.2.1 Lean at Arla Foods

The lean-concept that Arla Foods developed together with McKinsey and implemented at all the dairies builds on three main pillars. These are:

- Management infrastructure
- Operational systems
- Mindset and behavior

The following sections further explains these three main pillars.

4.2.2 Management infrastructure

Management infrastructure implies goal-steering using a board structure (as in physical board placed on the wall). The idea is that the management team sets TIP-objectives that the dairy wants to reach. The objectives are different at each dairy depending on what they need to focus on. The objectives are then broken down to goals on boards at different levels of the dairy. Each production line often has one board as well as each department. There is also one for the management team. The higher up in the organization you get, the more general and long term the goals become. This means that the goals at the production lines are often very specific and focus on daily or weekly issues while the management team deals with more general goals closer to the overall business objectives. Figure 5 illustrates the general hierarchy at a dairy with production lines, departments and a management team. Each box in the figure is connected to a board with goal-steering. The number of departments and production lines differ at each dairy depending on size and type of production.

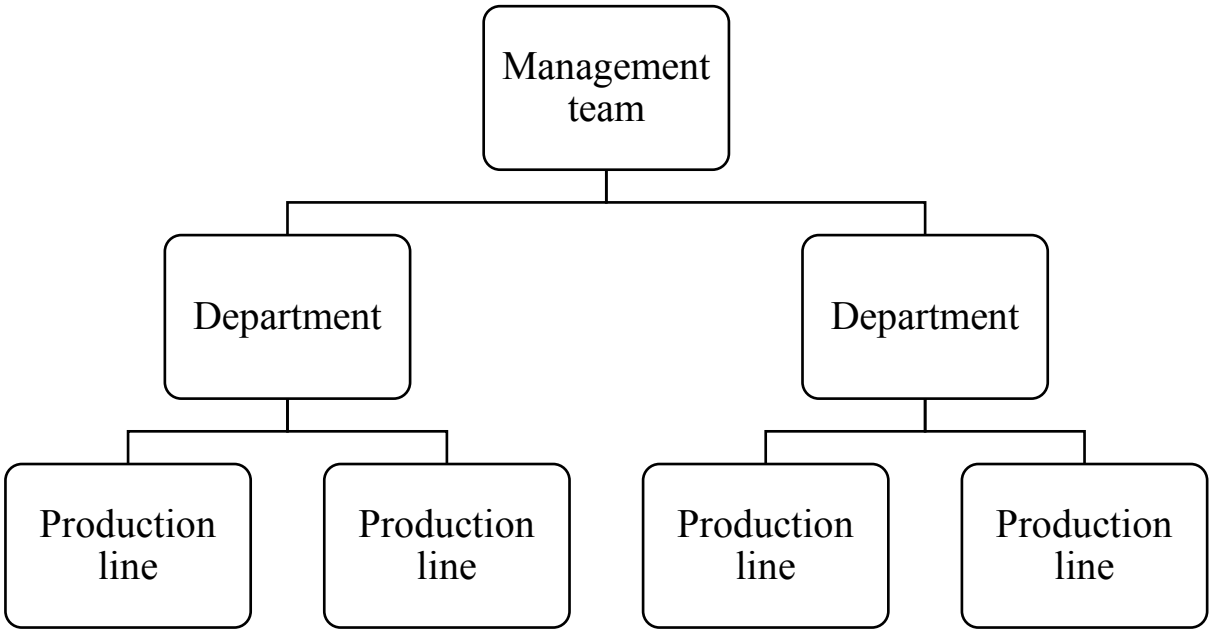

Figure 5. Illustration of the general hierarchy at a Arla Foods dairy.

Each board is divided into four categories where specific goals are formulated:

- Humans: goals that focus on work-safety and well-being etc.
- Processes: goals that focus on resource use and machine efficiency etc.
- Customers: goals that focus on delivery reliability etc.
- Finance: goals that focus on costs and profit etc.

In order to make sure they are on the right track of reaching the goals, the dairies use something they call "*Key Performance Indicators*" (KPI). These are indicators on the present state in relation to the goals. The KPI:s are continuously followed up during meetings.

The departments and management-team within a dairy have a board-meeting once a week. The production lines though often have meetings several times a day. The meetings are often held by operational employees in order to make sure everybody is involved. During these meetings, employees have the opportunity to raise suggestions for improvements and discuss how to proceed in order to reach the goals. Problems that they have faced in their work are also high lightened on the boards. When a certain problem occurs, the person who have come across it writes it up on the board. Then someone is assigned to investigate what to do about the problem. It could for instance mean that a problem solving tool such as A3 problem solving or 5-whys need to be applied (further explained in the next sub-section). The dairies strive to solve all problems as close to the production lines as possible. But if a problem sustains or reoccurs, it can be escalated to the board above. On the board you can then follow the process of solving the problem and there is always a final date on when the problem shall be solved.

One of the managers says that using a board structure is a way of increasing transparency at the dairies. All the employees should be able to follow the progress of the dairy on the boards. This is a way of making everybody understand his or her role and how it relates to the overall business objectives. This structure is appreciated by the employees who feel that they have an

opportunity to influence their own working conditions. Since the dairies started with a board structure, of one the managers perceive that the motivation among employees has increased. Since lean gives the employees an opportunity to affect their own working environment and operations, the manager experiences that employees are more motivated and involved in the daily operations. Health and work safety are also aspects that have improved with lean. One manager explain that they have formulated a goal on the board to increase the number of risk observations. By doing so they have found a number of activities that could compromise the safety of the employees. But since these activities now have been high lightened they can manage them and make the environment for the employees safer. Since the implementation of lean, staff surveys have been conducted every year. These show that motivation and well-being have improved at all the dairies. This result is supported by all the Lean Managers who says that they perceive an increased motivation among employees since the implementation of lean production.

The board structure is also a useful method of measuring and rationalizing resource use such as water and energy. One manager explains that these were issues that did not use to have high prioritization. But because of the increased complexity during the last years where a lot of new products and variations have been introduced, these issues have been given a higher priority and lean production is viewed as a method of managing them. When lean production was implemented it became easy to measure and see that striving to lower the use of resources could also save money for the corporation. Therefore, to lower the use of water and energy are typical objectives that the dairies are working towards. So far they have been successful in doing so which they all think is important as Arla Foods is in high degree depending on natural resources for production. Without lean production, one of the managers says that the use of energy and water would probably be much higher than today as well as the level of food waste and emissions. A strength by working with lean production is that it is flexible in high lightening and manages all sorts of issues.

4.2.3 Operational systems

Lean production at at the dairies is apart from the board structure also associated with several practical tools and techniques. These are assembled under the pillar that the Lean Managers refer to as operational systems. The tools and techniques are used to solve problems or come up with suggestions for improvements to make the dairies more productive and increase efficiency. The tools and techniques that are most frequently used are called: 5S, Overall Equipment Efficiency (OEE) and root-cause analysis such as 5-whys and A3 problem solving. The dairies also carry out work shops when a certain problem need further attention.

5S is used at all the dairies. The main purpose is to create an efficient and productive workplace. 5S stands for:

1. Sort
2. Set in place
3. Shine
4. Standardize
5. Sustain

5S in its most basic form is about having the right things at the right place at each part of the dairies. Doing so will eliminate time waste when people otherwise would need to look for things or go a long way to get them. So a part of 5S is according to one of the Lean Managers

about orderliness and structure, but it also goes beyond that. Another manager elaborates and says that 5S should be seen as a quality tool to detect errors and deviations. It should be easy to detect when something is not working as intended. The manager explains this using an example: "*If there is a puddle of oil on the floor, it will be easier to spot if the floor is clean. Then it is also easier for us to see that for instance a machine is leaking. Then we can actually do something to fix the problem*". However, all the managers are careful about saying it should not be seen as a tool just for orderliness but rather a philosophy. "*We want to get away from touching 5S as orderliness and rather highlight it as having the right things at the right place. Its a structured approach to facilitate the everyday life at the dairies to save time and maintain a certain level of quality*". Therefore, the managers say 5S should be viewed more as a philosophy. In order to make sure it is used as intended, the dairies conduct regular audits. All the managers perceive that 5S have made the employees more productive and effective as there is now a clear structure at the departments and production lines. A lot of time is saved as employees does not have to look for things.

OEE is a system that is frequently used at the dairies and where the aim is to maximize the efficiency of the machines that are used. This is done by focusing on the availability factor of the machines. One of the managers explains how it works and says that by looking at how many hours a machine is supposed to run, you can deduct the hours that the machine is not running because of factors such as cleaning or downtimes. By doing so you will end up with the time that the machine is available for production. Then you count how many hours of these that the machine is actually used for production. If 100 percent of that time is not used for production, the efficiency of the machine use is not maximized. The dairy must then put resources into increasing its efficiency. The attendants who are operating the machines are keeping records over this why it is possible to see trends and reoccurring problems. By working according to OEE, the managers say that there is now a better synchronization between machines and people and that the use of energy is lowered as the usage of machines are now better optimized.

In order to solve problems and come up with solutions that sustain, the dairies are working according to tools such as 5-whys and A3 problem solving. This is done in order to find the root to a certain problem and avoid "quick-fixes". Problems that are analyzed can be anything from a machine that is leaking to a missed delivery. 5-whys mean that when you have a problem with something, you ask yourself five times why it has happened. You go five steps backward, forcing yourself to answer the question to get closer to the real problem. One of the managers explains: *"If we miss a delivery from a production line, we ask ourselves why we missed the delivery. The answer may be that the machine was not running because we had a breakdown. Then we ask ourselves why we had a breakdown. Maybe because the lid application unit was not working. but why did not that work then?* -So you continue to ask yourself why-questions to dig deeper and deeper into the problem. "*The final answer might be that we had a configuration error in the machine or that the quality of incoming materials from the supplier was poor, and the we can tackle the root problem instead of just doing the quick-fix. If we do not ask our self these questions, there is a risk that we just put the machine together and are satisfied with that. But then you have not corrected the root cause to the problem why there is a risk that it might occur again*". Applying 5-whys has been useful in finding root-causes to problems and is a tool that is sometimes used when a problem has been formulated on the boards.

A3 problem solving is another tool that is frequently used at the dairies. When a problem has been identified, a structure called PDCA (Plan, Do, Check and Act) is applied. *Plan* is the

analysis-part where you define the problem: what needs to be done or changed in order to fix it. Then you collect relevant data and construct an action plan. *Do* is the activity itself where you follow your action plan and perform the actions needed to be done in order to deal with the problem. It is often about changing a behavior or routine. *Check* is the follow-up part where you look at the result of the change that you have implemented. *Act* is about making sure you do not fall back to the old routine. The new behavior or routines need to be secured so that everyone follows it. One of the managers says they are often successful in planning and doing, but to follow up on the result and secure the new behavior is more difficult.

Workshops are sometimes carried out when a problem need further attention. During these workshops, people that are affected by the issues are involved. By involving all the stakeholders, valuable inputs from individuals working closest to the problem can be raised. The work shops are always carried out in groups in order to thoroughly discuss the issues and find solutions that sustain.

4.2.4 Mindset and behaviour

When lean production was first implemented at Arla Foods it was mainly build around one person, the Lean Manager at each dairy. However, one manager explains that doing so will only lead to a certain level of success. To move the work on lean production beyond that level, its important to create a culture that is constantly thinking in lean-terms, and that is what Mindset and behavior is all about. It is about making lean production a part of the culture to make sure that everybody within the organization understands why they are working with lean production and how the organization can benefit from it. In order to reach this, Arla Foods has created what they refer to as the “Lean academy”. Lean academy is a program where employees at the dairies are educated in lean-associated tools and techniques to become specialists at certain fields. By educating employees in certain fields, one manager says that the culture of lean production can be spread through the organization and reach beyond just the Lean Manager and the management team. The employees that have been specially educated have regular meetings with the Lean Manager who coaches and supports them. The meetings are often held once a week where a specific agenda is checked. The Lean Managers refer to these employees as “soft tools” that are used to spread the culture and philosophy of lean production throughout the organization.

4.3 Empirical summary

Lean production at Arla Foods was implemented in 2011 as a growth model where focus is on cutting costs. Now, in 2016, all the dairies have lean production programs that are up and running. The lean-concept builds on three main pillars.

- Management infrastructure: Implies goals steering using a board structure. There are several boards at each dairy. Each production line often has one board as well as each department, and there is also one for the management team. The goals become more general the higher up in the organization. Goals are divided into four categories: humans, processes, customers and finance. These are continuously followed up using KPI:s.

- Operational systems: Implies practical tools and techniques that are associated with problem solving and continues improvements. Typical tools that all the dairies are working according to are 5S, OEE, 5-whys and A3 problem solving.

- Mindset & behavior: In order to spread the culture of lean production, Arla Foods has something they refer to as Lean Academy. This is a program where employees can gain extra education in specific areas in order to become ambassadors of lean production at the dairies.

By working according to lean production, the managers perceive that Arla Foods has become a more productive and efficient organization where costs have been decreased. Lean has also led to lowered use of water and energy, and the levels of food waste and emissions have been lowered. The managers further perceive that lean has led to increased motivation, health, well-being and work-safety amongst the employees.

5 Analysis

In this chapter, the empirical material is analyzed with help from the theoretical framework. The analysis is divided into two sections. The first is categorized according to lean production as described by Liker (2004). The second focuses on perceived benefits for society from working on lean production.

5.1 Lean production and shared value linked together

This section presents the empirical material that can be connected to lean production as described by Liker (2004). The section is divided according to the 4P-model consisting of the four categories: philosophy, processes, people & partners and problem solving. It strives to answer the first research question that reads:

RQ 1: How does lean production contribute to the creation of shared value?

5.1.1 Philosophy

Liker (2004) argues that organizations must base their decisions on a long term philosophy, even if it is at the expense of short term financial goals. The goals should be framed so that value for both corporation and society is created.

When framing objectives at the dairies, cutting costs is an important part. However, it seems like a long term perspective is dominant. Many activities within the lean-concept are short term expensive but are still implemented as Arla Foods believe it might generate long term benefits. For instance, all the dairies have goals to increase health, work-safety, motivation and employee well-being. Doing so costs money in short terms but may be beneficial in the long run as employees who are healthy, motivated and feel safe at work are more productive. It is also costly in short terms to carry out work shops and involve employees in decision-processes like the dairies often do. But this is done as they believe it may generate long term benefits as decisions then are more well thought-through. Adressing these issues, the dairies also contribute to value creation for society as externalities associated with the health of individuals are decreased. This is suggested by Porter and Kramer (2011) as a way of creating shared value.

The dairies are also striving to lower their use of water and energy and they use the board structure with goal-steering to make this happen. Lowered food waste and emission have also been seen. According to Porter and Kramer (2011), shared value is created when a corporation creates value for both itself and the society. This seems to be the case at Arla Foods. When striving for stricter use of resources, externalities that have an impact on society are lowered, meaning that working according to a long term philosophy at Arla Foods leads to redefining productivity in the value chain: shared value is created.

5.1.2 Processes

When there is a continuous flow of processes, its easier to detect errors and problems (Liker, 2004). And by synchronizing people and machines, it is possible to eliminate waste of time. One of the tools that the dairies use to create a flow and optimize the efficiency of people and

machines is OEE. By applying OEE, it is possible for the dairies to make sure that the machines are used as much as possible during production hours which decreases waste of waiting. The managers also say that the tool called 5S is useful in order to create structure at the workplace. This enhances a continuous flow as employees do not have to go look for things all the time. Everything is at the place where it is intended to be, leading to decreased waste of motion. By creating this flow, it is also easier to detect errors and problems that can be brought up on the boards and managed during the board meetings.

In order to avoid overproduction, Liker (2004) argues that a producing corporation should use "pull" systems and produce only according to consumer demand. This is a part that is not high lightened by the managers at the dairies. It could be due to the fact that Arla Foods is a cooperative and therefore obligated to buy the milk that is produced by the farmers. It is therefore difficult to produce only on consumer demand. However, Arla Foods has a milk powder factory that can turn overproduced milk into powder that can then be sold in Sweden and abroad. This is a way of making use of all the milk that is produced and avoids waste of overproduction, even if it is not directly related to lean production.

The Senior Consultant says that the lean-concept is constructed the same way at all the dairies. All production lines and departments at each dairy are working according to the same board structure, tools and techniques. This is a way to standardizing tasks and processes, which is high lightened by Liker (2004) as important in order to achieve best result for continuous improvements. All the employees are according to the Lean Managers well understood in how the lean-concept works in practice and they know what to do when facing a problem or striving to find a solution to one. The clear and visible boards make it easy to do so.

In order to always make sure that the dairies are on the right track of achieving the goals, they use KPI:s that show the current state in relation to the goals. It is according to Liker (2004) important to have clear indicators on when a performance deviates from expected or wanted result. The KPI:s are clearly stated on the boards together with the goal they are striving for. By doing so, all the employees can follow the progress and be involved in making sure the goals are reached.

By focusing on processes using several tools and techniques, the dairies have created a system that the managers perceive as efficient and well functioning which improves prouctivity and effiecieny. However, focusing on processes seems to be directly related to lowering corporate costs and not to generate benefits for society, why the linkage between focusing on processes and creating shared value is scarce.

5.1.3 People and partners

Liker (2004) argues that employees within the organization with leadership qualities should be promoted, as instead of searching for external competence. Arla Foods has something they call Lean academy. This is a program where employees get extra education in certain areas. They often get special education to manage certain tools and techniques associated with lean production. This also implicates a greater responsibility. The incentives for Arla Foods to do this is to spread the culture of lean production in the organization. These employees therefore act as ambassadors, or "soft tools" as one manager expresses it, at the production lines and departments with extra responsibility and knowledge. Liker (2004) also says that recruiting internally is better because it is then easier to make them embrace the philosophy and act in

line with it. By education employees in the Lean academy, Arla Foods tries to institutionalize the philosophy of lean production so that this becomes part of the culture for these employees who then can spread it to the rest of the organization.

When striving for problem solving and continuous improvements, group work is encouraged (Liker, 2014). This is something the dairies do during work shops and board-meetings. Together they try to find solutions to problems and come up with suggestions for improvements. By working in groups, different kind of inputs in terms of knowledge and experience can result in better solutions.

Liker (2004) also argues that organizations should establish long term partnerships with stakeholders and strive for common goals. Stakeholders should be viewed as extensions of the organization and challenged to perform better. According to the Senior Consultant, lean production at Arla Foods is still relative new and does not stretch outside the dairies. There are though future plans of extending the concept to involve other parts of the corporation and possibly stakeholders outside. But so far this is not a part of the lean-concept. However, in order to further develop it, this is something they might want to consider.

The linkage between people & partners and shared value is scarce since there are no obvious benefits generated for society. It rather seems like benefits are created for the corporation as employees become more efficient and productive in their daily work with more knowledge and education.

5.1.4 Problem solving

According to Liker (2004), decisions should be based on actual observations and the responsible person should personally engage in the situation. The dairies are using the board structure to assemble problems that occur in the daily operations. The person who has encountered a problem writes it on the board and during the regular meetings all the problems that have been written on the board are discussed and analyzed. Someone then gets the responsibility to find a solution to the problem. If the production line or department does not find a solution, the problem can be escalated to the board of the management team. When trying to find a solution, Liker (2004) underlines that it is important to find the root to the problem in order to avoid quick fixes. The dairies often apply root cause analysis such as 5-whys or A3 problem solving for this matter. This makes them come closer to the root of the problem in order to find solutions that sustain.

Liker (2004) also argues that decisions should be made slowly with consensus. All possible solutions should be investigated before making a decision. The stakeholders that might be affected by the potential change shall be involved. When a problem of larger proportions occurs, the dairies engage the employees in workshops where the problem and possible solutions are discussed. The idea is to have thoroughly investigated all the options in order to find a solution that sustain. By engaging the employees, the persons who are working closest to the operations have the opportunity to contribute with valuable input, since they are the ones who often have the best understanding of how things actually work in practice. When doing this, the PDCA-structure is followed. This means that a problem should be identified and analyzed before taking action. Then a plan is constructed and carried out. The change must then be checked to make sure that the new behavior or routine is working as intended and that people do not fall back in old patterns. According to one of the Lean Managers, this is the hardest part of a change in routine or behavior.

To continuously take time for reflection, root cause analysis and investigation of possible solutions and changes are important (Liker, 2004). The dairies strive to make the PDCA-thinking a part of the culture. To always reflect and strive for continuous improvements should be something everybody does all the time. That is why the managers perceive the board structure as a valuable tool. It makes it easy for employees to report problems that they come across and then take time to analyze and discuss them together. Liker (2004) says that it is important that the knowledge created through the process of continuous problem solving should be kept preserved in the organization. The dairies strive to apply and use the knowledge generated in other parts of the dairy. It is also possible to share knowledge with other dairies.

The linkage between problem solving and shared value at Arla Foods is scarce as the incentive is to create a more efficient organization, without focusing on value creation for society.

5.2 Perceived benefits for society from working on lean

This section presents perceived benefits for society from working on lean at Arla Foods. The section makes a distinction between social and environmental benefits in order to make it easier to follow. It strives to answer the second research question that reads:

RQ 2: What are the perceived benefits for society from working with lean?

5.2.1 Perceived social benefits from working on lean

By working according to lean, the Lean Managers at the dairies perceive that the motivation and well-being among employees have improved. Lean gives the employees an opportunity to affect and influence their own working conditions which is appreciated. They experience that the employees are more engaged and involved in the daily operations. Especially the board structure constitutes an important function since it gives the employees an opportunity to participate at a strategic level and come up with suggestions for improvements. Health and work safety are also aspects that have improved with lean as these are issues followed on the boards using goal-steering that are continuously followed up using KPI:s. Risk observations is a typical goal that is followed on the boards. By doing this, a number of activities that could implicate risks for the employees have been high lightened and managed. The staff surveys that have been conducted every year also show that motivation and well-being have been improved.

These kind of issues are raised by Porter and Kramer (2011) as important when creating shared value. Adressing them loweres the externalities that a corporation gives raise to, why it is possible to say that decreasing these externalities leads to redefining productivity in the value chain, which is one of three ways to create shared value according to Porter and Kramer (2011).

5.2.2 Perceived environmental benefits from working on lean

Before lean was implemented at Arla Foods, the high use of energy and water consumption did not have much attention according to one of the managers. Because of the increased complexity during the last years where a lot of new products and variations have been added

to the product range, these issues have been given a higher priority and lean production is viewed as a successful method of dealing with them. One of the managers says that without lean production, the use of energy and water would have been much higher than today as well as the levels of food waste and emissions. By working with lean production, the dairies now have a structure to manage these issues. This is primarily due to the board structure where goal-steering towards lowered energy and water consumption use is applied, and by continuously following the progress using KPI:s, the dairies have made it possible to lower its use of energy. The same structure has been applied to other uses of resources that creates environmental issues. Water use, food waste and emission have decreased, as goal-steering using the board structure has been applied.

According to one of the managers, one of the greatest strengths with lean production is that it is flexible to manage all sorts of issues. Using this structure has led to lowered corporate costs because of decreased resource use, but it has also led to decreased externalities for society as it leads to a lowered exploitation of natural resources. Lean production at Arla Foods could therefore be seen as a method of improving the performance in the environmental aspect and create shared value by redefining productivity in the value chain as described by Porter and Kramer (2011).

5.3 Analytical summary

This analysis indicates that implementing lean production leads to the creation of shared value as described by Porter and Kramer (2011). The long term philosophy within lean production implicates that goals leading to lowered externalities for society while it also providing corporate benefits are formulated. Corporate benefits have been perceived in terms of increased productivity and efficiency as well as lowered corporate costs. Social benefits have been perceived in terms of increased employee well-being, health, motivation and work-safety. Environmental benefits have been perceived in terms of stricter use of resources as well as lowered food waste and emissions. However, the incitements for the corporation have been to lower corporate costs and become more productive and efficient. Nevertheless, benefits that stretches outside the corporation have been perceived. This though means that the social and environmental benefits are spin-offs from the financial benefits.

Figure 6 illustrates the perceived benefits from working according to lean production. Note that benefits in all of the three aspects (financial, social and environmental) in the triple bottom line are created.

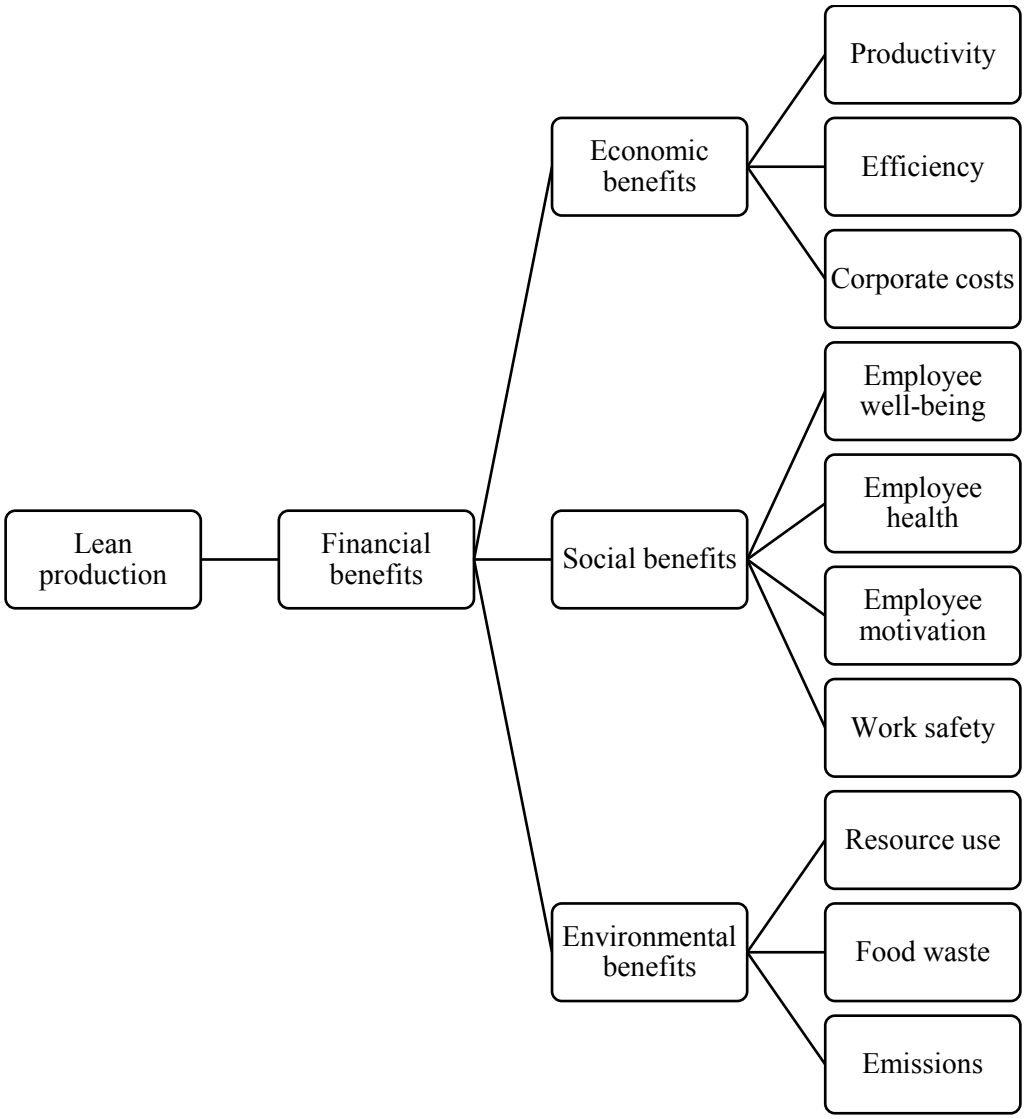

Figure 6. Illustration of the economic, social as well as environmental benefits from working with lean production.

6 Conclusions

This chapter strives to reach the aim and answer to the two research questions that were phrased in the first chapter. It reads:

The aim of this study is to explain the role of lean production in developing sustainable business practices in the food industry. To reach this aim, the following research questions are phrased:

1. *How does lean production contribute to the creation of shared value?*
2. *What are the perceived benefits for society from working with lean?*

This study shows that working according to lean production leads to the creation of shared value as described by Porter and Kramer (2011). Working according to a long philosophy in line with Liker (2004) implicates that benefits for both corporation as well as for society are created. This is done using goal-steering at a board structure where goals that benefits both corporation and society are formulated. These are then followed up using KPI:s to make sure the goals are reached. However, the benefits that are created for society are spin-offs from the financial benefits, as the corporation's main incentive with lean production is to decrease costs and increase productivity and effiecieny.

The long term philosophy implicates that social benefits in terms of increased employee well-being, motivation, health and work-safety are created, as well as environmental benefits in terms of less use of resources such as water and energy and as lowered emissions and food waste. When working towards these goals, externalities that have an impact on society are lowered, why lean production is a way of redefining productivity in the value chain. Simultaenously, corporate benefits are created in terms of decreased corporate costs and increased productivity and efficieny.

6.1 Discussion of results

This study contributes to a growing number of research focusing on the relation between lean production and sustainable development in the food industry. The results can be used for analytical generalization as described in chapter 4 and explained by Yin (2013). By linking together lean production by Liker (2004) and creating shared value by Porter and Kramer (2011), the study makes a theoretical contribution by showing that a corporation can generate benefits for society while focusing on a long term philosophy where goals that benefit both corporation and society are formulated. Empirically it contributes by showing how managers in the food industry perceive the work on lean production in relation to sustainable development. The results of the study could be used to build strategies for managing sustainability issues in the food industry.

6.2 Suggestions for further research

This study has a qualitative approach where a single corporation poses as case company. However, the study could be conducted using a quantitative approach where multiple corporations poses as case companies. This would give a broader perspective where new

perspectives are brought to light, especially since lean production is a concept differently constructed at each corporation. It would also be interesting to conduct a study where employees are interviewed, as this study has taken a manager perspective. For instance, motivation theory such as employee empowerment by Thomas and Velthouse (1990) could be applied in order to explain how lean affects the motivation amongst employees.

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Appendix 1: Interview guide with senior consultant

The following topics were considered during the interview with the Senior Consultant at Arla Foods.

Introduction

- The role as senior consultant at Arla Foods

Background to lean

- When and why Arla Foods implemented lean
- How lean was implemented

Lean at Arla Foods

- Parts of the supply chain that are included
- How lean is constructed
- Tools and techniques that are used

Perceived effects of working on lean

- Corporate effects
- Environmental effects
- Social effects

Challenges of working with lean

- Leadership & management
- Change
- Culture

Appendix 2: Interview guide with Lean Managers

The following topics were considered during the interviews with Lean Managers at the dairies at Arla Foods.

Introduction

- The role as Lean Manager at Arla Foods

Lean at Arla Foods

- How lean is constructed
- Tools and techniques that are used
- How the result of lean is measured

Perceived effects of working on lean

- Corporate effects
- Social effects
- Environmental effects

Challenges of working with lean

- Leadership & management
- Change
- Culture