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**HÖGSKOLAN I JÖNKÖPING**

**Critical competitive priorities and  
capabilities in a high cost environment**

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Production Systems, specialization Production  
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## **Abstract**

**Purpose** – The purpose of this thesis is to identify the critical competitive priorities and capabilities that enables competitive manufacturing in the high cost environment of Sweden and how these can be improved to increase manufacturing performance.

**Method** – The purpose of this thesis was achieved through two main research methods. First a systematic literature review was conducted in order to condensate the existing literature on competitive priorities and capabilities. Secondly a case study was conducted in order to examine the identified competitive priorities and capabilities in the context of a high cost environment.

**Findings** – Initially, a set of articles were identified and included in the literature review. Through an analysis of the included articles, a framework was created including competitive priorities and competitive capabilities. A comparison between the framework and the empirical data collected at the case company identified a number of priorities and capabilities considered critical for competitive manufacturing in a high cost environment. The literature review revealed a set of improvement actions and methods that could be used to improve the identified critical competitive priorities and capabilities in order to increase manufacturing performance.

**Implications** – The thesis makes a theoretical contribution by condensing the existing literature on competitive priorities and capabilities in a high cost environment, and creates a starting point for future research. Further it makes a practical contribution by providing awareness for practitioners regarding priorities and capabilities, what may be important in the future, and how these could be improved.

**Limitations** – This study identifies how critical priorities and capabilities can be improved, however, it does not specify how they can or should be applied and used. Additionally, the inclusion criteria in the systematic literature review did not include improvement actions and thus other suggestions for improvements may not be included. The case study was limited to one company, making the result difficult to generalize.

**Keywords** – Competitive priorities, competitive capabilities, dynamic capabilities, high cost environment, Sweden, improvement actions

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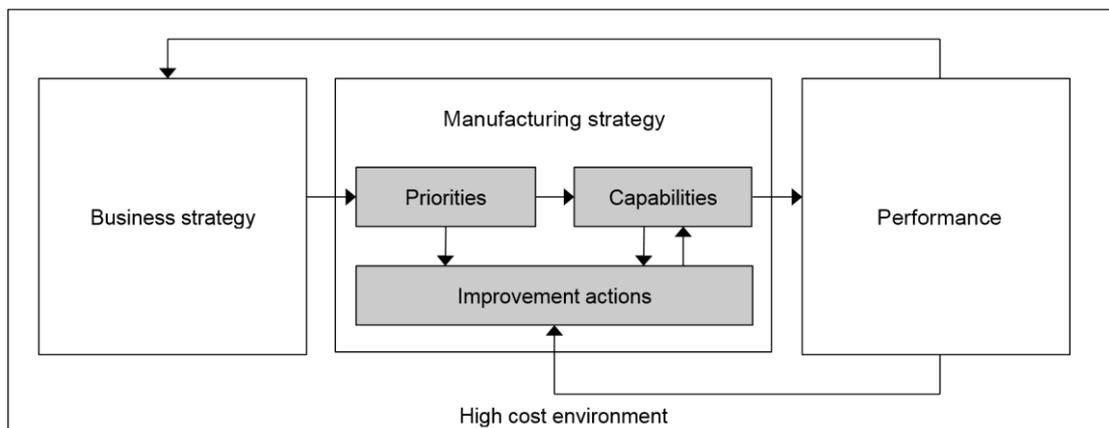
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# 1 Introduction

*This chapter gives the reader the background to and description of the problem that the study is built around. Further the purpose and research questions are presented, together with the scope and delimitations.*

## 1.1 Background

The last decade offshoring has become a common business practice for company's trying to lower their costs for manufacturing (Jensen & Pedersen, 2012). A clear trend is that manufacturing is being moved away from Europe, and earlier US, mainly to Asian countries representing low cost environment and thereby an opportunity for large gaining's in cost savings (Fredriksson & Jonsson, 2009). Meanwhile the industries in Europe are shrinking and experiencing that the ability to add value is diminishing. At the same time the gross domestic product (GDP), that is used to measure a country's economic health, has primarily been based on manufacturing and Europe has now lost more than a third of this GDP. The consequences have been weaker state finances as well as high unemployment resulting from company's offshoring decisions and thereby creating problems for the welfare (Westkämper, 2013). Many manufacturing companies are facing intensive competition, and in many cases fighting for their survival (Cheng & Musaphir, 1996). The main goal of any company is long-term survival and to be able to produce useful output for their customers. This is made through making decisions regarding how to use their resources. Depending on how these decisions are being made, regardless if it is conscious or unconscious, it will determine how the company is being run (Hallgren, 2007), i.e. the company's strategy. *Figure 1* shows the main concepts of this thesis and how they are related to, and affected by each other.



*Figure 1. Framework of thesis (Per Hilletoft, Research project, 2015)*

Strategy is a broad master plan that companies use to achieve its missions and objectives. Slack and Lewis (2011) describe strategy as setting broad objectives that is directing a company towards the overall goal and the path to get there, focusing on long-term objectives rather than short-term, and dealing with the full picture instead of parts. Strategy can be defined at three different levels: corporate, business, and functional. Business strategy is the tool that companies use to achieve competitive advantages over others (Khalili et al. 2013). Functional strategy however, is a strategy set for a specific area. One of these functional strategies is the manufacturing strategy. It determines how the production uses the existing resources and capacities in the plant to support the general

objectives and be competitive (Demeter, 2003). The existence of such a strategy could have a positive contribution to performance of the production.

There are two central core elements that make up the definition of the manufacturing strategy (Platts et al., 1998). First, that there must exist manufacturing objectives that is consistent with the company's business objectives, i.e. competitive priorities. These are goals and objectives that a company has set up which will guide management's decisions and actions. They represent the company's future emphasis of the manufacturing, indicates the strategic position desired in the marketplace, and supports the corporate strategy (Hung et al., 2015). It is important for companies to recognize the importance of their competitive priorities. There are indications that failure to do so could lead to eventually making them less productive (Takala, 2002).

The second core element that is central to the definition of manufacturing strategy is the patterns of decisions that set the capabilities of the manufacturing system (Platts et al., 1998). These can be defined as what competitive strengths a company possess to meet customer expectations compared to its competitor's ability to do the same (Thürer et al., 2014). Frolich and Dixon (2001) mentions cost, quality, delivery, flexibility, and service as competitive priorities. It is important for managers to understand what capabilities that are needed to support the business and manufacturing objectives, and based on that identify what means they need to build and develop these (Hallgren, 2007). It has been demonstrated that the manufacturing capabilities have importance in contributing to firm performance (Schroeder et al. (2002). Performance dimensions usually mentioned are quality, delivery, flexibility, and cost. In order to increase performance, companies can apply different improvement actions and methods, such as advanced manufacturing techniques (Laosirihongthong & Dangayach, 2005) and product modularity (Antonio et al., 2009) among others. Applying these actions or methods can influence the performance of competitive priorities and capabilities.

## **1.2 Problem formulation**

Extensive research on competitive priorities and capabilities have been conducted in the literature (Frohlich & Dixon, 2001; Hallgren, 2007) and in different countries such as Brazil (Thürer et al., 2014), Taiwan (Hung et al., 2015), USA (Patel et al., 2012), Jordan (Alsmadi et al., 2011), Japan (Flynn & Flynn, 2004), Spain (Martín-Peña & Díaz-Garrido, 2008) and multicultural studies (Szász & Demeter, 2014). Yet the potential of these factors for achieving competitive manufacturing in the context of high cost environment, and specifically Sweden, has not been emphasized. In addition, not every priority and capability will be relevant for every company. It is likely that there are those more critical than others, thus there is a need for a holistic and systematic evaluation of these factors that enables competitive manufacturing in a high cost environment.

A survey conducted by Svenskt Näringsliv (2013) showed that although some companies tend to move parts of their business back to Sweden, there are still more companies moving it away. Although no clear trend for reshoring has been found, Atlas Copco, Husqvarna and Thermia are all examples of global companies that have been moving parts of their business back to Sweden. 76% of manufacturing companies state that it is production that has been moved back. Main reasons for moving back the activities are the capability to achieve lower costs (37,5%), increase level of quality (37,1%) or that technological development has made it possible to keep manufacturing within Sweden while keeping it cost efficient (24,9%). Identifying a company's competitive priorities and improving the competitive capabilities could be considered critical to enable competitive manufacturing for companies who operates in a high-cost environment, and may be a

crucial factor that makes it possible for companies to reshore or keep their business in Sweden. Thus it is of interest to investigate what priorities and capabilities that are critical for competitive manufacturing in a high cost environment and their impact on manufacturing performance. In addition it should be investigated how companies can work to improve these to further strengthen their competitive advantage and secure their position in the global market.

### 1.3 Purpose and research questions

It has been stated in the problem formulation that there has been extensive research concerning competitive priorities and capabilities, but that research emphasizing the context of high cost environment is lacking. Furthermore it has been stated that more companies are still moving their business away from Sweden rather than to it. It has been shown that the main reasons for reshoring is among others lower costs and increased quality. Therefore it is important for companies to identify what priorities and capabilities makes them competitive on the market and how to improve these in order to keep their business within Sweden or reshore. Thus, the purpose of this thesis is:

*To identify the critical competitive priorities and capabilities that enables competitive manufacturing in the high cost environment of Sweden and how these can be improved to increase manufacturing performance.*

In order to fulfill the purpose of the thesis it has been divided into two research questions. The first step in fulfilling the purpose is to investigate competitive priorities and capabilities and identify which could be considered critical for achieving competitive manufacturing in high cost environment. Thus, the first research question of the thesis is:

1. What competitive priorities and capabilities are critical for competitive manufacturing in the high cost environment of Sweden?

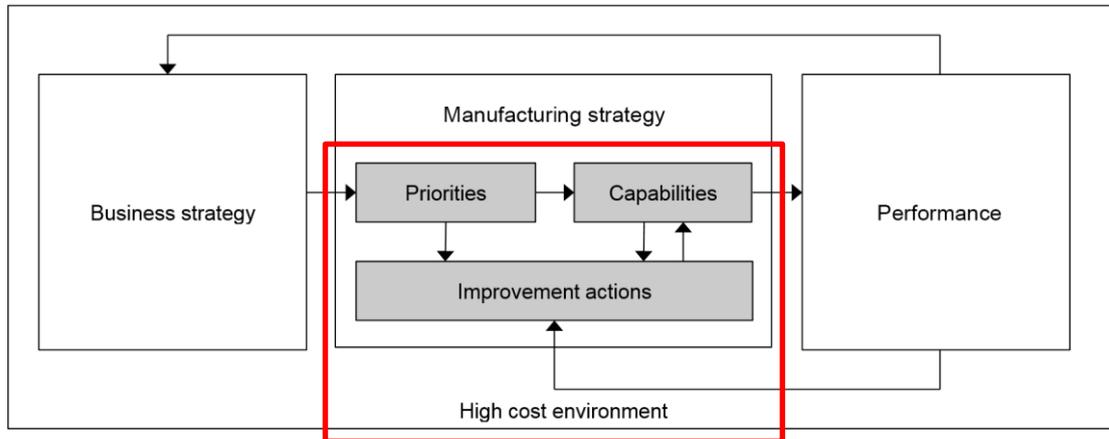
The second step in fulfilling the purpose is to identify how companies in high cost environment can improve the identified critical priorities and capabilities, and thereby increase manufacturing performance. Thus, the second research question of the thesis is:

2. How can companies in the high cost environment of Sweden improve the critical priorities and capabilities in order to increase the manufacturing performance?

In order to answer the research questions, and fulfill the purpose of this thesis, a systematic literature review and a case study including a Swedish firm from the manufacturing industry will be conducted.

## 1.4 Scope and delimitations

The focus of this study was on the competitive priorities and capabilities in a high cost environment that the manufacturing system provides, and the improvements that can be done within this area. *Figure 2* illustrates the area in focus and thus the scope of this study.



*Figure 2. Scope and limitations (based on Per Hilletoft, 2015)*

Priorities and capabilities are determined to a large extent by the manufacturing strategy, but will this have not been a focus. The reason is that manufacturing strategy contain other elements, for example the decision making process, which lies outside of the scope of this thesis. Another factor that was not taken into consideration in this thesis is the performance. Performance will be affected by the improvements made in the competitive capabilities, but the effects and consequences of such improvements was not investigated.

## 1.5 Disposition

The structure of this thesis is divided into seven chapters as presented below.

**Chapter 1** gives a brief introduction and background to this thesis project. Further the problem description is presented, the purpose of the thesis is formulated and the research questions are specified. The chapter concludes with the scope and delimitations

**Chapter 2** provides the theoretical framework regarding manufacturing strategy, competitive priorities and competitive capabilities, and manufacturing performance.

**Chapter 3** explains the research process undertaken within the systematic literature review and the case study, as well discussing how validity and reliability have been achieved.

**Chapter 4** presents the results from the systematic literature review included in the thesis. A descriptive analysis and a content analysis are included.

**Chapter 5** presents the results from the case study. Current and future competitive priorities and capabilities are included, as well as future improvements.

**Chapter 6** presents the combined analysis between the systematic literature review and the case study.

**Chapter 7** comprises discussions about the findings of the research, and presents implications, limitations and further research.

## 2 Theoretical framework

This chapter provides the reader with the frame of reference used in this study. Theory for the main concepts relevant is presented. This includes manufacturing strategy, competitive priorities and capabilities, and performance.

### 2.1 Introduction

For a manufacturing company to be competitive enough to outperform their rivals, they need to establish something that differentiate them and be able to maintain it. This differentiation can be achieved in several ways. The company can either offer superior value in comparison to their competitors, comparable value at a lower cost, or both. In the end, the differences between manufacturing companies in terms of price and costs originate from all the activities performed until the product reaches the customer (Porter, 1996). The cost or value advantage is formulated through a business strategy, which then is transferred and specified in a functional manufacturing strategy, as seen in *Figure 3*.

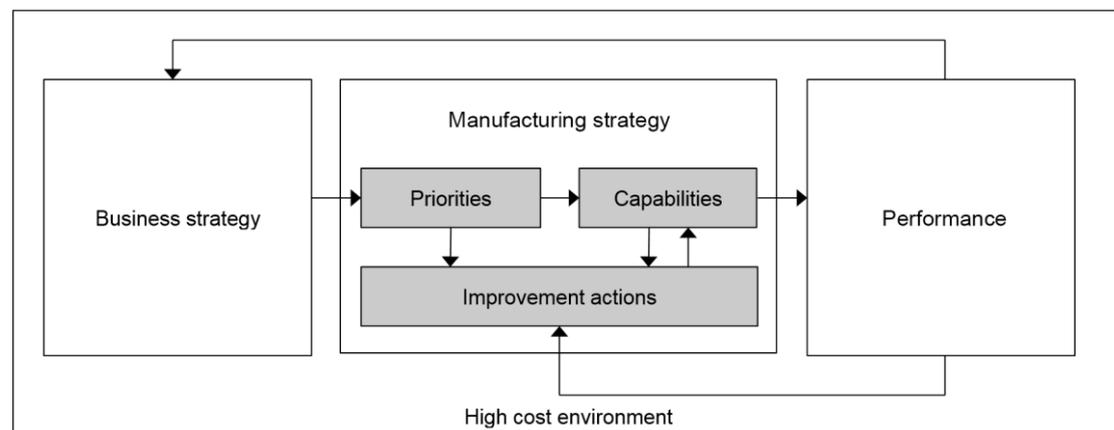


Figure 3. Theoretical framework (Per Hilletoft, Research project, 2015)

The manufacturing strategy has two main elements included. The first elements is the competitive priorities, a set of statements that manufacturing must be able to accomplish in order to compete. The second element is the competitive capabilities the manufacturing system has. These are the actual capabilities of the manufacturing system and have been formed through historical patterns of decision-making. The competitive capabilities affect the organizational and operational performance. Competitive priorities and capabilities should be aligned and enhanced through different improvement action in order to increase manufacturing performance.

### 2.2 Manufacturing strategy

The main goal of companies is long-term survival and to be able to produce useful output for customers through making decisions regarding how to use their resources. Depending on how these decisions are being made, regardless if it is conscious or unconscious, it will determine how the company is being run, i.e. its strategy (Hallgren, 2007). Slack and Lewis (2011) describe strategy as setting broad objectives that is directing a company towards the overall goal and the path to get there, focusing on long-term objectives rather than short-term, and dealing with the full picture instead of its parts. As indicated by Skinner (1969) few companies carefully adapt their production systems to perform the tasks that support the corporate strategy. Historically there has been a “bottom up” approach to

manufacturing, but Skinner (1969) propose using “top down” manufacturing. This “top down” manufacturing begins in the company and its competitive strategy, where a functional strategy for the manufacturing should exist. A functional manufacturing strategy of a company determines how the production uses the existing resources and capacities in the plant to support the corporate objectives and be competitive, and the existence of such a strategy could have a positive contribution to performance of the production (Demeter, 2003).

Platts et al. (1998) describe manufacturing strategy as a pattern of structural and infrastructural decisions, which determine the capability that the manufacturing system will have to support the competitive priorities. It also specifies how it will operate to be able to meet objectives of the manufacturing function, which are linked to the overall business objectives. Using Platts et al. (1998) definition, it defines manufacturing strategy as consisting of two components. First, that there exist manufacturing objectives (competitive priorities) that are consistent with the company’s business objectives. Secondly, the decisions made by the company that decides what capabilities (competitive capabilities) the manufacturing system will possess. As a direct result of these decisions made strengths and weaknesses are thus built into the manufacturing function (Wheelwright, 1984). Even though manufacturing strategy is being conceptualized in relatively static terms, manufacturing and its strategic role seem to have changed steadily. Manufacturers have changed focus in line with trends and changed market demands (Frohlich & Dixon, 2001).

### **2.3 Competitive priorities**

Competitive priorities are goals and objectives that a company has set up which will guide management’s decisions and actions. They represent the company’s future emphasis of the manufacturing, indicates the strategic position desired in the marketplace and supports the corporate strategy (Hung et al., 2015). It is important for companies to recognize the importance of their competitive priorities and that these are aligned with their business strategy. There are indications that failure in recognizing the importance of these priorities and that these are aligned with the strategy could lead to eventually making the company less productive (Takala, 2002). Competitive priorities are generally mentioned in four different dimensions. These include cost, quality, delivery, and flexibility (Rosenzweig & Easton, 2010). Some studies suggest three additional priorities, innovativeness (Peng et al., 2011), after-sales services (Frohlich & Dixon, 2001), and sustainability (Johansson & Winroth, 2010).

### **2.4 Competitive capabilities**

The competitive capabilities of the company can be defined as what strengths they possess to meet customer expectations compared to its competitor’s ability to do the same (Thürer et al., 2014). Rosenzweig and Easton (2010) define competitive capabilities as the manufacturer’s ability to compete on the different competitive priority dimensions mentioned. The capabilities are formed by decisions taken in the manufacturing strategy. Frohlich and Dixon (2001) talk about 11 different capabilities. These include low price, design flexibility, volume flexibility, broad product line, conformance, performance, delivery speed, dependability, after-sales service, broad distribution, and advertising. The competitive capability of low price gives the company ability to compete on price versus their competitors. Flexibility in design, volume, and product line concerns making changes to products, respond to variations in demand and to offer broad product lines. Conformance and performance refers to how well companies can provide consistent quality as well as high performing products. Companies can also possess capabilities in delivering products quickly, and to deliver them on time. Finally companies may have

capabilities of providing services in form of after-sales service for already sold products, being able to distribute their products widely, and advertise and promote their products. It is important for managers to understand what capabilities that are needed to support the business and manufacturing objectives, and based on that identify what means they need to build and develop these (Hallgren, 2007). Studies have ultimately shown that continuously developing and sustaining the competitive capabilities of the company contribute to the businesses performance and a higher economic outcome (Szász & Demeter, 2014). Dynamic capabilities have been suggested as an additional capability (Teece et al., 1997). However, this capability has been identified as a capability on a higher strategic level, thus impacting all other competitive capabilities. Therefore this has been given a separate section within this thesis.

## **2.5 Manufacturing performance**

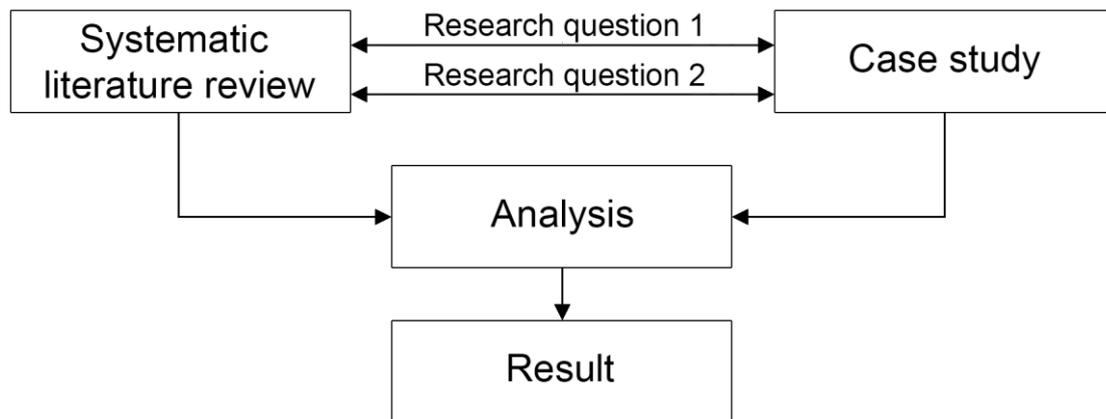
Return of investments (ROI), profitability and other financial measures are usually measurements on a plant level that can be affected by external factors outside manufacturing (Hallgren, 2007). Therefore it is rather difficult to evaluate manufacturing performance. There are attempts where performance is isolated to when operational management is vital, and conveniently dimensions is closely related to the competitive priorities; quality, delivery, flexibility and cost performance. Quality performance is a complex term to define. Quality can refer to specifications, usually meaning high-end specifications (Slack & Lewis, 2011). It can also refer to appropriate specifications, that the specifications fit their purpose and do what they are supposed to do. The authors further argue that quality can be viewed from different perspectives, which can be categorized into hard dimensions (e.g. features, performance, reliability, aesthetics, security/safety and integrity) and soft dimensions (e.g. helpfulness, attentiveness, communication, friendliness and courtesy). Delivery performance can be divided into two main categories: speed and reliability (Ward et al., 1996; Slack & Lewis, 2011). The former is concerned with the time between placed an operation starts and its end. It could be used externally (i.e. from a customer request until customer receives it) or as an internal measurement (i.e. the time materials enters the process until it has been completed). The latter is defined as the ability to deliver on time according to schedule or promised agreement. Flexibility performance in operational terms means to have the ability to adapt - take on different positions or do different things (Slack & Lewis, 2011). As an example it could be to have the ability to quickly change production output according to variance in demand or having a wide range of products or service (and perhaps even have the ability to customize according to customer requirements). According to Hallgren (2007) flexibility distinguishes itself from other manufacturing performance by being a measurement of potential instead of an actual performance. Cost performance refers to the amount of resources needed to produce a product (Hallgren, 2007). Even companies who do not compete on their price will still be interested in keeping their costs low (Slack & Lewis, 2011).

### 3 Method and approach

*In this chapter the implemented research methods are presented. First the research approach is presented, followed by an outline of the data collection and then a description of the data analysis. Towards the end of the chapter the reliability and validity of the study is discussed.*

#### 3.1 Introduction

The following section presents how the methods for data collection and data analysis have been used to answer the study's research questions. *Figure 4* describes the connection between the research questions and used methods.



*Figure 4. Connection between research questions and methods*

For the first research question a systematic literature review and a case study have been conducted. By reviewing the literature, information about what competitive priorities and capabilities that are critical for competitive manufacturing according to research was gained. The empirical data collected through the case studies provided information about what competitive priorities and capabilities that are critical for companies in a high cost environment.

The literature review and the case study were the basis for the second research question as well. The literature review provided information about different improvement actions, methods or strategies that can be used for improving the competitive priorities and capabilities found in the first research question. The case study provided information about how the company actively works with improving their competitive priorities and capabilities.

The information gained from the literature review and the case study was analyzed separately, and then analyzed together through a combined analysis. The analysis is the foundation for the final conclusions.

## 3.2 Research approach

Selecting an appropriate research approach for the study to be conducted is important. Research is an inquiry process that has a set of clearly defined parameters with the aim to, for instance, solve problems, and for development, evaluation and improvement of systems and services. Further it can also be used to provide information before introduction of new services or systems, and for theory building (Williamson, 2002). The purpose of this research is to identify competitive priorities and capabilities that are critical for manufacturing in the high cost environment of Sweden, and create understanding of how manufacturing companies can improve the performance of these. To conduct this study in a systematic way, the research process had to be carefully considered.

There are two different types of scientific reasoning approaches in literature, deductive and inductive. With deductive reasoning the arguments goes from general principles to the particular case (Williamson, 2002). This means that the reasoning is a “top-down” approach based in theory. From that hypothesis are made, followed by observations, which result in confirmation or rejection. Inductive reasoning begins in the other end. Here, observations and measures occur at first, followed by analysis of data gathered. From this analysis, the researcher can develop concepts and understanding from detected patterns in the data and by this develop general conclusions or theory (Williamson, 2002). In this research both reasoning styles have been used. Through a systematic literature review on competitive priorities and capabilities, a deductive reasoning was applied. A picture of the field of research have been created out of published literature and the reasoning was taken from there. Simultaneously inductive reasoning have been applied while conducting the case study. Interviews was made and based on the gathered data, and the following analysis, general theory and conclusions can be drawn.

There are two types of research approaches, qualitative and quantitative. According to Savin-Baden and Major (2013), qualitative research has an ‘emic’ perspective, which means that it is concerned with describing beliefs and behavior that the participant find meaningful. Quantitative research, on the other hand, take an ‘etic’ perspective that describes belief or behavior of an observer. As the purpose of this research have been to gain understanding for a specific topic, and the research is treating complex questions concerning ‘how’, a qualitative research approach was applied. Any research that requires in depth understanding is well suited for undertaking a qualitative approach (Williamson, 2002).

## 3.3 Research strategy

This section presents the research strategy applied within the thesis. First the systematic literature review is presented, followed by the case study.

### 3.3.1 Systematic literature review

A systematic literature review has been conducted in order to answer the research questions of this study and thus fulfilling the aim. The field of manufacturing priorities and capabilities is well-developed and mature, and thus this step is taken in order to systematically evaluate the contribution of already existing literature. Fink (2010) defines a research literature review as “... a systematic, explicit, and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars, and practitioners.” Savin-Baden and Major (2013) argues that the intention with a literature review is to create context for qualitative research; it is not enough to just present the findings, the researcher should also do a critical analysis of previous research, make critical arguments and draw conclusions. There are many different ways of doing a

literature review, which vary depending on author and field, but some common steps in a literature review includes (Fink, 2010; Jesson et al, 2011; Savin-Baden & Major, 2013, Williamson, 2002): determining a search strategy, collecting articles, doing the review, and synthesizing and presenting the result.

A literature review can be used to build a framework for the research, setting its context and background for the study (Williamson, 2002). It assists the researcher to gain an understanding of the problem and its context, and thus can play an important role in refining the research questions and hypotheses. A thorough literature review enables the researcher to identify gaps in previous research. Absence of coverage in literature could indicate that there is a need for further research and thus provide originality for the research. Savin-Baden and Major (2013) argues that a good literature review is one that is organized in a transparent manner with a process that is clear to anyone reading. They further states that it relies on well-documented information from reliable sources. In addition, a systematic literature review is neutral and technical process with high standardization, which in turn demonstrates a higher objectivity and transparency to the reader (Jesson et al., 2011). The authors argue that the systematic approach is vital in order to deal with the width of the research field and provide a result that covers as much of the existing area as possible. Further on, by using predefined search algorithms including key words, delimitations and inclusion criteria's, any subjectivity in the data collection is removed.

Literature review filled three purposes within this thesis. An initial literature review was done in order to gain understanding of the topic, thus enabled the identification of a research gap, the purpose of this study, and refining of the research questions. Furthermore the initial review provided the theoretical framework used within the thesis, on which the systematic literature will be based on. Finally, the systematic literature review was a research methods used within the thesis in order to create a framework, which have been used in order to answer the research questions and thus fulfilling the aim. The goals with the systematic literature review was to condensate the current body of literature that discusses competitive priorities and capabilities, and investigate different means to improve these.

### **3.3.2 Case study**

According to Williamson (2002), a case study aims to investigate a phenomenon within a real-life context, mainly collecting qualitative data. In a case study it is essential where to draw the boundaries of the case (Savin-Baden and Major, 2013). However boundaries for case studies cannot easily be foretold and managed. There are a number of features that characterize a case study research. A case study tends to have a narrow scope, be focused and intensive. It should be a limited number of documents reviewed, observations made, and/or interviews conducted. Further the case study should be holistic and particularistic, which means that it should aim to describe the whole, as well as relationships between its parts, and focus on the specifics rather than on generalization. It should also be contextual, which means that it is necessary to give the context in order to fully understand the case. The research on competitive priorities and capabilities in a high cost environment is not yet considered being mature, thus a case study approach was considered suitable.

When choosing to undertake a case study, the design of the case has to be considered. According to Savin-Baden and Major (2013), there are three aspects to consider. First, the case has to be defined, which means refining the object of the study in terms of problem, research question or activity. Secondly, the boundaries of the case have to be set. Thirdly, a decision regarding if the study should use single or multiple cases should be taken. A single case study gives the opportunity for an in-depth analysis of a specific context. A

multiple case study gives instead the opportunity to demonstrate similarities and provide stronger evidence from multiple sites (Savin-Baden & Major, 2013). The use of a case study is appropriate when understanding of context has a high importance, and when experiences of individuals are critical (Williamson, 2002). Savin-Baden and Major (2013) presents a set of advantages with the use of case studies. The method is flexible, allows for in-depth analysis of events and relationships, and allowing the researcher to use several sources and techniques for data gathering. This also makes it possible to present descriptions that are rich and thick (Savin-Baden and Major, 2013). Company X was chosen as case company in this study. They were chosen due to their participation in the larger ongoing research project at School of Engineering at Jönköping University and their close proximity, thus having their participation was deemed convenient. As the focus of this study was to present a thorough analysis of case Company X, a single case study was suitable. The authors choose a single case study over a multiple case study in order to gain more in depth data from one company, rather than broad data from several.

### **3.4 Data collection**

This section describes the process of collecting data in the thesis. First a description of the data collection within the systematic literature review is presented. Then a description of the data collection within the case study is presented.

#### **3.4.1 Systematic literature review**

The database used for the literature review is Scopus. The database was considered to be appropriate since it includes relevant journals in the field and the sample was big enough without any additional database. Certain delimitations were done to narrow down the final sample and make it manageable, which can be found in Table 1.

Initially, before undertaking the systematic literature review, an exploratory search was done in order to gain an initial understanding on the field of competitive priorities and capabilities. The exploratory search was done by using certain keywords such as ‘competitive priority’, ‘competitive capability’ and then adding new keywords related to relevant articles that was found. This facilitated the generation of keywords and the scope of the search in the systematic literature review, which will be explained further on.

Table 1. Search delimitations

<b>Delimitations</b>	<b>Explanation</b>
<b>Field</b>	Title, Abstract, Keywords
<b>Time</b>	No time limitation
<b>Document type</b>	Articles
<b>Source type</b>	Journal
<b>Language</b>	English

For the systematic literature review a list of search terms (or keywords) was created. Three main concepts were generated: manufacturing strategy, competitive priority and competitive capability. In the exploratory search, the concepts were extended by adding additional synonyms through brainstorming and searching for other keywords linked to the main concepts. The search terms can be located in Table 2.

Table 2. Search terms

Concept	Terms (and synonyms)	Search terms
<b>Manufacturing strategy</b>	Manufacturing strategy	"manufacturing strategy"
	Production strategy	"production strategy"
	Operations strategy	"operations strategy"
	Supply chain strategy	"supply chain strategy"
<b>Competitive priority</b>	Competitive priority	"competitive priority"
	Performance objective	"performance objective"
	Manufacturing objective	"manufacturing objective"
	Intended critical factor	"intended critical factor"
	Business priority	"business priority"
	Strategic priority	"strategic priority"
<b>Competitive capability</b>	Competitive capability	"competitive capability"
	Manufacturing capability	"manufacturing capability"
	Strategic capability	"strategic capability"
	Strategic dimension	"strategic dimension"
	Cumulative capability	"cumulative capability"
	Dynamic capability	"dynamic capability"
	Operational capability	"operational capability"
	Realized success factor	"realized success factor"
	Competitive dimension	"competitive dimension"

The goal with the sample generation was to create a sample that is large enough to include an appropriate number of relevant articles while still being manageable. During the first round, “manufacturing” and the synonyms were combined with “priorities” and its synonyms according to Boolean logic, and tested in order to see if a large enough sample could be generated. The first round generated 787 articles. In the second round “competitive capabilities” and its synonyms were added, generating a total of 2081 articles. During the third and final round “manufacturing strategy” and “taxonomy” were added. This generation provided a sample of 2089 articles, which was considered large enough for the literature review and was thus selected. The process can be found in Table 3.

Table 3. Sample generation

Sample generation		
("manufacturing" OR "production" OR "operations" OR "supply chain" OR "strategy") AND ("competitive priority" OR "performance objective" OR "manufacturing objective" OR "Intended critical factor" OR "business priority" OR "strategic priority")	787	Round 1
("manufacturing" OR "production" OR "operations" OR "supply chain" OR "strategy") AND ("competitive priority" OR "performance objective" OR "manufacturing objective" OR "intended critical factor" OR "business priority" OR "strategic priority") OR ("competitive capability" OR "manufacturing capability" OR "strategic capability" OR "strategic dimension" OR "cumulative capability" OR "dynamic capability" OR "operational capability" OR "realized success factor" OR "competitive dimension")	2081	Round 2
("manufacturing" OR "production" OR "operations" OR "supply chain" OR "strategy") AND ("competitive priority" OR "performance objective" OR "manufacturing objective" OR "intended critical factor" OR "business priority" OR "strategic priority") OR ("competitive capability" OR "manufacturing capability" OR "strategic capability" OR "strategic dimension" OR "cumulative capability" OR "dynamic capability" OR "operational capability" OR "realized success factor" OR "competitive dimension") OR ("manufacturing strategy" AND "taxonomy")	2089	Round 3
<b>Sample</b>	<b>2089</b>	

The screening process consisted of two main steps: abstract screening and article screening. The abstract screening was done within the database to narrow down the number of articles for the article screening to save time, and included reading the abstract and the keywords. The remaining articles were then screened more in depth by reading the abstract, the conclusions and looking at figures and tables. From the abstract screening 448 articles were selected for article screening, and 230 articles were selected as the final sample, see Table 4.

Table 4. Sample screening

Stages	Articles
Initial sample	2089
Excluded after abstract review	1643
Sample	446
Excluded after article review	216
<b>Final sample</b>	<b>230</b>

The generation of keywords and the screening of articles have been done in cooperation with a research project at the School of Engineering, Jönköping. This made it possible for a more efficient process with a higher final sample and a higher trustworthiness in the systematic literature review. The screening was based on the following inclusion criteria:

1. Papers addressing priorities
2. Papers addressing capabilities
3. Papers investigating different types of manufacturing strategies
4. Papers investigating the link between strategies and priorities and/or capabilities
5. Papers investigating the link between priorities and/or capabilities and the environment
6. Papers presenting a taxonomy of priorities and/or capabilities

### **3.4.2 Case study**

A case study has been conducted at Company X. Primary data was collected through interviews and secondary data through documents provided by the company.

#### **3.4.2.1 Interviews**

Interviews were conducted with several key employees within different areas. According to Savin-Baden and Major (2013), interviews are a central technique for data collection within qualitative research, and can be set to be either structured, semi-structured or unstructured depending on the level freedom the researcher takes during the interviews. The goal of the interviews at the company was to capture the respondents' perspective and being able to ask follow-up questions based on a specific set of questions, thus semi-structured interviews were the most appropriate choice for this thesis.

In order to gain a holistic view on the collected data, employees from several different functional areas were chosen. Interviewing different employees also ensures more reliable data. Thus interviews were conducted with key employees, see **Table 5** for more details. To further increase the trustworthiness, a recording device was used in addition to making notes. This made sure that all necessary data was collected and that no misinterpretation of the given answers occurred.

Table 5. Interviews

<b>Date</b>	<b>Purpose</b>	<b>Respondent</b>	<b>Method</b>	<b>Time</b>
<i>2015-01-27</i>	Business presentation	Technical & Quality manager	Semi-structured	30 min
<i>2015-01-27</i>	Mapping	Technical & Quality manager	Semi-structured	60 min
<i>2015-01-27</i>	Mapping	Production engineering	Semi-structured	60 min
<i>2015-01-27</i>	Mapping	Technical product manager	Semi-structured	60 min
<i>2015-01-27</i>	Mapping	Head of sourcing	Semi-structured	60 min
<i>2015-01-27</i>	Mapping	Workshop manager	Semi-structured	60 min
<i>2015-01-28</i>	Mapping	Planning manager	Semi-structured	60 min

The interviews were used in order to collect data to answer the thesis purpose and research questions. One interview was conducted with the help of a PowerPoint-presentation in order to gain information about company facts such as history, organization and product range etc. The aim with the remaining interviews was to map how the company works with manufacturing strategy, their competitive priorities and capabilities, and improvement actions at short and long term perspective.

#### **3.4.2.2 Documents**

Documents were collected in the form of a PowerPoint-presentation, excel-sheets and PDF-files. The PowerPoint-presentation contained information about company history, organization, product range, site information, production layout, and improvement philosophy. The excel-sheets were connected to the company's Kaizen-process and contained information about the planning of Kaizen events, objectives and goals. The PDF-file were also connected to the company's Kaizen-process and included their process for problem-solving, including a description of the problem and a counter measure, who is responsible for it and the date it should be finished and the date it is actually finished.

### **3.5 Data analysis**

This section describes the process of analyzing the information gathered in the thesis. First a description of the analysis of the systematic literature review is presented, then a description of the analysis of the case study. At the end a description of the combined analysis is presented.

#### **3.5.1 Systematic literature review**

In the analysis of reviewed literature, an excel-template containing several categories was used in order to create an overview on the content and make the analysis more efficient. The categories included year, method, priorities and capabilities, improvement actions, and additional notes. The final sample of articles was fully reviewed and relevant information was summarized and entered into the appropriate field in the template. Once the template was complete an additional template was created in order to categorizing articles into relevant competitive priorities and capabilities. Both these templates were continually shared between the authors of this thesis and the researchers involved with the larger project. This enable comparison between the templates and the possibility to confirm the data. Some main concepts were initially created and articles discussing those concepts were placed under that category, or put into a new one. Once every article was categorized, priorities that were similar or had the same meaning were merged together, the same process occurred with the capabilities. Categories that were mentioned and supported by single authors were either merged into similar categories when possible, or considered as a priority or capability that is not acknowledged and thus excluded.

From the final categories a descriptive analysis and a content analysis were conducted. The descriptive analysis presents statistics regarding year of publication, most common journals, methods used within the articles, distribution of priorities over time, and as an addition, dynamic capabilities over time. This information was used in order to draw conclusions about the development of priorities and capabilities in literature, as well as what methods that have been used most frequently. In the content analysis relevant information from the literature were extracted and summarized in each category. From the definitions presented in the literature, the authors of this thesis draw conclusions and presented their definitions on the competitive priorities and capabilities.

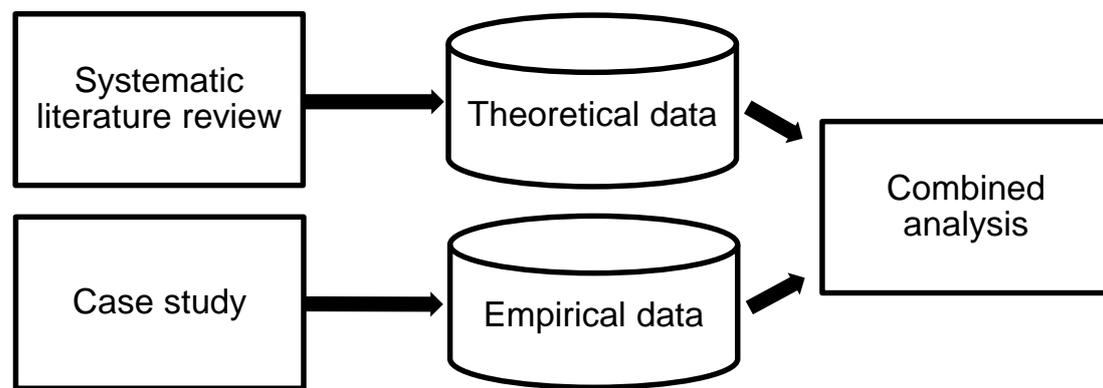
#### **3.5.2 Case study**

Miles and Huberman (1984) describe three steps to analyze case study data: data reduction, data display and conclusion drawing. Data reduction is used to select and simplify raw data, data display is used to organize the assembled information to be able to make conclusions of the selected data, and conclusion drawing is used to draw meaning and create logical evidence from it. The interviews from Company X was recorded and transcribed. This reduced the risk of misinterpretations of the information and made the data extraction more efficient. The transcripts were analyzed in order to collect data and relevant information was summarized into a case study template (i.e. data was reduced). In addition to the interviews, some documents were used in order to complement and add more information not provided by the interviews such as company information, kaizen etc. This information was entered into the case study template as well. The information was put into different categories (i.e. data was displayed in categories) according to dimensions set by the authors. Finally some conclusions were made and connections between different data were identified (i.e. meaning was created from the data).

According to Williamson (2002) there is always a risk of bias when collecting and analyzing qualitative data. Bias can occur due to the presence of the researcher at the location, and by the researchers own beliefs and prior assumptions. The effects from biases have been countered in this thesis in two ways: by crosschecking information from interviews and documents, and by using multiple interviews with employees at different company departments. The information collected from the different interviews has indicated that there is high consensus among employees concerning the topics.

### 3.5.3 Combined analysis

In order to draw further conclusion from the systematic literature review and the case study, as well to answer the research questions presented in the thesis, a combined analysis was necessary. The analysis process can be seen in *Figure 5*.



*Figure 5. Process of analysis*

First the information collected through the systematic literature review was summarized and presented, together with the definitions done by the authors. Secondly the result from the case study was summarized and presented, in which some definitions from the systematic literature were applicable. The data was then compared and analyzed through a combined analysis to identify similarities and differences, thus define if there is a match between the literature and the case presented.

## 3.6 Research quality

In this section the validity and reliability is discussed and argued for through the use of different methods and techniques.

### 3.6.1 Validity

In order to increase the validity of this thesis, triangulation have been applied. Triangulation refers to the reliance of combining several research methods or techniques to strengthen the research design (Fink, 2010). Yin (2009) lists four types of triangulation: *data triangulation* (different type of sources), *investigator triangulation* (involving multiple researchers), *method triangulation* (using more than one method to gather data), and *theory triangulation* (using more than one theory to interpret data). The first three types of triangulation have been applied in this thesis. Data triangulation have been applied in both the systematic literature review and the case study. In the systematic literature review it has been applied by reviewing several different articles, thus providing confirmation of the gathered data. In the case study it has been applied by interviewing several employees within different departments and different job descriptions, confirming the data from each

interview. Investigator triangulation have been applied in the systematic literature review. First, besides the two authors of this thesis, additional researchers have been involved in the process of screening and extracting data from articles. The extracted data have then been verified continuously throughout the study. Finally method triangulation has been applied in the case study by using both interviews and documents for gathering data from the case company. Moreover, the researchers have no personal connection to the employees at the included case company, eliminating the risk that any relationship affects the collection and interpretation of information.

Williamson (2002) defines validity in research as the ability of a measuring technique to measure what it is supposed to measure, and further divided this into two categories: internal validity and external validity. Internal validity refers to the result being attributable to the impact of the independent variable, and not caused by another unknown factor. In this thesis a combined analysis were conducted through matching of different patterns, which strengthens the internal validity of the study. External validity refers to the ability to generalize the results to another contexts. In this thesis a single case study has been applied. Single case studies are often criticized for being hard to generalize, but Yin (2009) argues that there is a difference between statistical generalization, in which a sample is intended to generalize to a larger universe and analytic generalization, in which the research is striving towards generalizing a set of results to a broader theory. In this thesis a framework of competitive priorities and capabilities have been developed, which is then applied to a case study in order to investigate what is to be considered critical. Thus, although the findings from the case may not be entirely generalizable to other companies in a high cost environment, the findings within the entire study can be generalized towards the theory found within available literature.

### **3.6.2 Reliability**

Reliability is defined as the consistency of the results produced by the measurement techniques (Williamson, 2002). The objective is to make sure that later investigators can follow the same steps as described in the research and achieve the same results (Yin, 2009). The systematic literature review has been conducted in a systematic and transparent manner. Assuming future research would limit the time-scope to the same included in this thesis, as no limitation to years of publication were set, they would come to the same result. In the case study interviews was used as a main technique for collecting data. Interviews conducted with interviewees at the company by other researchers should result in similar data. There is no guarantee that single interviewed employees would respond the same, however put together it would most likely give the same result. Applying triangulation by interviewing several employees on different functions, which was complemented with documentation, increased the reliability of the collected data. Thus high reliability was achieved. The research process has been systematic and transparent with steps that are easy to follow and replicate. Any drawbacks from used methods have been counteracted by using method triangulation in order to minimize variations in the results.

## 4 Systematic literature review

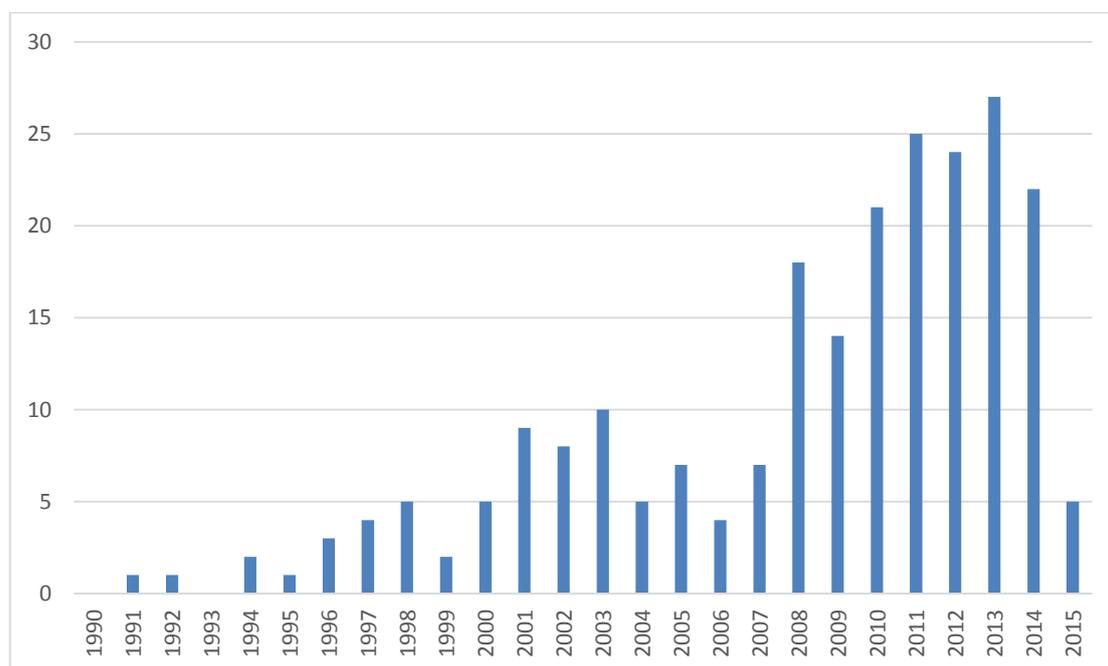
*This chapter presents the data collected in the systematic literature review. This is presented in two separate analysis parts, each focusing on different type of data. The first part, the descriptive analysis, is presenting analysis made on statistical data. The second part is content analysis, which in contrast to the descriptive analysis, focus on creating a deeper analysis of findings identified in the literature.*

### 4.1 Descriptive analysis

This section presents the first round of analysis of the collected material from the systematic literature review. The articles in the final sample are first analyzed according to distribution of publications over time, followed by distributions of main journals. Further, statistics on the methods used in the articles are presented, followed by distribution of competitive priorities over time. The section is ending with a presentation of the distribution of dynamic capabilities over time.

#### 4.1.1 Distribution of papers across the time period and journals

The final sample that were identified and used consists of 230 papers. The publications are distributed over the time period of 1991 until 2015. No limitations concerning year of publication was set in the initial search. However, the final sample resulted in no relevant articles found being published before 1991, as shown in *Figure 6*. Manufacturing strategy has been researched before this point (an example is the research done by Skinner (1969), which many subsequent authors base their studies on), but the concept of competitive priorities and capabilities was probably not as developed during this time.

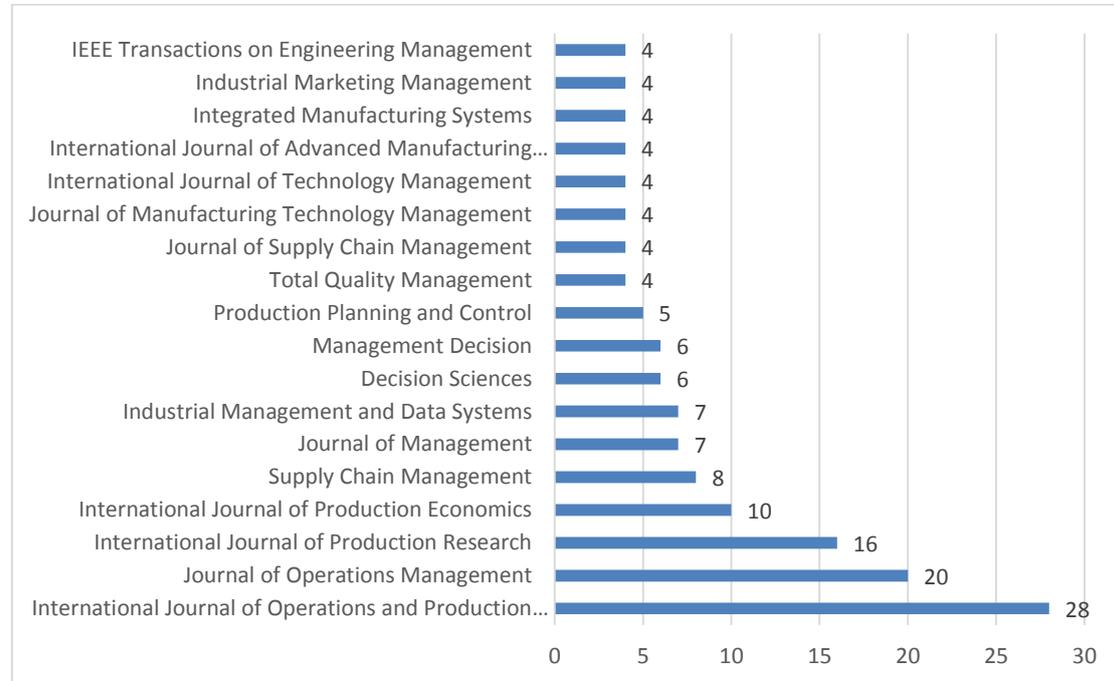


*Figure 6. Distribution of publications per year (n=230)*

As can be seen in the figure, the number of relevant articles in the final sample remains relatively low until the end of the 2000's, where there is a significant increase. This trend of increased relevant publications continues through the first half of the 2010's. The articles published during the years of 2008 until 2015 represents roughly 67% (161) of the total sample. This indicates that the competitive climate is constantly intensifying and more

focus is put on the concept of competitive priorities and capabilities. The low number of relevant papers found in 2015 is explained by the study being conducted in early spring, leaving a limited space for articles published that year to be included in the sample.

The articles included in the final sample of the systematic literature review was published in a variety of different journals, see *Figure 7*.

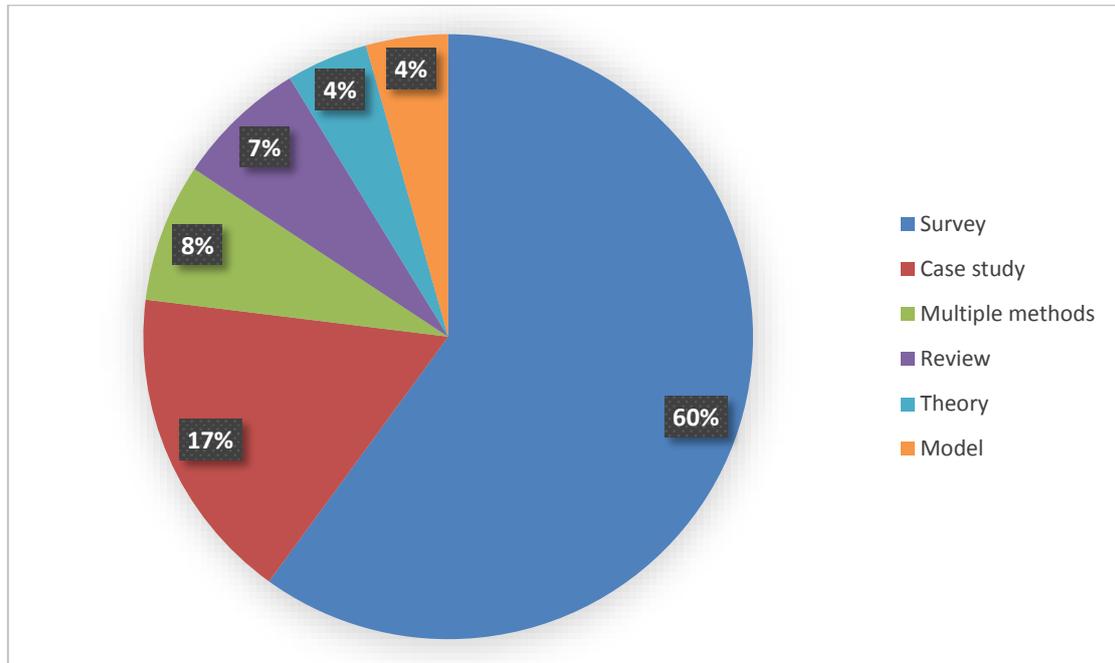


*Figure 7. Distribution of main journals*

These journals cover different subject areas such as operations management (*International Journal of Operations and Production Management, Journal of Operations Management etc.*), production and manufacturing (*International Journal of Production Research, International Journal of Production Economics etc.*), management (*Management Decision, Industrial Management and Data Systems, Journal of Management etc.*), logistics (*Journal of Supply Chain Management, International Journal of Logistics Management, etc.*), and several others. The figure shows the most commonly found journals in the final sample of literature. It shows all journals having four, or more, relevant articles published in them. From the figure it possible to identify the subject areas dominating the journals relevant for this study. These are within the research areas of operations management, production management, management research, and supply chain management. From this, it can be concluded that the topic of this thesis is mainly concerned with research within these areas.

#### 4.1.2 Applied research methods

Papers were classified according to their different research methods. Six different groups have been identified and characterized as either; (1) surveys; (2) case studies; (3) literature reviews; (4) theoretical or conceptual papers; (5) modeling papers; or (6) a mixture of different methods. Papers using a mixture of methods mostly combined a theoretical method (e.g. model or review) and an empirical method (e.g. survey or case study), with some exceptions. The distribution of methods is presented in *Figure 8*.

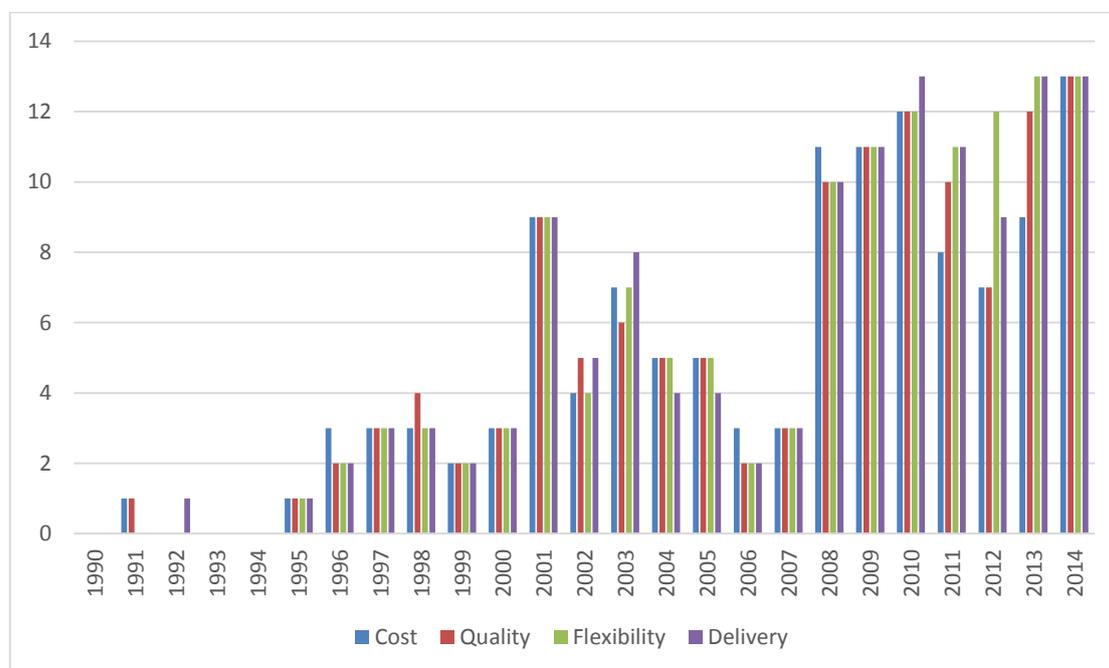


*Figure 8. Methods used in papers*

138 papers were found to be using survey as the main research method. This category was by far the most represented methods among the examined papers. 39 papers used case study as their main research method, thus being the second most represented methods. 17 papers used a combination of different methods, while 16 papers performed a literature review. The least used methods were modeling papers and papers that are purely theoretical or conceptual in their nature, both represented in 10 papers each. Papers using empirical methods (i.e. survey and case study) represented more than three quarters (at least 78 per cent) of the sample, while purely theoretical papers represented less than one quarter (below 22 percent) of the sample. The large number of empirical studies could be explained by the maturity of the topic, which in this thesis can be traced back to as early as 1991. The theory regarding competitive priorities and capabilities are well developed, thus the main focus in most studies is how these theories applies in different context, such as industry and country, and how they change over time.

### 4.1.3 Distribution of priorities over time

To be able to identify patterns in the four key competitive priorities (cost, quality, flexibility, delivery) identified in the systematic literature review, their distribution over time is visualized in *Figure 9*. The distribution of the four key competitive priorities found in literature are following a similar pattern. The one likely reason for this is that most authors in the literature review presented all four of these in the same papers.



*Figure 9. Priorities over time*

This is because in theory they are considered to be the basic set of priorities and therefore even papers who focus on one single priority still mentions the others. In the pattern, which they are all following, they are starting to increase after 1994, only to decrease in mid 2000's. After the decline they all start to increase again, hitting a higher level than before. As for the decline in mid 2000's, the exact reason is unclear, however as there are trends in industry so there is trends in research. One likely reason that could have influenced the increase of papers on competitive priorities is the global financial crisis that took place 2007-2008. This may have influenced the increased research because the crisis lead to increased demands on companies improving performance in order to survive, thus research on competitive priorities may have gained larger interest from researchers. Considering crisis as possible reasons related to increases in articles on competitive priorities provide an explanation for the sudden increase of papers in 2001 as well. Between the years of 1999 – 2001 the collapse of the IT bubble took place. This may have brought an increased attention on research on competitive priorities, just like the financial crisis a few years later may have done.

Figure 10 present the distribution of the other four competitive priorities identified in literature. These are; service, innovation, environmental protection, and people. As the research field is developing, new priorities emerge.

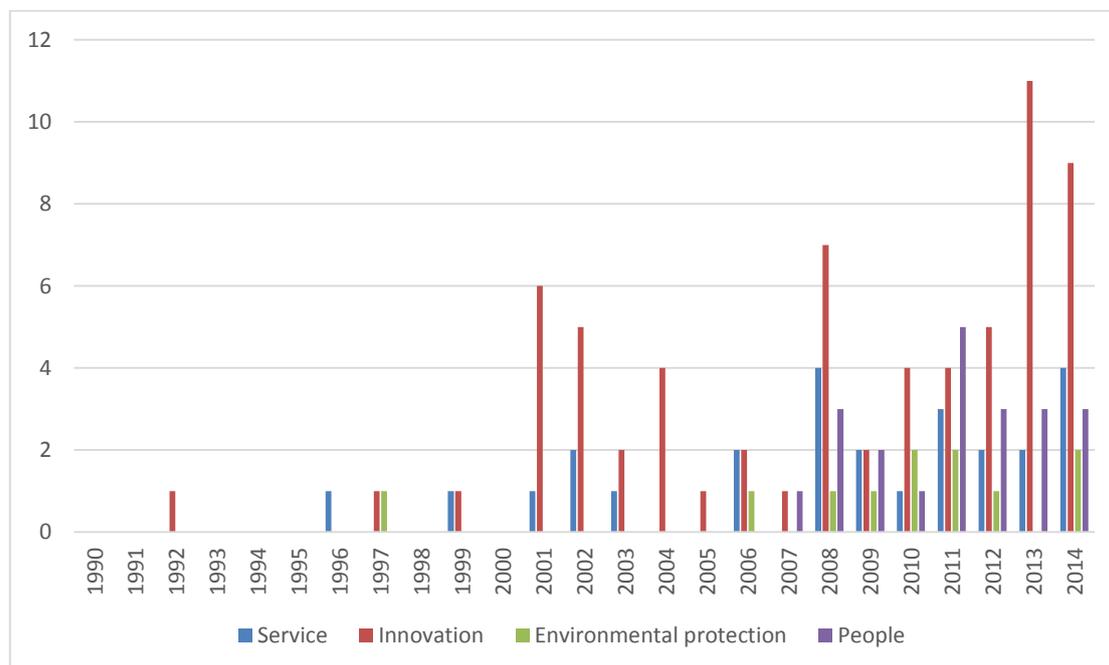
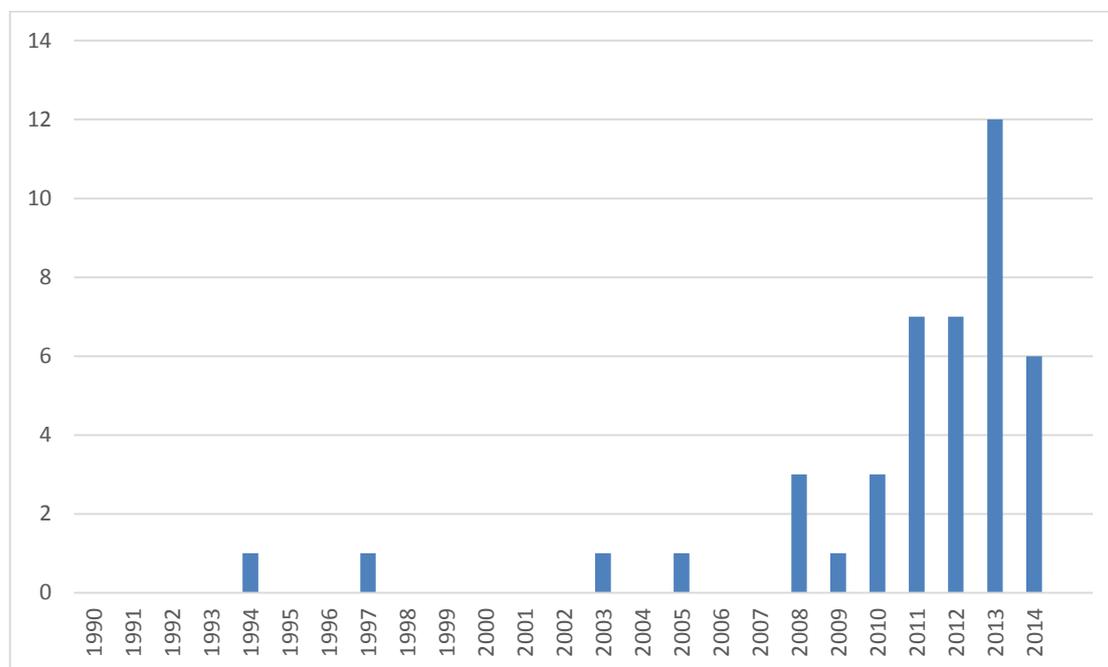


Figure 10. Priorities over time (cont.)

As seen in the figure, the published papers on service as a competitive priority start to emerge in the 2000's, with exception of a few single papers published earlier. After 2007 however, there is a small increase. From the total distribution it can be seen that service does not receive the same recognition as a competitive priority that innovation has done. Papers presenting innovation as a competitive priority is the ones most represented. During the 1990's quite few papers discuss this as a priority, however after the introduction of the new millennium papers presenting innovation as a priority explode. These papers mentioning innovation as a competitive priority increase throughout the rest of the period with exception of temporary decreases and spikes in published papers. This may be due to innovation papers being published in certain volumes of journals certain years, even though the papers are written earlier. It is expected that the trend of papers on innovation will continue. This may be due to that the latest papers present innovation as one of the main priorities by a number of authors, compared to earlier when it was mentioned as a possible being one. The distribution of papers mentioning environmental protection as a competitive priority is quite few, as the figure shows. These papers start to appear in the late 2000's, with exception on one single paper in 1997. This goes in line with the literature that mentions environmental dimensions as a possible new competitive priority that should be included, and therefore one could expect an increasing trend in the future. The topic of environment and sustainability is quite well discussed in literature, but as this result shows, it is not often put in the context of a competitive priority. That is a possible reason why quite few papers were found in this study. Papers discussing people do not occur until 2007, but remain on a stable level since. People as a priority have not been defined in specific terms in literature before this thesis, to the extent of authors' knowledge, which could explain the relatively low interest earlier.

#### 4.1.4 Distribution of papers discussing dynamic capabilities

In addition to the competitive priorities and capabilities identified in the literature, several authors describe *dynamic capabilities* as a complementary to the regular capabilities. Since this capability occurred so frequently within the literature it was of interest to include and analyze. The distribution of papers discussing dynamic capabilities can be found in *Figure 11*.



*Figure 11. Dynamic capabilities over time*

As can be seen in the figure, the concept of dynamic capabilities were introduced as early as 1994, by Teece and Pisano. However, it has not gotten any further recognition in literature until late 2000's. The authors mentioning dynamic capabilities almost exclusively refers to the early work of Teece and Pisano (1994) and Teece et al. (1997). This could indicate that these authors are considered pioneers within the field, and that the subject of dynamic capabilities are relatively immature and undeveloped.

## 4.2 Content analysis

The second section of the analysis part of the systematic literature review present the competitive priorities and capabilities identified, including definitions. Further, an analysis of each and every of the competitive priorities and capabilities are presented. This is followed by a content analysis on improvement actions and methods mentioned in the literature.

### 4.2.1 Introduction

As an initial step towards creating a framework the competitive priorities and capabilities has been identified. These are presented in Table 6. As could be seen in the table, eight different competitive priorities have been identified. These are cost, quality, flexibility, delivery, service, innovation, environmental protection, and people. These are presented one after the other together with the related capabilities. Dynamic capabilities have been added to the framework, this should not be considered as a separate capability, but rather

as a state in which every other capability could be present. The concept is explained further towards the end of this section.

Table 6. A framework of competitive priorities and capabilities

Priorities and capabilities	Defined as the ability to:
<b>Cost</b>	
1. <i>Low manufacturing cost</i>	manufacture products with low total cost
2. <i>Low inventory cost</i>	keeping low amounts of inventory
3. <i>Low price</i>	selling products at low price
4. <i>High resource utilization</i>	utilizing resources without waste
<b>Quality</b>	
5. <i>Conformance quality</i>	producing product with consistent quality
6. <i>Reliable products</i>	producing durable products
7. <i>Product performance</i>	producing high performing products
<b>Flexibility</b>	
8. <i>Volume flexibility</i>	make changes in volume
10. <i>Mix flexibility</i>	quickly change product mix in production
11. <i>Design flexibility</i>	make changes in product design
13. <i>Broad product line</i>	offer a variety of products
<b>Delivery</b>	
14. <i>Delivery dependability</i>	delivery products or services on time
15. <i>Delivery speed</i>	delivery products or services fast
<b>Service</b>	
16. <i>Customer service</i>	provide customer service
17. <i>After-sale service</i>	provide after-sale service
18. <i>Advertising</i>	promote product or service
19. <i>Broad distribution</i>	offer products to a wide market
<b>Innovation</b>	
20. <i>Innovation in product or service</i>	apply new product or service technology
21. <i>Innovation in process</i>	apply new manufacturing technology
<b>Environmental protection</b>	
22. <i>Environmental friendly products</i>	produce environment friendly products
23. <i>Environmental friendly processes</i>	produce with environment friendly processes
<b>People</b>	
24. <i>Knowledge</i>	absorb and apply knowledge
25. <i>Collaboration</i>	coordinate activities

Dynamic capabilities

The cost priority consists of four different capabilities: low manufacturing cost, low inventory cost, low price, and high resource utilization. Quality consists of three identified capabilities: conformance quality, reliable products, and product performance. Flexibility has four different capabilities: volume flexibility, mix flexibility, design flexibility, and broad product line. Delivery capabilities are: delivery dependability, and delivery speed. Service includes four capabilities: customer service, after-sale service, advertising, and broad distribution. Innovation presents two capabilities: innovation in products or service, and innovation in process. Environmental protection is concerned with two capabilities: environmental friendly products, and environmental friendly processes. People present two capabilities: knowledge and collaboration. These are all presented further in the following sections.

#### 4.2.2 Cost

The concept of cost has been termed differently by authors, but the most common ones are cost (Alsmadi et al., 2011), low cost (Bulak & Turkyilmaz, 2014), cost efficiency (Flynn & Flynn, 2004) and low price (Antonio et al., 2009). In this thesis the priority cost has been chosen as a combined definition for all terms related to cost. The classifications of articles treating cost as a priority and related capabilities is presented in Table 7. Competing in the

market based on cost is defined as a company's ability to manufacture and distribute comparable products or services as competitors but at a lower cost (Dangayach & Deshmukh, 2006; Drohomertski et al., 2014; Peng et al., 2011), thus being able to offer customers a lower price (Alsmadi et al., 2011; Laosirihongthong & Dangayach, 2005) while still being profitable (Corbett, 1996; Koufteros et al., 2002). Low price products are many times commodity products, which customers cannot distinguish between one brand and another in terms of functions or aesthetics (Lau et al., 2013). Being able to decrease cost is essential for sustainable success in cost-focused environments (Bulak & Turkyilmaz, 2014). Focusing on the competitive priority of cost is required when selling products in a budget market segment (Den Hertog, 2014). Rosenzweig et al. (2003) argues that manufacturers whom focus on cost leadership within manufacturing are able to be more price-responsive and thus have higher margins compared to their competitors. In Sum et al. (2012), three different elements of cost are put forward: (1) the initial cost (the price the customer pays when purchasing); (2) operating cost (the cost to use the product during its lifetime) and (3) maintenance cost (cost of repairs and maintenance). Although all three elements are affected by how it is manufactured, only the initial cost is considered in the cost priority within this thesis.

Table 7. Articles presenting cost

Priority and capabilities	Articles Reference numbers ( <i>See Appendix for bibliographic details</i> )
<b>Cost</b>	[1, 3, 6, 7, 9, 10, 11, 12, 13, 14, 19, 20, 21, 24, 26,28, 29, 30, 34, 35, 37, 38, 39, 40, 41,42, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 62, 64, 65, 66, 67, 68, 69, 70, 73, 74, 75, 76, 81, 84, 85, 91, 93, 96, 97, 98, 99, 100, 101, 102, 105, 106, 107, 108, 109, 110, 111, 113, 114, 115, 117, 118, 119, 120, 121, 123, 133, 134, 135, 139, 144, 148, 153, 155, 160, 162, 163, 165, 166, 169, 170, 171, 173, 174, 176, 178, 179, 180, 183, 184, 192, 193, 194, 198, 199, 201, 202, 205, 207, 208, 209, 210, 211, 215, 219, 221, 222, 225, 228, 229]
<i>Low manufacturing cost</i>	[1, 9, 10, 11, 19, 20, 28, 29, 31, 34, 35, 41, 43, 45, 48, 52, 53, 54, 56, 58, 59, 66, 68, 72, 75, 82, 84, 85, 88, 89, 90, 92, 94, 110, 111, 112, 117, 122, 127, 128, 129, 130, 133, 138, 142, 143, 145, 150, 151, 165, 181, 182, 192, 199, 207, 209, 210, 211, 221, 222, 225, 228, 229]
<i>Low inventory cost</i>	[9, 11, 34, 35, 43, 84, 90, 129, 206, 209, 210]
<i>Low price</i>	[7, 14, 46, 49, 74, 115, 116, 117, 125, 130, 139, 184, 199]
<i>High resource utilization</i>	[9, 11, 34, 35, 43, 70, 84, 90, 192, 207, 210]

Although some companies does not compete solely or primarily on cost, all manufacturers are to some extent concerned about costs and are highly conscious about cost control (Chi, 2010; Ward et al., 1998). It is thus important to keep expenses to a minimum even when cost is not the main priority. How to achieve low cost have been discussed by several authors, and include different methods or capabilities that reduces cost, mainly within manufacturing. According to Frohlich and Dixon (2001), an average of 67% of all costs can be pinned to the manufacturing function within a company. Other authors confirm this (Amoako-Gyampah, 2003; Santos, 2000; Kroes & Ghosh, 2009). Some general methods to lower cost mentioned in the literature includes using efficient processes that makes it able to utilize a company's available resources in a cost-effective manner (Espino-

Rodríguez & Padrón-Robaina, 2004; Ibrahim, 2010; Swink et al., 2005) with a minimal amount of waste (Badri et al., 2000; Longoni & Cagliano, 2015) or by producing high number of products without higher unit costs and achieving economies of scale (Boyer, 1998; Cai & Yang 2014). Specific capabilities that are mentioned includes among others low materials cost (Ward et al., 1996; Zhao et al., 2002), low overhead costs (Gröbler, 2010a; Oltra & Flor, 2010), low labor cost (Ward et al., 1998), low production cost (Kim et al., 2013; Mukerji et al., 2010; Thürer et al., 2014), low inventory cost (Avella et al., 2011; Chi, 2010; Ward et al., 1998), high equipment or capacity utilization (Chi et al., 2009; González-Benito & Suárez-González, 2010) or high labor productivity (Avella et al., 2011; Chi, 2010; Sum et al., 2012). Some authors refer all above simply as low cost (Dangayach & Deshmukh, 2006; Yusuf & Adeleye, 2002).

In this thesis, *low manufacturing cost*, *low inventory cost*, *low price* and *high resource utilization* has been defined as the competitive capabilities related to cost. These capabilities are broad enough to include all previously mentioned capabilities while still remain specific enough to be relevant. Low manufacturing cost is defined as the company's ability to convert input to output at minimum cost, including both unit and overhead costs. Low inventory cost is defined as the company's ability to keep inventory to a minimum level. Low price is defined as the company's ability to sell products or service to a lower price than the competition. High resource utilization is defined as the company's ability to utilize its resources such as machines and people as efficiently as possible.

As an interesting side note, Koufteros (2002) mentions the opportunity for companies to compete on premium price. This is an ability that could be defined as a cost-related capability and priority. The main argument is that premium price will indicate a superior product or service to the customers by having higher quality, having a more innovative design, or receiving more dependable or faster deliveries. The authors of this thesis argue that although it is possible to charge premium prices for superior products and services (even more than the customer gets in return at times), the main reason for being able to do that is to excel at other priorities such as *quality*, *innovation* or *delivery*. Additionally, a company competing on premium price will still try to lower their costs in order to achieve higher margins. Thus premium pricing is discarded as a capability on its own.

### 4.2.3 Quality

Quality is mentioned as one of the key competitive priorities in the majority of papers included in the systematic literature review (Gray et al., 2009; Ibrahim, 2010; Jabbour et al., 2012; Johansson & Winroth, 2010). The classifications of articles treating quality as a priority and related capabilities is presented in Table 8. Quality is without a doubt very important in the competitive global environment of today (Zhao et al., 2002; Alsmadi et al., 2011). Organizations who do not focus on quality face increasing threat of losing market share and as a result decline in profits. According to Sum et al. (2012) quality is not easy to define, the priority has multiple definitions. Scholars view the quality priority in different ways: the quality of a product is considered or the overall quality including both hard and soft aspects (Bulak & Turkyilmaz, 2014). Quality can be defined as offering products that meet pre-set product specifications (Drohomeretski et al., 2014), and producing products with high performance standards (Dangayach & Deshmukh, 2006; Laosirihongthong & Dangayach, 2005; Drake et al., 2013). Quality is also defined in more customer-focused ways as the ability of a company to offer products and services that meet or exceed the expectations of customers (Alsmadi et al., 2011; Koufteros et al., 2002; Drake et al., 2013; Santos, 2008). Espino-Rodríguez and Padrón-Robaina (2004) makes a distinction of the definition of quality depending on if it is being viewed from a customer or company perspective. Quality seen from a customer perspective mean obtaining a

product or service that meets the need of the customer, while from a company perspective it is being defined as doing things well the first time.

**Table 8. Articles presenting quality**

<b>Priority and capabilities</b>	<b>Articles</b> Reference numbers ( <i>See Appendix for bibliographic details</i> )
<b>Quality</b>	[1, 3, 6, 7, 9, 10, 11, 12, 13, 14, 19, 20, 21, 22, 24, 26, 28, 29, 30, 34, 35, 37, 38, 39, 40, 42, 44, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 62, 64, 65, 66, 67, 68, 70, 73, 74, 75, 76, 81, 84, 85, 91, 92, 93, 96, 97, 98, 99, 100, 101, 102, 104, 105, 107, 108, 109, 110, 111, 112, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 134, 139, 144, 148, 151, 153, 155, 160, 162, 163, 165, 166, 168, 169, 170, 171, 173, 174, 176, 178, 179, 180, 181, 182, 183, 184, 192, 194, 198, 199, 202, 205, 207, 208, 209, 210, 211, 215, 219, 221, 225, 227, 228, 229]
<i>Conformance quality</i>	[9, 10, 11, 28, 31, 34, 35, 41, 43, 46, 48, 49, 52, 53, 54, 56, 58, 59, 66, 68, 70, 73, 74, 75, 82, 85, 88, 89, 94, 95, 103, 106, 110, 112, 115, 117, 122, 127, 129, 130, 133, 138, 142, 143, 165, 179, 207, 209, 210, 211, 225, 228, 229]
<i>Reliable products</i>	[9, 10, 11, 45, 46, 52, 54, 56, 58, 59, 66, 90, 95, 111, 117, 122, 129, 133, 151, 166, 192, 199, 209, 210, 211, 229]
<i>High performance products</i>	[1, 9, 10, 11, 19, 29, 31, 34, 35, 41, 46, 49, 52, 53, 54, 56, 58, 59, 66, 74, 75, 82, 89, 95, 103, 106, 111, 115, 122, 125, 128, 129, 130, 133, 138, 139, 142, 143, 145, 151, 165, 166, 179, 184, 192, 199, 201, 209, 210, 211, 225, 228, 229]

A firm that is focusing on quality, as a competitive priority, needs a certain set of developed capabilities to support that priority. There are different views regarding the number of capabilities that quality consists of. Devaraj et al. (2004) defines quality through three dimensions: product reliability, durability, and conformance, while other authors choose to split quality into five or eight capabilities. The five sets of capabilities include durability, reliability, performance, conformance, and design (Avella et al., 2010; Zhao et al., 2002), while the set of eight capabilities include performance quality, conformance quality, reliability, durability, serviceability, features, aesthetics, and perceived quality (Alsmadi et al., 2011; Bulak & Turkyilmaz, 2014; Flynn & Flynn, 2004; White, 1996). However, a number of capabilities are more often mentioned in literature than others. These are; conformance quality (Größler, 2010a; Mukerji et al., 2010; Rebolledo & Jobin, 2013), reliability (Größler, 2010a; Sum et al., 2012; Thüerer et al., 2014), performance (Kim et al., 2013; Narasimhan & Schoenherr, 2013; Thüerer et al., 2014), durability (Hong et al., 2010; Oltra & Flor, 2010; Sum et al., 2012), features (Bolivar Cruz & Espino Rodríguez, 2008; Shi et al., 1997), perceived quality (Avella et al., 2001; Da Silva et al., 2009), high quality product (Lau et al., 2013; Rebolledo & Jobin, 2013), design quality (Jayaram & Narasimhan, 2007; Oltra & Flor, 2010), and low defect rate (Chan, 2005; Liu & Liang, 2015; Martín-Peña & Díaz-Garrido, 2008). These capabilities are defined in different ways by different authors and boundaries between them are often unclear. Chi (2010) defines conformance quality as that it provides customers with high performance design, reliable and consistent quality of products, and following product design specifications. Thus some authors choose to combine several capabilities together into one single capability. As there are such a large number of different capabilities of quality mentioned in the literature there is a need to define a certain set of these. A set of three capabilities is therefore chosen for this thesis.

The capabilities are *conformance quality*, *product reliability*, and *product performance*. These are in line with the work of Díaz-Garrido (2011) who also uses these three capabilities to define quality. Conformance quality is defined as the ability to keep a consistent level of quality of product all the time, which thereby include low defect rates, having high quality processes, consistent quality, and manufacturing according to design specifications. According to Ward et al. (1996) a high level of conformance quality is the most essential capability a manufacturer can possess. Achieving a high level of conformance quality is necessary before the manufacturer can pursue cost or delivery advantages. Unstable quality levels create defects and rework, which negatively affect other priorities. Product reliability is defined as the ability to supply the market with durable products that customers can rely upon when used. Product performance is defined as offering products that are high performing including features, functions, aesthetics and technology.

#### **4.2.4 Flexibility**

Flexibility is one of the key priorities mentioned by the majority of authors discussing competitive priority in the literature. However, it is difficult to define flexibility due to the existence of many reasonable definitions (Sum et al., 2012). The classifications of articles treating flexibility as a priority and related capabilities is presented in Table 9. A general definition of flexibility is that it can be seen as a measure of a firm's responsiveness to change. However there are many definitions differing little between. Flexibility can be defined as the ability of an organization to respond to changes in production or product design and specifications (Frohlich & Dixon, 2001; Dangayach & Deshmukh, 2006; Badri et al., 2000). Cousens et al. (2009) define flexibility as being able to allow operations to maintain and improve performance in spite of variety and uncertainty. Flexibility in operations means having the capacity to adapt operations when necessary and respond quickly to changes in demand or needs of the production processes (Drohomeretski et al., 2014). Manufacturing flexibility is the ability of the organization to change or react with little penalty in time, effort, cost or performance (Rodriguez et al., 2013; Patel et al., 2012). Flexibility further represents the ability of the organization to set up resources its resources to respond to environmental changes (Alsmadi et al., 2011; Espino-Rodríguez & Padrón-Robaina, 2004; Gao et al., 2014a; Guimarães, 2014; Phusavat et al., 2008). Flexibility is also the ability to perform different tasks and achieve different objectives with the same set of resources and facilities (Rodriguez et al., 2013; Zhang et al., 2007).

Firms that choose to compete on flexibility are situated to deal with the uncertainties of the environment in the manufacturing industry (Kroes & Ghosh, 2009). Uncertainties include variations related to both production and product. Production is concerned with variations in volume and product mix due to customer demand and products with variations in changing product requirements. However, at the same time a firm that competes on flexibility will be able to respond quicker to changes in emerging markets than competitors (Oltra & Flor, 2010). A company choosing to compete on flexibility as a competitive priority requires a set of capabilities supporting this goal. In literature different capabilities of flexibility are mentioned, however there are a set of capabilities more frequently mentioned than others. These are volume flexibility (Gray et al., 2009; Gröbler, 2010a; Rebolledo & Jobin, 2013), mix flexibility (Avella et al., 2011; Chi, 2010; Zhao et al., 2002), design flexibility (Bolivar Cruz & Espino Rodríguez, 2008; Christiansen et al., 2003; Dangayach & Deshmukh, 2006) and broad product line (Cousens et al., 2009; Dangayach & Deshmukh, 2006; Frohlich & Dixon, 2001;). The other capabilities mentioned in the literature are often representing similar abilities as those frequently mentioned ones above. Examples of these capabilities are customization (Sum et al., 2012), product mix changes (Laosirihongthong & Dangayach, 2005; Liu & Liang, 2015), product/process flexibility

(Hong et al., 2010; Swink et al., 2005), design (Lin et al., 2012; Thüerer et al., 2014), wide product range (Mukerji et al., 2010; Thüerer et al., 2014), modification flexibility (Krause et al., 2001; Malhotra & MacKelprang, 2012), and several other.

Table 9. Articles presenting flexibility

<b>Priority and capabilities</b>	<b>Articles</b> Reference numbers ( <i>See Appendix for bibliographic details</i> )
<b>Flexibility</b>	[1, 3, 6, 7, 9, 10, 11, 12, 13, 14, 19, 20, 21, 24, 26, 28, 29, 30, 32, 34, 35, 37, 38, 39, 40, 41, 42, 44, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 64, 65, 66, 67, 68, 69, 70, 73, 74, 75, 76, 81, 83, 84, 85, 91, 92, 96, 98, 99, 100, 101, 102, 104, 105, 106, 107, 108, 109, 110, 111, 112, 114, 117, 118, 119, 120, 121, 123, 125, 134, 135, 139, 144, 148, 150, 151, 153, 155, 159, 160, 162, 163, 165, 166, 168, 169, 170, 171, 173, 174, 176, 178, 179, 180, 182, 183, 184, 192, 193, 194, 198, 199, 202, 205, 207, 208, 209, 210, 211, 215, 217, 219, 221, 225, 226, 227, 228, 229]
<i>Volume flexibility</i>	[1, 9, 10, 11, 19, 32, 34, 35, 36, 41, 43, 46, 47, 48, 49, 52, 53, 54, 56, 58, 59, 66, 68, 70, 73, 74, 84, 88, 89, 90, 95, 97, 110, 111, 115, 117, 122, 130, 133, 138, 142, 143, 145, 151, 165, 181, 184, 192, 199, 201, 210, 211, 217, 221, 225, 228, 229]
<i>Mix flexibility</i>	[9, 10, 11, 15, 34, 35, 36, 43, 46, 47, 49, 52, 54, 56, 58, 59, 73, 88, 89, 90, 95, 110, 111, 117, 122, 127, 129, 130, 133, 136, 145, 151, 192, 199, 207, 210, 211, 229]
<i>Design flexibility</i>	[9, 10, 11, 19, 32, 34, 35, 41, 43, 46, 52, 53, 54, 56, 58, 59, 66, 74, 82, 84, 90, 94, 95, 97, 111, 115, 117, 122, 128, 130, 133, 136, 138, 143, 151, 156, 181, 184, 192, 193, 199, 201, 211, 217, 225, 228, 229]
<i>Broad product line</i>	[9, 10, 34, 35, 41, 43, 46, 47, 48, 49, 53, 66, 74, 82, 84, 133, 142, 143, 151, 165, 199, 221, 228, 229]

As mentioned earlier, these additional capabilities are often similar to those frequently mentioned in literature. Therefore there is a need to group these into a set of flexibility capabilities that are manageable. For the future research a set of four capabilities have been chosen. The chosen capabilities are those frequently mentioned in the literature, namely *volume flexibility*, *mix flexibility*, *design flexibility* and *broad product line*. Other capabilities with similar meaning are grouped into each corresponding capability of these four. The capabilities are defined in this thesis as follows. Volume flexibility is defined as the ability to rapidly respond to changes in volumes due to increase or decrease in demand. A company having a well-developed volume flexibility capability can utilize resources and infrastructure to react and respond to changing demands with little penalty in cost or performance. Mix flexibility capability concerns being able to efficiently switch between producing different types of products in response to changes in market demand. A company possessing the capability of mix flexibility can switch between producing different products without any major penalty on cost or performance. Design flexibility is defined as the capability making it possible to make rapid changes in product design, product functions or features in response to market uncertainties. This will allow an organization to adapt their products to customer demands with minimum penalty on cost or performance. Broad product line refers to holding an ability to provide the market with a wide set of products at the same time. This includes both several different types of products, but also include variations in them. These four capabilities chosen are viewed by

the authors as broad enough to include variations of flexibility capabilities found in the literature, but also narrow enough to be able to define.

#### 4.2.5 Delivery

Delivery, as a competitive priority, has been mentioned by authors in a wide variety of different terms. It is defined as delivery (Avella et al., 2011; Vachon et al., 2009), speed (Carpinetti & Martins, 2001; Chan, 2005; Flynn & Flynn, 2004), delivery reliability (Drohomeretski et al., 2014) delivery fulfillment (Bolivar Cruz & Espino Rodríguez, 2008), dependability (Amoako-Gyampah, 2003; Cai & Yang 2014; González-Benito & Suárez-González, 2010), and time (Drake et al., 2013). These terms are sometimes used interchangeably (e.g. speed could be describing the competitive priority delivery) and sometimes used to describe each separate capability. The classifications of articles treating delivery as a priority and related capabilities is presented in Table 10. Delivery dependability refers to a company's ability to deliver products or services according to requested and promised time (Alsmadi et al., 2011; Nand et al., 2013), schedule (Chi, 2010; Dangayach & Deshmukh, 2006;) or deadlines (Drohomeretski et al., 2014). A company may not have the lowest prices or the highest quality, but are able to delivering products in time, even on dates that are far away in the future (Chi, 2010; Ward et al., 1996; Oltra & Flor, 2010).

Table 10. Articles presenting delivery

<b>Priority and capabilities</b>	<b>Articles</b> Reference numbers ( <i>See Appendix for bibliographic details</i> )
<b>Delivery</b>	[1, 3, 5, 6, 7, 9, 10, 11, 12, 13, 14, 19, 20, 21, 24, 26, 28, 29, 30, 32, 34, 35, 37, 38, 39, 40, 41, 42, 44, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 62, 64, 66, 67, 68, 73, 74, 75, 84, 85, 91, 92, 96, 97, 98, 99, 100, 101, 102, 104, 105, 106, 107, 108, 109, 110, 111, 112, 114, 115, 117, 118, 119, 120, 121, 122, 123, 124, 129, 134, 138, 139, 142, 144, 148, 150, 151, 153, 155, 160, 162, 163, 165, 166, 168, 169, 170, 171, 173, 174, 176, 178, 179, 180, 181, 182, 183, 184, 189, 192, 194, 198, 199, 201, 202, 205, 207, 208, 209, 210, 211, 215, 217, 219, 221, 223, 225, 228, 229]
<i>Delivery dependability</i>	[9, 10, 11, 22, 28, 32, 34, 35, 41, 45, 46, 48, 49, 52, 53, 54, 56, 58, 59, 66, 68, 73, 74, 75, 82, 88, 89, 90, 94, 111, 117, 122, 127, 128, 129, 130, 133, 138, 139, 143, 145, 151, 165, 178, 181, 192, 197, 199, 207, 209, 210, 211, 217, 221, 225, 228, 229]
<i>Delivery speed</i>	[9, 10, 11, 22, 28, 32, 34, 35, 41, 45, 46, 48, 52, 53, 54, 56, 58, 59, 66, 68, 73, 74, 75, 82, 88, 90, 94, 111, 117, 122, 127, 138, 139, 143, 151, 165, 192, 199, 207, 209, 210, 211, 217, 221, 225, 228, 229]

To achieve dependability it is required to deliver as promised consistently (Koufteros et al., 2002). To deliver on promised time is one of the fundamental requirements to fulfill customer needs (Alsmadi et al., 2011; Zhao et al., 2002). To have dependable deliveries, it is not only required that you deliver to promised time, it is also essential that it is in the right quantity and quality (Ibrahim, 2010; Sarmiento et al., 2007). Being able to deliver on time is nowadays not enough though, some customers also want the delivery as soon as possible (Alsmadi et al., 2011; Chi et al., 2009; Zhao et al., 2002; Ward et al., 1998; Ward et al., 1996), and thus delivery speed becomes important. Delivery speed refers to a company's ability to respond and deliver products or services faster than the competition

(Avella et al., 2011; Badri et al., 2000; Vachon et al., 2009; Dangayach & Deshmukh, 2006). It can also be referred to as delivery lead-time (Sum et al., 2012). Since delivery dependability is not always enough delivery speed can help a business to win orders and thus have high importance for manufacturing companies in a competitive environment (Alsmadi et al., 2011; Zhao et al., 2002; Sum et al., 2012). A company might be required to locate the production facilities in close proximity to its customers in order to achieve short delivery times (Johansson & Winroth, 2010).

According to Koufteros (2002), companies who operate according to Just-In-Time have the inventory between them and their suppliers reduced significantly. For them delivery dependability is essential because of low buffers, and they are often willing to pay a premium price (as mentioned in the cost priority) for this service. This view is supported by Sarmiento (2007), who states that delivering their products or service on time is only a minimum requirement for customers. In other words, if the suppliers do not deliver on time, the customers will just go to another supplier. The competition has become so fierce that dependable deliveries are considered standard.

In this thesis, the general term delivery has been chosen to describe the competitive priority while *delivery speed* and *delivery dependability* describes the competitive capabilities. These definitions are similar to the ones defined by several other authors (Chi et al., 2009; Frohlich & Dixon, 2001; Dangayach & Deshmukh, 2006). Szasz (2014) argues that a firm can have a very slow delivery system but still deliver to customer exactly as promised. Thus it is necessary to separate the two different capabilities, or performance measurements could become biased, resulting in loss of orders or worse. Chi et al. (2009) does however add that although the terms are separable, promises of delivery speed needs to be kept with a high degree of delivery dependability.

#### **4.2.6 Service**

In addition to the four classic competitive priorities of cost, quality, flexibility and delivery, service is considered by many authors as a key competitive priority (Alsmadi et al., 2011; Frohlich & Dixon, 2001; Ibrahim, 2010; Kim, 2006). Service could be defined as the manufacturing's interface with the company's customers (Corbett, 1996). The classifications of articles treating service as a priority and related capabilities is presented in Table 11. Customers are not only seeking high quality products which are delivered on time to a reasonable price, they are also demanding better customer service from manufacturers, thus the service dimension is growing dramatically in manufacturing firms and becoming increasingly important (Alsmadi et al., 2011; Zhao et al., 2002; Rebolledo & Jobin, 2013; Zhang et al., 2008). According to Bolivar Cruz and Espino Rodríguez (2008), the borders between product and service are becoming continuously indistinct, to the extent where there is no product that does not have any type of service element incorporated. In a case example provided by Lin et al. (2012), the company realized the importance of service for their customers, and therefore shifted from being a product manufacturer to a service provider. This is confirmed by Rebolledo and Jobin (2013), who state that several organizations re-define their value creation through service. Providing good service adds value to the physical product (Zhang et al., 2011) and in many cases gives more value for the amount of money the customer spends (Orr, 1999). Lau et al., (2013) states that the sale of a physical product in many cases only accounts for a small portion of the overall profit and that most revenues instead have their source from support, maintenance and other service-activities.

The increased use of IT-technology has facilitated the possibility to enhance a company's relationship with their customer by providing, among others, more accurate after-sale

service, product support, product availability, real time information and customizing products to meet each individual customer's need (Alsmadi et al., 2011; Zhao et al., 2002). It also makes it possible for application of individual marketing and predicting each individual customer's needs (Zhao et al., 2002; Den Hertog, 2014; Zhang et al., 2011). A company that succeeds in increasing their service-related capabilities and create closer relations with their customers will also be able to create closer collaboration, further adapting their products or service to the customer needs (Zhang et al., 2011). A company that is successful in providing excellent service could decrease customer turnover and increase their market share, thus improving their competitive position (Kim, 2006).

Table 11. Articles presenting service

<b>Priority and capabilities</b>	<b>Articles</b> Reference numbers ( <i>See Appendix for bibliographic details</i> )
<b>Service</b>	[3, 7, 19, 20, 24, 26, 42, 46, 49, 60, 62, 66, 74, 81, 99, 101, 113, 130, 138, 153, 165, 205, 226, 225, 228, 229]
<i>Customer service</i>	[47, 49, 66, 99, 114, 119, 125, 138, 150, 162, 185, 229]
<i>After-sale service</i>	[19, 41, 45, 46, 48, 49, 53, 66, 70, 74, 82, 138, 143, 151, 165, 194, 209, 210, 225, 228, 229]
<i>Advertising</i>	[41, 53, 74, 143, 146]
<i>Broad distribution</i>	[41, 46, 53, 74, 143]

Service can be divided into several specific capabilities, where some of the most common ones are defined as after-sale service, advertising and broad distribution (Christiansen et al., 2003; Corbett, 1996; Dangayach & Deshmukh, 2006; Frohlich & Dixon, 2001; Nair & Boulton, 2008). Other capabilities that has been mentioned includes amongst others information (Díaz-Garrido et al., 2011; Martín-Peña & Díaz-Garrido, 2008), customer service (Crowe & Brennan, 2007; Da Silva et al., 2009) and product support (Corbett, 1996). In this thesis, the traditional capabilities *after-sale service*, *advertising* and *broad distribution* has defined as competitive capabilities related to service, but extended with the capability *customer service*, as the traditional capabilities does not include any direct customer service provided before selling the product. This is supported by Bulak & Turkyilmaz (2014), who states that service can occur before purchasing. Customer service refers to any service that is related directly to the customer before purchase such as provide information (that is not provided by advertising), handling special requests, and providing real time information status such as availability and delivery status etc. After-sale service is refers to all service provided after customer purchase and includes product support, maintenance, customer complaints etc. Advertising refers to the ability to promote a product and providing information so it is easily accessible for customers. Broad distribution refers to the ability to provide the product or service to a large market.

#### **4.2.7 Innovation**

Innovation is another key priority in addition to the previously mentioned classic competitive priorities. Innovation has been defined quite broadly in the literature and any general consensus on a specified definition seems to be missing. Some definitions that have been proposed are the following: innovation as the process of making changes and adopting new ideas or methods (Crowe & Brennan, 2007); as a capacity to successfully introduce new products or processes (Alsmadi et al., 2011; Guimarães, 2014); designing

new products and launch new products faster than, or not offered by the competition (Drohomeretski et al., 2014; Kroes & Ghosh, 2009) the introduction of new product and processes (Dangayach & Deshmukh, 2006); as new things which are applied to bring additional value to customers (Laosirionghong et al., 2014); as the gathering of ideas from internal or external sources to produce products or services that adds additional value (Pai & Chang, 2013); as the ability to combine existing elements or generate new ideas to create new value (Stalk et al., 1992); or the ability to develop new products or technology in manufacturing processes (Gao & Tian, 2014a). The classifications of articles treating innovation as a priority and related capabilities is presented in Table 12. Innovation includes both small-scale improvements and larger changes, defined as incremental and radical innovation (Crowe & Brennan, 2007; Nair & Boulton, 2008; Noble, 1997; Soosay & Hyland, 2008). Incremental innovation includes smaller changes or improvements to existing products, services or processes, while radical innovation includes developing new products, service or processes (Noble, 1997).

Table 12. Articles presenting innovation

<b>Priority and capabilities</b>	<b>Articles</b> Reference numbers ( <i>See Appendix for bibliographic details</i> )
<b>Innovation</b>	[3, 7, 14, 19, 20, 23, 24, 26, 40, 39, 37, 38, 45, 48, 51, 57, 53, 56, 55, 58, 52, 54, 60, 64, 68, 73, 75, 81, 89, 91, 99, 100, 101, 102, 111, 115, 117, 120, 121, 122, 123, 125, 130, 143, 144, 148, 153, 154, 160, 165, 166, 167, 168, 171, 179, 181, 188, 189, 194, 199, 198, 204, 220, 221, 229, 230]
<i>Product innovation</i>	[15, 44, 49, 56, 59, 58, 52, 54, 68, 75, 111, 114, 116, 115, 117, 122, 129, 142, 165, 166]
<i>Process innovation</i>	[15, 18, 44, 49, 75, 111, 114, 117, 125, 132, 139, 186, 221, 222, 229]

In order to achieve innovation, companies must have deep understanding of the markets and their customers (Rodriguez et al., 2013). Companies who frequently improve or innovate their products are able to closely match customer demands and expectations (Koufteros et al., 2002). Companies also needs to be absorptive and have the ability to exploit its resources to be able to gain knowledge, both from internal sources as well as external ones (Laosirionghong et al., 2014). It is important that they have the ability to share knowledge across different units, therefore they must set up organizational processes that enable them to do so (Brühl et al., 2010). Companies who compete in industries were other competitive priorities are considered order-qualifiers or compete in very turbulent environments may try to use innovation in order to differentiate themselves from the competition and maintain competitive advantage (Krause et al., 2001; Zheng et al., 2011). According to Koufteros (2002), up to 80% of quality issues are possible to track to decisions in the product development stage, thus expects that innovation will have a large impact on a products final quality. A company therefore should encourage continuous improvements in innovation (Koufteros et al., 2002; Soosay & Hyland, 2008). Failing to adapting new technologies can lead to established organizations losing their leadership positions to new entrants in the market (Nair & Boulton, 2008).

Innovation capabilities are generally divided into product innovation, process innovation and sometimes technology innovation (Dangayach & Deshmukh, 2006; Drohomeretski et al., 2014; Gao & Tian, 2014a; Guimarães, 2014; Pai & Chang, 2013; Alsmadi et al., 2011; Brühl et al., 2010). In a few articles service innovation has been included (Crowe &

Brennan, 2007; Pai & Chang, 2013; Brühl et al., 2010). In this thesis, *innovation in product or service* and *innovation in processes* is chosen to describe the competitive capabilities within innovation. These two categories are supported by several authors (Gao & Tian, 2014a; Guimarães, 2014; Brühl et al., 2010) Laosiriongthong et al., 2014). Innovation in product or service is defined as the ability to change and develop new components, features and technologies within the product or service design. It reflects the company's ability to find new markets and fulfilling customer needs which were previously unknown. Innovation in processes refers to the ability to develop and improve production process technologies to manufacture a product. Technology, which has been defined as a capability within innovation by some authors, has not been included. The reason is that technology is viewed as a mean to achieve innovation in products, services or processes and is already included within these capabilities.

#### **4.2.8 Environmental protection**

In recent years, environmental concern has arisen beside the commonly mentioned key competitive priorities cost, quality, flexibility, and delivery. The concern for environmental issues has led to considering environmental protection or responsibility or sustainability or management as a seventh competitive priority for the manufacturing organization (Avella & Vázquez-Bustelo, 2010; Avella et al., 2011; Díaz-Garrido et al., 2011; Da Silva et al., 2009; Vivares-Vergara et al., 2014; Longoni & Cagliano, 2015; Jabbour et al., 2012; Johansson & Winroth, 2010; Szász & Demeter, 2014; Martín-Peña & Díaz-Garrido, 2008; Sackett et al., 1997; Liu & Liang, 2015; Größler & Grübner, 2006). Environmental protection or responsibility is defined as minimizing the consequences of production on the various components of the environment. Environmental sustainability has a similar definition, however it is more concerned with consuming natural resources at a rate that is below the natural regeneration, or generating limited emissions not affecting the ecosystem (Vivares-Vergara et al., 2014). Jabbour et al. (2012) define environmental management as an organization-wide process that applies innovation to achieve sustainability, social responsibility, and waste reduction focusing on eco-efficiency. This is, according to Jabbour et al. (2012), a preventive approach that does not create competitive advantage and thus may not be seen as an additional competitive priority. Díaz-Garrido et al. (2011) however include environmental protection as a competitive priority as there are multiple consequences involved (social, cultural, economic and political). The classifications of articles treating environmental protection as a priority and related capabilities is presented in Table 13. The environment is a strategic variable since firms are both causing environmental impact, but at the same time are part of the solution for reducing this impact (Díaz-Garrido et al., 2011). Therefore they should and must consider their processes and products and what impact they have. An environmental dimension as a new competitive priority is not incompatible with the other priorities, in fact it can increase the performance of these (Da Silva et al., 2009; Jabbour et al., 2012). Various different techniques used in development of environmental friendly or sustainable products such as life cycle assessment, recycling, reuse and reduction of consumption of raw materials will affect for example cost performance. As any other competitive priority, environmental priority set by a company must have a set of capabilities supporting it. The literature presents a set of capabilities consisting of a product and process dimensions. These capabilities are producing environmental friendly products, and using environmental friendly processes (Avella et al., 2011; Szász & Demeter, 2014; Martín-Peña & Díaz-Garrido, 2008). A company possessing these capabilities will provide itself with a positive environmental image as well as preventing environmental incidents. This is further supported by Díaz-Garrido et al. (2011) that strengthen the importance of considering production and products that respect the environment and minimize contamination.

Table 13. Articles presenting environmental protection

Priority and capabilities	Articles Reference numbers ( <i>See Appendix for bibliographic details</i> )
<b>Environmental protection</b>	[3, 7, 14, 19, 20, 23, 24, 26, 40, 39, 37, 38, 45, 48, 51, 57, 53, 56, 55, 58, 52, 54, 60, 64, 68, 73, 75, 81, 89, 91, 99, 100, 101, 102, 111, 115, 117, 120, 121, 122, 123, 125, 130, 143, 144, 148, 153, 154, 160, 165, 166, 167, 168, 171, 179, 181, 188, 189, 194, 199, 198, 204, 220, 221, 229, 230]
<i>Environmental friendly products</i>	[15, 44, 49, 56, 59, 58, 52, 54, 68, 75, 111, 114, 116, 115, 117, 122, 129, 142, 165, 166]
<i>Environmental friendly processes</i>	[15, 18, 44, 49, 75, 111, 114, 117, 125, 132, 139, 186, 221, 222, 229]

The topic of sustainability and environment is frequently discussed in literature, however research considering environment as a competitive priority is still limited. The environmental capabilities presented in the literature focus around two different dimensions, products and processes, as mentioned. Organizations focusing on environmental performance as a priority provide the market with environmental friendly products and/or produce its products in environmental friendly ways. Based on the literature, a priority named environmental protection has been adopted in this research. By including this priority, the research follows recommendations in literature that greater attention should be placed on this topic (Avella & Vázquez-Bustelo, 2010). This priority is being defined by the authors as minimizing environmental impact of manufacturing and products on the environment. Two capabilities are set in order to support this priority, these are *environmental friendly products* and *environmental friendly processes*. Environmental friendly products are defined as the ability of the company to supply customers with products that have a minimum impact on the environment. Environment friendly processes are defined as the company's ability to manufacture products with minimum impact on the environment through waste, resources, energy consumption and emissions.

#### 4.2.9 People

In addition to the previously mentioned competitive priorities, people have been identified as an eight priority. Lekurwale et al. (2014) argues that strategy-specific human resource management can have a significant impact on manufacturing performance, especially when customer demands are of large variety and small volume and automation is not economical. Although people affect manufacturing performance, how to manage people and resources have generally not been discussed within the examined literature. Thus this priority will be defined in this thesis by the two competitive capabilities that has been identified, *knowledge* and *collaboration*. These capabilities are to some extent connected to each other, which will be explained further on. The classifications of articles treating people as a priority and related capabilities is presented in Table 14.

*Knowledge*, sometimes defined as “know-how” (Alsmadi et al., 2011; Chai et al., 2009; Ibrahim, 2010; Kristianto et al., 2011), refers to a company's ability to collect, absorb and apply new knowledge. The ability to manage knowledge, creativity and skill development is key in markets where decreasing products' lifecycles is a challenge (Phusavat et al., 2008; Alsmadi et al., 2011). This includes knowledge about technologies, customer needs and manufacturing processes (Alsmadi et al., 2011; Phusavat et al., 2008). One source of knowledge that is mentioned is customers (Soosay & Hyland, 2008). Trying to get an understanding of customers' issues and problems is an opportunity to gain new

knowledge, information or methods for problem solving. Soosay and Hyland (2008) also points out the importance for employees within the company to gain knowledge through different training programs and experience.

Knowledge is not only about absorbing and applying knowledge, it is also about being able to transfer and share it, also known as knowledge exchange. Generally knowledge exchange can be achieved in two ways: internally and externally. Internal knowledge exchange occurs when the source of knowledge transfer occurs within the manufacturing facility, while external knowledge exchange occurs when the source of knowledge transfer originates from outside of the manufacturing facility, even if it comes from another facility within the same company (Gavrinski et al., 2011; Robertson et al., 2012). Cooperation between two companies or two departments within a company can present an opportunity to import external knowledge, for example could a successful solution or technology from one manufacturing facility (or department) be applied to one's own company (Chai et al., 2009). By sharing successful solutions between partners a higher efficiency in problem solving could be achieved. There are advantages in utilizing co-operation and integration when developing and assimilating new knowledge.

**Table 14. Articles presenting people**

<b>Priority and capabilities</b>	<b>Articles</b> Reference numbers ( <i>See Appendix for bibliographic details</i> )
<b>People</b>	[2, 3, 4, 17, 29, 71, 78, 99, 119, 126, 132, 154, 159, 162, 167, 168, 188, 197, 222, 230]
<i>Knowledge</i>	[4, 29, 78, 99, 119, 154, 167, 188, 222, 230]
<i>Collaboration</i>	[2, 4, 17, 71, 126, 197]

The second competitive capability is defined as *collaboration*. Collaboration is defined as a company's ability to coordinate activities across functional and inter-organizational boundaries, also known as internal and external integration (Allred et al., 2011). It links structural aspects of business processes through technology, logistics and information sharing (Beske et al., 2014). Fawcett (2012) presents interviews with several managers, where some expressed that due to increased customer demands (higher pressure on prices, among others) and suppliers becoming more powerful there is a risk that companies in the middle ends up in a highly pressured situation. Uncertainties in supply chains have also increased, causing disturbances in demand forecasts, which are then amplified upstream in the supply chain, known as the bullwhip-effect (Thatte et al., 2009). Collaboration facilitates companies in a supply chain to reduce cost and reduce uncertainties in demand by sharing information, thus reducing some of the pressure. Collaboration can be divided into customer orientation and supplier orientation (Allred et al., 2011). Customer orientation promotes the gathering, sharing and use of customer information to efficiently meet customer needs. Supplier orientation, on the other hand, emphasizes the need to manage supplier capabilities and capacity to improve quality, productivity and innovation, and can be applied within the same organization as well. Successful collaboration indicates that there are several key components that work as intended between different organizations. Conflicting and non-aligned goals, unwillingness to share information, lack of trust are some reasons to why collaboration does not succeed (Allred et al., 2011). To achieve successful collaboration organizations have to develop a number of key components. These components include among others trust, coordination, frequent and open communication, quality of shared information, joint problem solving, alignment of

goals, a willingness to share risk and rewards, and high levels of manager interaction and commitment (Amlus et al., 2014; Allred et al., 2011; Beske et al., 2014; Fawcett et al., 2012).

#### 4.2.10 Dynamic capabilities

The literature has mostly been describing competitive capability in terms of cost, quality, flexibility, delivery etc. There are cases when an additional capability, dynamic capabilities, have been introduced and included. In a fast-changing dynamic world, where market and industry settings are changing more rapidly than ever before, for a company to be sustainable over time they must be able to adapt and exploit these changes in their business environment (Beske, 2012; Bhatt & Grover, 2005; Sandberg & Abrahamsson, 2011; Zheng et al., 2011). The term dynamic capabilities were first termed in Teece and Pisano (1994) and further developed by Teece et al. (1997), and defined it as “... *the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments*”. This definition is one of the most widely used within further research (Beske, 2012; Brühl et al., 2010; Cheng et al., 2014; Fawcett et al., 2012; Grimaldi et al., 2013; Pai & Chang, 2013; Parente et al., 2011; Protogerou et al., 2013; Rodriguez et al., 2013; Santos-Vijande et al., 2012; Tondolo et al., 2010; Wu et al., 2010; Zhang et al., 2013). Other definitions includes: the capacity to purposefully create, extend, or modify its resource base (Beske et al., 2014); a firm’s capability to switch resources set to compete in changing and hypercompetitive markets (Della Corte et al., 2013); a firms potential to systematically solve problems (Niehaves et al., 2014); and a process that impacts the resource base of a company (Woldesenbet et al., 2012). The classifications of articles treating dynamic capabilities is presented in Table 15. Parente et al. (2011) adds that these abilities are rooted within a company’s organizational and learning processes. Dynamic capabilities builds on the resource-based view, which in short considers a company to consist of a set of resources, of which some are valuable and difficult to imitate (Beske, 2012). In an organization, according to a resource-based view, there are certain operational capabilities. These capabilities are directed to convert inputs to outputs, thus consist of the daily routines and processes that enable a company to function in a relatively stable environments (Gao & Tian, 2014b; Gebauer et al., 2012; Protogerou et al., 2013; Wilden et al., 2013). Dynamic capabilities, on the other hand, are directed towards transforming and reconfiguring operational capabilities (Gao & Tian, 2014b; Protogerou et al., 2013), thus consist of capabilities on a higher strategic level compared to operational capabilities.

Table 15. Articles presenting dynamic capabilities

Articles	
Reference numbers ( <i>See Appendix for bibliographic details</i> )	
<b>Dynamic capabilities</b>	[1, 2, 4, 8, 12, 16, 17, 18, 23, 27, 33, 43, 49, 63, 71, 76, 79, 80, 86, 87, 99, 104, 111, 130, 132, 140, 145, 147, 151, 152, 158, 162, 164, 166, 172, 175, 177, 184, 186, 188, 189, 190, 195, 196, 200, 202, 204, 206, 213, 216, 218, 223, 224, 227]

There is little consensus in what dimensions should be included in dynamic capabilities. Some specific dimensions that have been suggested include entrepreneurial capabilities (Woldesenbet et al., 2012), Ethics-focused dynamic capability (Arend, 2013), organizational intelligence (Caniato et al., 2013), and dynamic IT-capabilities (Bhatt & Grover, 2005). The most common dimensions mentioned in literature are those presented by Teece et al. (1997): Sensing capabilities, seizing capabilities and reconfiguration capabilities. These dimensions are on a more general level compared to those suggested in the previously mentioned papers, and are supported by other authors (Gebauer, 2011; Gebauer et al., 2012, Grimaldi et al., 2013; Wilden et al., 2013). Sensing refers to the ability

scan and monitor changes in environment for new threats and opportunity in the environment. Seizing refers to the ability to address and respond to the sensed threats or opportunities. Reconfiguration refers to the ability for a company to remain competitive through enhancing, combining, protecting, or reconfigure assets. Gebauer et al. (2012) argues that there is a bridge between sensing and seizing that concerns the acquisition of strategic insight, while the bridge between seizing and reconfiguration refers to the actual execution of said strategy.

The adaption of dynamic capabilities can thereby lead to long-term competitive advantage (Beske, 2012). It is not sufficient enough to just have strong resources and organizational capabilities, an organization must also continuously renew these (Della Corte et al., 2013). Dynamic capabilities have a positive influence on performance in several ways such as matching the resource base with the changing environment, creating market change and supporting capability-building (Wilden et al., 2013). It also has an indirect influence on performance by changing the operational capabilities, thus having a positive effect on performance and can create competitive advantage.

#### **4.2.11 Improvement actions and methods**

Through the systematic literature review a number of improvement actions and methods were identified. These were often not specified as improvement actions but as ways to handle certain problems. A set of five categories of improvement actions and methods were found and are presented in Table 16. These improvement actions and methods are presented further below.

Table 16. Improvement actions

<b>Improvement action</b>	<b>Articles</b> Reference numbers ( <i>See Appendix for bibliographic details</i> )
<i>Strategic alliances</i>	[2, 16, 71, 98, 129, 157, 186, 222]
<i>Product modularity</i>	[7, 124, 130]
<i>Internal integration</i>	[7, 46, 170, 197]
<i>Alignment</i>	[9, 12, 106, 108, 121, 179, 202]
<i>Production methods/Advanced manufacturing technology (AMT)</i>	[15, 25, 26, 28, 33, 46, 53, 54, 56, 58, 59, 68, 82, 122]

*Strategic alliances* were the first category identified in literature. Several authors mention different concepts such as collaboration (Allred et al., 2011; Fawcett et al., 2012; Park et al., 2011), and long term relationships (Beske, 2012; Zeng et al., 2008), which can both be connected to strategic alliances (Hung et al., 2015; Lin et al., 2014; Singh et al., 2013). Hung et al. (2015) define strategic alliances as the exchange between two independent firms who look for mutual benefits through collaborative partnerships and to develop new processes, products, services, or technologies. According to Fawcett et al. (2012), such collaborative advantages are especially difficult to replicate, and it will enable faster new product development, lower product and supply chain costs, enhance quality, shorten order fulfillment times, and improve customer service. According to Lin et al. (2014) horizontal alliances influence cost and flexibility, downstream alliances influence the performance of cost, while upstream alliances furthering delivery. The reality is that collaboration between firms is critical to both change and competitiveness. Fawcett et al. (2012) list several factors driving the need for this type of collaboration between firms. Increasing competitive pressure and globalization, increased demands from customers, need to establish global

reach, desire to build a winning team, and a need to secure the company's strategic position in the supply chain are all examples of driving forces.

*Product modularity* is the second category of improvement actions or methods found in literature. Antonio et al. (2009) define product modularity as continuum that is describing separateness, transferability, and specificity of product components within a product system. This definition includes the extent to which modules are independent or separate, transferable or reusable within the production process, and the extent to which components are specific. In response to the global competition on the market, manufacturers must cope with high product variety, short product life cycles, customization, and rapidly increasing development costs (Lau et al., 2007). Product modularity can be used as a tool to influence performance of competitive capabilities needed to cope with this market and by using product modularity companies can influence delivery, flexibility, and customer service capabilities (Lau et al., 2007). As an example Lin et al. (2012) present Chinese bus manufacturers work with product modularity as an improvement action for delivery speed, while Antonio et al. (2009) present findings on product modularity improving product innovativeness, flexibility, and customer service.

*Internal integration* is the third identified category of improvement methods or actions. Antonio et al. (2009) define internal integration as processes within the company that aim to integrate internal functions in order to improve the performance of the corporation. It is not one specific process; it concerns activities and processes with intentions to improve information sharing, communication, coordination, and interaction across internal functions, particularly discussed within product development. However Corbett (1996) talk about integrating information systems into manufacturing, but also integration with suppliers and distributors. Rosenzweig et al. (2003) support integration within the supply chain and conclude that it lead to increased performance of competitive capabilities. Thatte et al. (2009) adds to this by stating that high level of information sharing will have increase the responsiveness of supplier network. According to Antonio et al. (2009) internal integration will improve product innovativeness, quality, delivery, flexibility, and customer service. Interaction between internal integration with product modularity will provide improvements in product quality and innovativeness capabilities. The complementary effect does not apply to capabilities related to low price, delivery, flexibility, and customer service.

*Alignment* is the fourth identified category for improvement actions and methods to increase performance. Alignment concerns having goals aligned to each another, whether they are inside or outside of the organization, and is mentioned by several authors as means to increase performance in various functions. However the function areas vary greatly. Avella and Vázquez-Bustelo (2010) highlight the positive effect on business performance by aligning manufacturing priorities and capabilities. Kathuria et al. (1999) and Joshi et al. (2003) stress the importance of alignment between general managers and manufacturing manager's priorities due to the proven positive effect on performance of the manufacturing unit. One way of increasing this alignment is through educating manufacturing managers (Kathuria et al., 1999). Azadegan et al. (2008) suggest that manufacturers should consider alignment between the company's own learning style and that of their suppliers, and that it can affect business performance. Vachon et al. (2009) discuss alignment related to the suppliers further; strategic decisions made by the company must include interaction with suppliers while at the same time being aligned with the competitive priorities. Building further on this, Kroes and Ghosh (2010) stress the importance of aligning competitive priorities of the firm with its drivers of outsourcing to increase the performance of the supply chain. Sarmiento et al. (2008) however, focus more on the importance of alignment between structural and infrastructural resources in order to achieve high performance.

The use of *production methods* and *advanced manufacturing technology (AMT)* is the fifth improvement category identified. It consists of actions and method presented in the literature. These vary from specific actions to overall approaches. Laosirihongthong and Dangayach (2005), Cagliano and Spina (2000), Carpinetti and Martins (2001), Dangayach and Deshmukh (2001), and Corbett (1996) all present different AMT concepts and tools for increasing performance of various capabilities. A selection of these is CAM/CAD for increasing product range and decreasing unit cost. Design for Assembly and Design for Manufacturing may be used to decrease unit cost, increase speed of new product development, and increase product range. Quality capabilities like conformance can be improved by using supplier qualification and quality assurance systems. MRP can improve deliveries, and reduce inventory cost, while JIT decrease lead-time and further strengthen dependability of delivery. The use of TQM may improve low manufacturing cost and increase quality, while investments in flexible manufacturing systems improve volume and mix flexibility (Cai & Yang, 2014). Drohomerecki et al. (2014) propose a more general approach to improving competitive priorities. Deploying Kaizen, Lean, Six Sigma or Lean Six Sigma increase the performance in priorities like quality and delivery. This approach is supported by Gelders et al. (1994) and Bengtsson (2008) talking about flow-oriented manufacturing, high utilization of resources and lowering inventory, reducing throughput time and rework/scrap. Using IT will also have a positive influence on performance (Cheng et al., 2014).

### **4.3 Summary**

In order to facilitate for the reader, this section concludes the systematic literature review chapter with a summary. Section 4.1 presented a descriptive analysis made from the papers included in this study. First the distribution of papers across the time period and journals, and then research methods were presented and analyzed. This was followed by an analysis of the distribution of the eight identified competitive priorities (cost, quality, delivery, flexibility, service, innovation, environmental protection, and people) and dynamic capabilities over time. Section 4.2 presented a content analysis including all literature on competitive priorities and capabilities found through the systematic literature review. This included presentation and analysis of the eight priorities and 25 capabilities identified along with identified articles. The findings were presented in form of a framework for competitive priorities and capabilities, see Table 6. In the end of the chapter the presentation and analysis of improvement actions and methods were presented. This included five improvement actions or methods found in literature See Table 16. These were; strategic alliances, product modularization, internal integration, alignment, and production methods/advanced manufacturing technology (AMT).

## 5 Case study

*This chapter presents the case study conducted. It starts with a company description introducing the context for the reader. It is followed by an analysis of the current competitive priorities and capabilities identified in the case company. The chapter finishes with future wished competitive priorities and capabilities.*

### 5.1 Company description

Company X is a manufacturing company founded in the 1930's, located in Sweden, and is part of a larger group consisting of other brands. The company has approximately 200 employees and a turnover of 500 million SEK. Company X manufactures fastening products, and are responsible for the entire process from R&D to manufacturing, marketing and distribution. The company is represented in over 120 countries worldwide, including countries in Europe, Africa, Asia and North America. The company has manufacturing and distribution centers located in Sweden, France, and China, and three different distribution centers in Sweden, France, and Germany. The facility in Sweden is mainly sending products to customers outside the EU.

The company does not have any specific strategy on where products are placed for production; however, factors that affect the decisions are either volume, technology or politics. The company uses a set of key performance indicators to measure the performance, including delivery precision, productivity, tied up capital and inventory turnover. The company aims to be the leading supplier in the world of quality fastening product and their values stands for tradition, design, innovation, high quality, satisfied customers and competence.

Most of the company's suppliers are located within an hour from the manufacturing facility, while the majority of the material value such as steel is brought in from further away. Their company is divided and organized into three main business areas: office products, tools and integrated solutions. The product segments provides solutions for fixation and hole-punching for both professionals and "do-it-yourself"-customers.

### 5.2 Existing competitive priorities and capabilities

Company X does not have any outspoken manufacturing strategy; their production goals are instead formulated through the company's Kaizen-process. Thus the company does not have any clear outspoken competitive priorities either, and the competitive capabilities are the results of historical decisions, rather than through conscious decision-making. Through the interviews performed with the employees, three existing competitive priorities have been identified: *quality*, *delivery*, *flexibility*, *service*, and *cost*. In addition to this, three desired competitive priorities have been identified through future challenges and opportunities expressed by the employees: *service*, *innovation*, and *people*.

The current capabilities identified in the case study can be found in Table 17. Capabilities have been found within the competitive priorities of *cost*, *quality*, *flexibility*, *delivery*, and *service*. The table only presents those capabilities that the company currently has.

Table 17. Existing priorities and capabilities

Priorities and capabilities	Existing capabilities
<b>Cost</b>	
<i>Low price</i>	No focus on lowering cost, but express that the prices of their products cannot be too high
<i>High resource utilization</i>	Lowering of overhead costs by reducing the number of employees
<b>Quality</b>	
<i>Conformance quality</i>	Able to manufacture products with a consistent level of quality
<i>Reliable products</i>	Manufactures products that is reliable and can withstand rough conditions
<b>Flexibility</b>	
<i>Volume flexibility</i>	Able to manufacture low and high volumes
<i>Mix flexibility</i>	Able to change mix rapidly due to short changeover times
<i>Broad product line</i>	Provide products in different price segments
<b>Delivery</b>	
<i>Delivery dependability</i>	High focus on accurate delivery
<i>Delivery speed</i>	Quick response to orders
<b>Service</b>	
<i>Broad distribution</i>	Distribution in over 120 countries

### 5.2.1 Cost

Company X does consider cost as a competitive priority. The company has products within lower price-segments, but these are still more expensive compared to competitors' products in the same category. The company does however consider cost to some extent, since if the products become too costly and the price is too high, the customer will choose a competitor's product instead. The main reason that the company does not compete on cost is that the cost of man-hours is higher in Sweden. Here they cannot compete with the low cost countries, even though it is said that machinery for production, and materials are not much more expensive than in China. Since they need a semi-automated production to cope with small orders and demanded volume and mix flexibility from customers, they cannot automate it to such an extent needed for reducing the amount of man-hours. The company have been trying to reduce costs by utilizing their resources more efficiently. This have been done by reducing the number of staff. This has been done in order to increase the efficiency per full time employee.

### 5.2.2 Quality

Quality is a determining factor to why a customer chose to buy products from Company X: their product brand stands for reliability. The brand name, together with the term "Made in Sweden" is factors that customers associates with superior quality. Without these aspects, the company would most likely not be able to manufacture and deliver the products from Sweden. The customer purchase products that rarely breaks and maintain good quality throughout the entire product life cycle. The company is able to manufacture products that offer a consistent quality according to customer, although they express that there are times when quality fails. They also manufacture products which, compared to many competitors has a longer life cycle and can maintain good function even when being exposed to rough condition. As an example, tools that are being frequently used will wear

out at some point. Their tools could be dropped from high altitudes, being exposed to different fluids and being handled recklessly, and still function as intended. Competing brands that sell for a much cheaper price might last for a couple of weeks while products from Company X could last for several months. The company does, however, state that they do not actively work on improving the quality of their products, and that quality was more emphasized earlier. The company has made rationalizations that affect the product development department and especially the production development. There are concerns that quality will decline due to this or that companies in other countries will outcompete them with both high quality and low costs.

### **5.2.3 Flexibility**

Another competitive priority that is frequently being mentioned by employees is to achieve higher flexibility. The company is working hard with achieving high volume flexibility, which means to be able to deliver products to the customer with a short lead-time in high or low volumes. Some employees believe that abilities in handling smaller volumes, and adjusting production with appropriate levels of automation and smart solutions, are factors for having a competitive advantage. The company has been continuously working with reducing their changeover time, thereby being able to achieve higher volume flexibility within manufacturing. Lower changeover times result in being able to produce small batches, and if a large customer order arrives they can ramp up their production. They are thus able to react more rapidly to variation in customer orders while maintaining or lowering inventory. The company also offers products in different price segments for both “do-it-yourself” customers and professionals, thus offering a broad product range.

### **5.2.4 Delivery**

Earlier delivery time or dependability were not considered a priority for the company. However, nowadays delivery is being described as one of the most important criteria's when winning customer orders. This makes delivery one of the current highest priorities. The company has customers that are spread globally around the world, with a large market being located in Europe. Being able to deliver to customers fast and on time is highly valued. The company describes that it is important to be able to deliver fast and on time because their customers too have short lead-times. This means that they are dependent on being able to access the products they need, when they need them.

Delivery speed is a factor Company X has been working to improve. Increasing delivery speed will probably result in increased competitiveness. The main mean of improving speed has been to reduce changeover time in the manufacturing processes. Since the company is working to reduce the batch sizes to be able to deliver smaller orders, a long changeover time could lead to shortage of material in manufacturing. The company has successfully been able to reduce the changeover time in a pressing area from about 120-130 minutes to below ten minutes. Being able to manufacture products faster means they can deliver their products on a shorter notice and with more accuracy.

### 5.3 Future competitive priorities and capabilities

In addition to the current competitive priorities and capabilities of cost, quality, flexibility, and delivery, three additional desired priorities have been identified through future challenges and opportunities expressed by the interviewees. These are *service*, *innovation*, and *people*, as could be seen Table 18.

Table 18. Wished or needed priorities and capabilities

Priorities and capabilities	Future capabilities
<b>Cost</b>	
<i>Low manufacturing cost</i>	Use design for assembly to ease assembly and reduce manufacturing costs
<i>Low inventory cost</i>	Reduce inventory level further
<i>Low price</i>	No focus on lowering cost, but express that the prices of their products cannot be too high
<i>High resource utilization</i>	Lower overhead costs by increase efficiency in internal flows and work tasks
<b>Quality</b>	
<i>Conformance quality</i>	Able to manufacture products with a consistent level of quality
<i>Reliable products</i>	Manufactures products that is reliable and can withstand rough conditions
<i>Product performance</i>	Integrate more electronics into the products
<b>Flexibility</b>	
<i>Volume flexibility</i>	Able to manufacture low and high volumes, working to further increase volume flexibility
<i>Mix flexibility</i>	Able to change mix rapidly due to short changeover times, working to increase mix flexibility further
<i>Broad product line</i>	Provide products in different price segments, continuously
<b>Delivery</b>	
<i>Delivery dependability</i>	High focus on accurate delivery
<i>Delivery speed</i>	Quick response to orders
<b>Service</b>	
<i>Advertising</i>	Improvements in marketing of products
<i>Broad distribution</i>	Provide products in over 120 countries all over the world
<b>Innovation</b>	
<i>Innovation in product or service</i>	Importance of new product development
<b>People</b>	
<i>Knowledge</i>	Accessing the right competence from the labor market
<i>Collaboration</i>	Internal integration between production and product development, and improve supplier relationships

The table presents those priorities that the company expresses a wish or need for in the future, in addition to those already presented in Table 17. A shorter explanation is included. The information from the interviews is presented below structured in accordance to corresponding priorities.

### **5.3.1 Cost**

In the future, there are several aspects related to cost that has to be considered for Company X. It is mentioned that the single most important factor that prevent the company from competing with the Chinese is the fact that man-hours cost much more in high cost environments like Sweden. In Sweden they cannot compete with the low cost countries regarding manufacturing, even though they state that machinery for production, and materials are not much more expensive than in China. In Sweden, compared to China, it is needed to have a semi-automated production since they have to cope with smaller orders and varying product demand from customers, which require operators. Therefore the challenge lie in finding a successful combination between man-hours needed and the flexibility demanded from customers to achieve as low costs as possible for production. This will be essential for moving production back home. One related possibility to this is improving cost performance concerning the existing and future products. One of the employees sees possibilities to decrease the production costs by using Design for Assembly. Making products easier to assemble, and by this decrease the man-hours needed, will result in lower costs per product. They believe this could be achieved through putting more functions into every part, and by that decrease the number of parts needed for a complete product. It is further expressed that possibilities for reuse of materials in the production and thereby make savings on materials cost.

A large challenge for the company also lies in dealing with its customers and the company itself, which focus on having a minimal number of products in stock to reduce inventory costs. In addition to this there are opportunities for the company to overlook the internal flow within the plant. This concerns the material flow, like transports with trucks, manual tasks and movements. This could be organized in other ways that require less transportation and thereby save time and utilizing their resources better. Another critical factor is to be able to keep production in Sweden or move outsourced production back. A possible way to achieve this is to redesign older product that is made in China and to make it more suitable to be produced by existing resources in Sweden. By doing this it can hopefully be manufactured cheaper in Sweden and therefore create possibility of reshoring. This does obviously provide large possibilities for the future of Company X, however it will require investments in the existing plant.

### **5.3.2 Quality**

A large challenge that Company X is facing is the dismissing of employees that has occurred during the last couple of years. Different departments have been reduced to fewer employees doing the same job as several did earlier. This is done in order to increase the efficiency that is measured per full time employee. This leads to several issues for the remaining staff and the company in general. The company believes the focus on quality and improvement of production is suffering from these actions. This can present major challenges for the company in the future and is already causing some quality-related issues in production. Another quality related is the existing possibilities in increasing the product range. It is believed that there are opportunities in extending the range of products so that customers do not have to work with different suppliers, thus becoming more attractive when they are looking for complete solutions. Additionally, more electronics integrated into these products can increase product performance further.

### **5.3.3 Flexibility**

Automation is one of the toughest challenges that the company is facing. As mentioned earlier, it is related to cost, but also to flexibility. A high degree of automation is needed to

compete with the Chinese in production costs. However, this is expensive and not something affordable and there are also other downsides with high degree of automation. It decreases the flexibility of the production in terms of volume and mix. Company X is now working with smaller volumes orders than earlier, and it requires a lot of changeovers. These two things are more or less contradicting each other presenting a dilemma involving both challenges and opportunities. Additionally, there is a need for constant work with development of the production so that the Chinese will not outcompete them. This means that the company must actively work with the development of their production, but increasing the automation level may not be the right option. Therefore they must actively search for other ways to increase competitiveness of their production. Another topic addressed is to broaden their product line. It is believed that the professional segment is where the opportunities are located. The company could also improve by using special offers on products along with accessories to increase competitiveness.

#### **5.3.4 Service**

The dynamic nature of the market presents opportunities for Company X. It is mentioned that the company and its employees must be positive to changes: the market changes no matter how they react to it. They can tie up new customers by increasing their focus on advertisement and become more successful in reaching out to customers. Markets are often dynamic and the markets for some of the company's products are decreasing, and they cannot see that it will increase in the future. Therefore the focus may have to change and development of the product portfolio has to be developed. Thus there is a need to increase their understanding of the different types of customers and their needs. It is mentioned that close cooperation with customers can present new opportunities in terms of greater understanding and deeper knowledge to be used in product development and reaching new markets.

#### **5.3.5 Innovation**

One critical factor for success in the future for the company is the importance of developing new products. There is a continuous demand for new technology and solutions that can open up new possibilities. Being one of the first actors with new products on the market is of immense importance for the company. The ability to achieve this gives the possibility to take market shares before other actors. One example is a new stapler that the company has created a patent for. It is of great importance to be able to act in frontline of technology for a company like Company X. Another example is that there is a need to see their tools business area as more than fixation tools.

#### **5.3.6 People**

One topic that could be critical for the company is the connections between product development and production. During development phases and industrialization of new products there is large possibilities for increased efficiency and effectiveness in the internal integration, which in turn will result in better processes. This can contribute to lower costs as well as better quality and increase the competitiveness of Company X. Access to the right competence on the labor market is another challenge. Educations for technical workshop roles are diminishing. There is a concern for problems with finding younger individuals with competence in tool making, but they are often very good at tasks involving automation. Although, compared to other countries, the company's operators are highly educated. Having access to the right people possessing the right knowledge will be crucial for competitive manufacturing. Concerns regarding the suppliers are expressed by the company. Earlier they ordered larger quantities and stored it in their facilities but nowadays

when the tied up capital is supposed to be lower, the size of the orders have decreased. This has resulted in a situation where some suppliers are unwilling to cope with the demands of smaller frequently delivered orders. It has also lead to an increased demand of getting the material at the right time, in right amount, and at right quality since stock levels are lower than before. This presents challenges in form of developing relationships with their suppliers that there was no need for earlier. This means that close collaboration across organization boundaries will be a success factor as well as an opportunity in the future.

## **5.4 Improvement actions and methods**

Company X does not have any specific, outspoken manufacturing strategy. The company formulates their strategic goals through the company's Kaizen-process. This, and to some extent lean practices, are the main improvement methods that the company utilizes.

Kaizen is the company's main tool for short-term improvements that they continuously work with. The company currently only works with Kaizen in the production but have plans to extend their practices to other departments in the future. Since they do not have any specific production strategy, the company has chosen to formulate their goals within the Kaizen-process. The process have its starting point within the improvements that has to be done within the upcoming year, which in turn is tightly connected to the company goals and what needs to be delivered. The process is formulated and finalized at the end of the year, normally in November or December, and its scope reaches the entire upcoming year. The company makes decisions regarding how many events they should initiate, what the general goals are and who should be involved. The events are distributed over the year, but the exact agenda is not initially set, instead the company adjusts it according to different problems or improvements that occur during the time. The company gets the help of consultants from Japan and also Kaizen gurus to improve their Kaizen-process. Therefore these activities have to be adjusted according to when these consultants' visits, and internal events will be planned to other weeks. The specific goals with each event is decided by the employees in production in cooperation with production management and is based on what they believe is a problem, what they need help with or what they think could be improved. The Kaizen-process is documented so the company can review the changes that have been made.

The other improvement method that the company has been working with is Lean and 5S. The company has been continuously working with Lean (since a previous change of ownership) and is documented within the company's policy documents set. The company had earlier to some extent been working with Lean in terms of using Kanban in the production, but the attempts had been unsuccessful. A reintroduction of Kanban was proven to be successful, and at this point employees from production requests it to be applied on more areas as they see the benefits. Approximately 50%-60% of inbound material to the factory is ordered by Kanban. They also have a lot of consignment stocks, in which they only pay for what they pick of the shelves. The company is working to implement one-piece flow as much as possible at some of the processes in production, mainly within assembly.

## **5.5 Summary**

In order to facilitate for the reader, this section summarize the case study findings. Section 5.2 presented the existing priorities and capabilities found at the case company. The identified priorities included cost, quality, flexibility, delivery and service. Within these priorities ten different capabilities were identified, see **Table 17**. These priorities and

capabilities were classified as existing due to the fact that the company expressed that they either had them to a certain degree, or they were currently working on achieving them.

Section 5.3 presented the future priorities and capabilities found at the case company. The identified priorities included cost, quality, flexibility, delivery, service, innovation and people. Within these priorities 17 capabilities were identified, see **Table 18**. These priorities and capabilities were classified as wished or needed capabilities since the company either expressed a wish to develop these further, or expressed challenges and opportunities that could be related to the stated priorities and capabilities.

The company works with certain improvement actions or methods. The main tool for improvements are their Kaizen-process. The Kaizen-process spans an entire year with a certain number of events, and the company adjusts the content of these events continuously according to what is needed at the time. The goal with each event is decided by the employees, and the company get the help of consultants and Kaizen-gurus from Japan. In addition to Kaizen, the company is working with Lean at an overall level. The main tools (except Kaizen, which is used at a larger extent) the company use is 5S and Kanban. The company is working to increase the amount of material ordered by Kanban, and also to implement one-piece flow in the production.

## 6 Analysis

This chapter presents an analysis of the findings in both the systematic literature review and the case study conducted at Company X. Starting with an introduction, followed by an analysis of each competitive priority and capability. The chapter ends summarizing analysis.

### 6.1 Introduction

By conducting and analyzing the systematic literature review and case study a set of priorities and capabilities were identified. These are presented in Table 19.

Table 19. Analysis of priorities and capabilities

Systematic literature review	Case study findings
<b>Cost</b>	
1. Low manufacturing cost	Use design for assembly to ease assembly and reduce manufacturing costs (W)
2. Low inventory cost	Reduce inventory level (W)
3. Low price	No focus on lowering cost, but express that the prices of their products cannot be too high (E) Lowering of overhead costs by reducing the number of employees (E)
4. High resource utilization	Lower overhead costs by increase efficiency in internal flows and work tasks (W)
<b>Quality</b>	
5. Conformance quality	Able to manufacture products with a consistent level of quality (E)
6. Reliable products	Manufactures products that is reliable and can withstand rough conditions (E)
7. Product performance	Integrate more electronics into the products
<b>Flexibility</b>	
8. Volume flexibility	Able to manufacture low and high volumes, working to further increase volume flexibility (E)
10. Mix flexibility	Able to change mix rapidly due to short changeover times, working to increase mix flexibility further (E)
11. Design flexibility	-
13. Broad product line	Provide products in different price segments, continuously (E)
<b>Delivery</b>	
14. Delivery dependability	High focus on accurate delivery (E)
15. Delivery speed	Quick response to orders (E)
<b>Service</b>	
16. Customer service	-
17. After-sale service	-
18. Advertising	Improvements in marketing of products (W)
19. Broad distribution	Distribution in over 120 countries (E)
<b>Innovation</b>	
20. Innovation in product or service	Importance of new product development (W)
21. Innovation in process	-
<b>Environmental protection</b>	
22. Environmental friendly products	-
23. Environmental friendly processes	-
<b>People</b>	
24. Knowledge	Accessing the right competence from the labor market (W)
25. Collaboration	Internal integration between production and product development, and improve supplier relationships (W)

Note: (E) = existing capabilities, (W) = wished capabilities

These priorities and capabilities could be considered critical for companies in a high cost environment. The left column present the priorities and capabilities defined from the literature, while the right column show those identified in the case company. Not every priority and capability identified in the literature was found in the case company. However, the majority could be identified as either existing or wished priorities or capabilities. A number of improvement actions have been identified in the literature and the case study. These improvements are presented in Table 20.

Table 20. Analysis of improvement actions

Systematic literature review	Case study
<i>Strategic alliances</i>	Wish to increase their collaboration with suppliers
<i>Product modularity</i>	Wish to have more function within fewer parts
<i>Internal integration</i>	Wish to increase the integration between product development and production
<i>Alignment</i>	-
<i>Production methods/Advanced manufacturing technology (AMT)</i>	Works with Lean and Kaizen

As the table shows, not every identified improvement action in the literature was identified during the case study. Improvement actions not identified might still exist to some extent but was not expressed by any interviewees. A deeper analysis of each improvement action is presented in section 6.3.

## 6.2 Competitive priorities and capabilities

The following section presents the analysis of the competitive priorities and capabilities related to the first research question. These include cost, quality, flexibility, delivery, service, innovation, environmental protection, people, and dynamic capabilities. Each of these will be analyzed based on literature and the case study, then discussed in relation to each other.

### 6.2.1 Cost

In the literature review cost was identified as a key competitive priority. The priority was defined as the ability to manufacture and distribute products or services at a lower cost than the competition. Competitive capabilities related to the cost priority were identified as *low manufacturing cost*, *low inventory cost*, *low price*, and *high resource utilization*. Low manufacturing cost has been defined as the ability to manufacture products with low material and overhead costs. Low inventory cost has been defined as the ability to keep low inventories, thus reducing costs related to inventory. Low price has been defined as the ability to compete based on low prices compared to the competition. High resource utilization has been defined as the ability to utilize resources in the form of processes, capacity, and people with maximum efficiency. It was found that companies who compete on cost are able to be more responsive to price-fluctuations on the market and have higher margins.

The case company does not stress cost as a competitive priority. Even so, low manufacturing cost, low inventory cost, low price and high resource utilization were still identified as capabilities related to the cost priority, at least to a certain extent. The company does not actively compete based on low price (although they have products within a lower budget segment), but still have to remain at certain prices or the customer will buy something else. Thus it could be considered to be an order qualifier for the company. They also point out that they wish to reduce inventory levels and design products

that are easier to produce, thus lowering the amount of time needed for assembly and the cost for labor. This goes in line with the literature, where it is stated that although a company does not compete mainly on low prices, they are still concerned about cost to some extent (Chi, 2010; Ward et al., 1998). High resource utilization could be identified as both an existing and wished capability. Currently they have high resource utilization due to reduction in employees. They are measuring efficiency by full time employee, thus being able to lower overhead costs. The company also wishes to further increase their resource utilization by improving the internal flow through reduction of transports, movement and manual tasks. This goes in line with the company's work with Lean and Kaizen. The company points out an important factor to why it is hard to compete based on cost when operating in a high cost environment: expensive labor costs. In today's global market it is possible to purchase machines and materials to similar costs independent on where you are. The main difference between companies in a high cost environment, in comparison to low cost environments, is that the average pay differs a lot. This means that unless the company is able to automate the production to some extent it will be difficult to achieve the same level of cost.

In general there seems to be some match between the literature and the case presented. The company does not manufacture and distributes products that could be considered low price products, and they do not consider cost to be an important factor on which they compete. Still they are concerned with cost and cost control to a certain degree. In order for manufacturing to remain within Sweden it could be important to keep cost to a minimum, although it may not be the most critical competitive priority for manufacturing in a high cost environment.

### **6.2.2 Quality**

In the literature review the authors has been agreeing on that quality is considered as one of the competitive priorities. Related to quality as a priority a number of capabilities was identified. As there is such a large variety of different capabilities mentioned, some with similar meaning, a set of three capabilities was decided suitable to be included. These capabilities were *conformance quality*, *reliable products*, and *product performance*. Conformance quality is defined in this study as the ability of the company to manufacture products of consistent quality of products all the time, which is including low defect rates, high quality processes, and manufacturing according to design specifications. Reliable products is the ability to supply the market with products that are durable and that customers can rely upon when used. Product performance includes offering products that are high performers in terms of included features, functions, aesthetics, and technology. These three capabilities of quality are considered to cover the quality priority and the abilities that different companies may possess.

At the case company a certain concern regarding the quality priority is expressed. Quality is the determining factor to why customers are choosing them and their products. The brand stands for reliability providing customers with a product that rarely break and maintain good quality throughout the entire product life cycle. The products are also marked with "Made in Sweden" is seen as a quality stamp, which place further importance on quality as one of their priorities, which in turn requires a set of capabilities supporting this. This goes in line with Zhao et al. (2002) stating that quality is without a doubt a very important aspect in the global competitive environment of today. Quality could be considered as an order qualifier for Company X, as it is required for the customer to even consider their products. However, even though the importance of quality is well known, the company does not actively work with quality management. This is due to rationalizations made to improve productivity, which has reduced the number of

employees working with quality related issues. The concerns regarding future quality issues and being outcompeted by other countries are well motivated. Zhao et al. (2002) state that organizations who do not focus on quality face increasing threat of losing market shares, which in turn would result in decreased profits for the company and increase the need for outsourcing the production.

Conformance quality can be identified as one of the existing capabilities in the case company. They are able to offer products with consistent quality under their brand name, even though there have a lower quality focus than earlier. According to Ward et al. (2011), a high level of conformance quality is the most essential capability a manufacturer can possess and it is necessary before a manufacturer can pursue cost or delivery advantages. This explains the concerns for quality issues in the future. Unstable quality levels can cause problems with defects and rework negatively affecting other priorities, which point towards a need for the case company to keep working with this capability in the future. Reliable products is the second capability that can be easily identified as existing in the case company. The company contribute to the market with products that has a long life cycle and can maintain good function even when used in rough conditions. This is essential when providing tools to especially the professional customer group. The products offered by the company are more expensive than certain competitors, however their durability is higher, which is required to justify a higher price. A third capability, product performance was identified in the literature. This was identified at the case company as well, although as a future capability that may be needed. They expressed a focus on having their products performing well, which are more related to reliability such as always functioning when needed. But they also mention including more electronics into these products, which would then increase performance further. Besides this, there was no expressed focus on functions, aesthetics, technology, and features that make their products stand out from competitors. This could be due to the business they are acting in, the importance of fixation equipment always working when bought and needed by the customers may be more important than providing extra functions. The data on quality found in the literature review corresponds well to what is found in the case company. However, what business a company act in may determine what quality capabilities that they develop or need to be competitive on the market.

### **6.2.3 Flexibility**

Flexibility was identified as one out of four key competitive priorities in the literature review. Different authors have different opinions on how to define flexibility. Some definitions provided by the literature includes among others the ability to responsive to changes in production or product design, the ability to react to changes with little penalty in terms of time, effort, cost or performance, or the ability to perform different tasks and achieve different objectives with the same set of resources. It was found that firms who compete on flexibility are able to deal with uncertainties in both production and products, and are able to quickly respond to changes in emerging markets. Four different competitive capabilities were identified related to flexibility: *volume flexibility*, *mix flexibility*, *design flexibility* and *broad product line*. Volume flexibility refers to the ability to quickly adjust production volume according to customer demand. Mix flexibility refers to the ability to efficiently switch between producing different products without penalty in cost or performance. Design flexibility refers to the ability to make rapid changes in product design, functions or features. Broad product line refers to the ability to provide a wide set of products.

In the case study it was found that the company is working hard to achieve higher flexibility in their manufacturing processes. Volume flexibility, mix flexibility and broad product line was possible to identify as competitive capabilities. The main focus is on improving volume

flexibility, thus being able to handle both high and low volumes with reasonable resources. This is in line with literature, where Rodriguez et al. (2013) states that an organization with high flexibility can react to changes with little penalty in time, effort, cost or performance. Excelling in handling smaller volumes are a factor for competitive advantage, and will become more important in the future. Thus flexibility could be considered an order winner, a reason that customer chose their products over the competition. The company is continuously working with reducing changeover time in order to increase volume flexibility, but also to increase mix flexibility. The company discusses the opportunity to introduce higher level of automation in order to be able to compete with the Asian market in terms of cost, but could have negative effects on flexibility in terms of volume and mix flexibility. Finally it is believes that the company should work to broaden their product line, in order to gain advantages in new market areas.

The competitive capability of design flexibility was not possible to be identified within the case company. It is possible, due to the characteristics of their products, that the ability to make rapid changes in the design is not considered necessary. Another possibility could be that there already is a wide variety of different functions and quality to choose from by having a broad product line, the customers does not require making additional changes. There seems to be a high match between the competitive priorities and capabilities that have been identified in the literature, and the priorities and capabilities identified in the presented case. The only exception would be the competitive capability of design flexibility, which has been discussed earlier. In general it seems that flexibility could be a key factor for competitive manufacturing within a high cost environment.

#### **6.2.4 Delivery**

In the literature review delivery was identified as one of the key competitive priorities. However, in literature delivery is mentioned under several different terms such as speed, time, and dependability amongst others. These are most often used interchangeably; they are not mentioned together. From the findings of the literature study, *delivery speed* and *delivery dependability* was identified as competitive capabilities Delivery speed is defined as the ability to respond and deliver products or services faster than competition, while delivery dependability refers to the ability to delivery on requested and promised time. According to Szász and Demeter (2014), a firm can have slow delivery system while still delivering on requested and promised time. Therefore it was necessary to separate these two abilities.

In the case study it was found that the company considered delivery as their most important priority, this was due to the fact that it was considered as a factor for winning customer orders. For the case company, who has customers all around the world, being able to deliver fast and on time is highly valued, and a necessity for competitiveness in the market. To be able to just deliver on time is nowadays often not enough, customers also want fast deliveries (Alsmadi et al., 2011; Zhao et al., 2002). Delivery speed was easily identified as an existing capability within the case company, there was an expressed effort put into increasing this. This was mainly done by reducing lead-time of products. This in turn has increased the accuracy of the case company's deliveries, which made it possible to identify delivery dependability as an existing capability. In general the findings from the systematic literature study and the case study corresponds well. The identified delivery priority existed in the case company together with the competitive capabilities, which further strengthen the relevance of choosing these two specific capabilities. The company has an expressed focus on both delivery speed and delivery dependability. This implies that this is an important part for the company in their struggle to be as competitive as possible on the market. Although they do not express any concern for delivery in the future, there

is no question about this being something that they have to keep improving. With their location in Sweden, they have an advantage compared to China in their location closer to certain market.

### 6.2.5 Service

Service was identified as a key competitive priority, although it was not mentioned as often as the other four competitive priorities of cost, quality, flexibility and delivery. *Figure 10* shows that although service has been identified as a competitive priority since at least 1996, it has not been generally accepted as such. Service was defined as the connection between the manufacturing function within a company and the customers, which was supported by Corbett (1996). Service as a priority is stated to become more important for two reasons: increased demands from customers, and that the borders between product and service is becoming less distinct. It was found that some companies are moving from producing products to providing service instead (Lin et al., 2012). Four competitive capabilities were defined related to service: *Customer service*, *after-sale service*, *advertising* and *broad distribution*. Customer service was defined as all service provided to the customer before purchase. After-sale service was defined as all service provided to the customer after purchase. Advertising was defined as the ability to promote and market a product or service. Broad distribution was defined as the ability to provide the products or service to a large market.

The company does not currently put any focus on the competitive priority of service, with the exception of the competitive capability broad distribution. It is important to point out that this does not mean that they do not have any service-related capabilities or does not value service, it just means that they do not consider it as a highly competitive factor. Broad distribution could be identified as a current competitive capability due to the company being present in over 120 different countries all over the world. Instead it was possible to identify some areas that they wish to improve or put more focus on further on, thus relating them to service. The company has to tie up new customers by focusing more on marketing and advertising to reach more customers, which can be related to the competitive capability advertisement. The company express certain worries about the market for some products decreasing, thus another factor is to increase their understanding of each individual customer in order to better respond to their needs and requirements, information and knowledge that can be used within product development, among others. This indicates that they want to put more focus on the competitive capability customer service. The competitive capability after-sale service was not possible to identify within the case company. The company are surely concerned with service of their products, however it is possible that the company does not consider this as a competitive priority.

There seems to be a bit of a mismatch between literature and the case presented, with one exception. The company does not consider service as a competitive priority at all, and the desired capabilities are not clearly stated. Instead was able to identify the capabilities by different challenges and opportunities. This could imply that service is neglected as a key competitive priority in both literature and by manufacturing companies.

### 6.2.6 Innovation

Similar to service, innovation has been considered as a key competitive priority by many authors in addition to the four key competitive priorities of cost, quality, flexibility and delivery. As can be seen in *Figure 10*, innovation has been discussed in literature as early as 1992, not long before service was introduced among articles included in the literature. The main difference is that, compared to service, innovation has been included in literature quite extensively, especially after year 2000. This could be an indication that innovation

have been generally more accepted as a competitive priority in literature than service, and believed to have higher importance. Although innovation seems to have gained more popularity, there is little consensus on an exact definition. The general definition seems to be a company's ability to generate new ideas and introduce new products or processes, and these innovations can be either radical or incremental (Crowe & Brennan, 2007). It was found that companies who frequently innovate are able to better match their customer demands, and may differentiate themselves from the competition (Koufteros et al., 2002; Krause et al., 2001; Zheng et al., 2011). Thus a company should encourage continuous improvement in innovation, or they could risk losing their position in the market to new entrants (Soosay & Hyland, 2008; Nair & Boulton, 2008). Competitive capabilities identified related to innovation was defined as *innovation in products or service* and *innovation in processes*. Innovation in product or service refers to the ability to develop new technologies within product or service design. Innovation in processes refers to the ability to develop new production processes. Some authors defined one additional capability within innovation, defined as technology, but this was not set as a separate capability within the thesis as it is included in the previously mentioned capabilities.

In the case it was found that the company does not consider innovation to be a competitive priority. Innovation in products or service, or innovation in processes was not something the company currently pursues. The factory located in Sweden is responsible for R&D and manufacturing, thus they develop new products or improve current products. It could therefore be stated that they have the competitive capability innovation in products, at least in an incremental scale. The developing of new products will be an important factor for future success. The company states that the demand for new technology and solutions could open up new opportunities. This could be linked to a desire to be both innovative in product or service and innovative in processes. Thus there are some indications that innovation, as a competitive priority, will have more value in the future.

There seems to be a match between the literature and the case presented. Innovation has previously been rather unrecognized by the case company, which goes in line with what the literature states. On the other hand, considering that the interest in innovation has increased in literature quite much since the beginning of the 21<sup>st</sup> century, and that the case company have showed tendencies to put more focus on innovation in the future, it can be stated that innovation as a competitive priority has become more critical. As previously mentioned, companies who does not adapt to new technologies risk losing market shares and could in the long perspective go out of business. Thus it is of importance for companies to ensure that they remain relevant within product, service and process technology.

### **6.2.7 Environmental protection**

Through the systematic literature study environmental protection could be identified as one of the competitive priorities. Studies were discussing different terms of environmental issues, however the most frequently mentioned one was environmental protection. This was thus chosen to represent this priority focusing on aspects related to setting up environmental goal concerning products and processes. This followed the recommendations by Avella and Vázquez-Bustelo (2010) to put increased attention into environmental topics. Through different dimensions mentioned two capabilities could be identified representing environmental friendly products, or processes. *Environmental friendly products* concerns supplying customers with products that have minimum impact on the environment, while *environmental friendly processes* concerns manufacturing products while minimizing the impact on the environment through waste, resource usage, energy consumption, and emissions. As could be seen the capabilities concern two aspects,

product and processes, which is considered to cover the environmental protection priority. This was strengthened further by Díaz-Garrido et al. (2011) which highlight the importance of considering products and production that respect the environment. In the case company however, no expressed focus on environmental factors were found. This does not necessarily mean that they have no focus on this; it could be that there are other priorities that require the attention. However, as the focus on environmental protection gains more attention in business, so will probably their awareness of this issue. Environmental protection is, as could be seen in *Figure 10*, is a priority that is discussed relatively little in literature. This therefore goes in line with the absence of expressed environmental focus in the case company.

### **6.2.8 People**

In the literature review seven different competitive priorities were identified that are more or less mentioned. In addition to these seven, an eighth competitive priority has been identified and defined as people. It was stated in literature that human resources has an impact on performance, but still has not received much attention within the literature. Thus people have been defined through the two competitive capabilities that have been identified: *knowledge* and *collaboration*. Knowledge is defined as a company's ability to collect, absorb and apply new knowledge. Knowledge can be transferred and exchanged both internally within the organization and externally between companies. Collaboration is defined as a company's ability to coordinate activities across functional and inter-organizational boundaries. Increased collaboration between organizations can reduce costs and uncertainties in the supply chain, but companies risk to fail in succeeding with collaboration due to factors such as conflicting and non-aligned goals, lack of trust or unwillingness to share important information.

The company does not currently put any focus on the competitive priority of people, not to the extent that has been defined within this thesis. The company does not work with any activities related to strategy-specific human resource management outside of any average activities within the function of human relations. They do, however, express certain concerns about finding people with the right competence and skills. The company has, in comparison to many other countries, employees that are highly educated. Even so, some skills such as tool making are hard to find in the labor market, especially when searching for younger individuals. Thus a future competitive capability that the company could need to put more focus on is knowledge. Having access to the right people at the right time will become crucial. Another topic expressed at the company is to increase the connections between product development and production, especially during the development and industrialization of new products. At the same time they express some concerns about suppliers who refuse to cope with the company's demand of smaller frequently delivery orders. Thus there is a need to improve the company's collaboration capability in order to better manage their suppliers. The company needs to improve their collaboration internally between different functions as well. By improving co-operation with the suppliers, the company can import external knowledge that could be valuable, which is supported by Chai et al. (2009).

People, as defined in this thesis, have not generally been accepted as a competitive priority until this point. The competitive capabilities of knowledge and collaboration have not been introduced within the literature until 2007, but gained some acknowledgement continuously since. Neither has the case company considered this as a determining factor for competitive success earlier, but expressed that this could become an important factor further on. Focusing on people in terms of developing knowledge, skills and experience, together with a higher collaboration and integration between departments and firms, are

becoming increasingly important. Thus it could be proposed that the competitive priority people will be an important factor to compete in a high cost environment.

### **6.2.9 Dynamic capabilities**

It was found that in addition to the competitive capabilities that had been described in literature, *dynamic capabilities* an additional capability existed on a higher strategic level. The definition mostly used within literature mainly referred to Teece et al. (1997), who stated that dynamic capabilities is a company's ability to adapt their resources to address changes within their environment. It differentiates itself from operational capabilities, which are defined as capabilities directed to convert input to output. The dimensions within dynamic capabilities are many and there is no general consensus, but the most common ones are sensing, seizing and reconfiguration (Teece et al., 1997). Sensing refers to the ability to discover opportunities and threats. Seizing refers to the ability to grasp opportunities. Reconfiguration refers to the ability to change assets accordingly. Dynamic capabilities were found to have an impact both directly on a strategic level and directly through the influence on operational capabilities.

The case company did not express that they consider dynamic capabilities at all. It could, however, be argued that they do possess some dynamic capabilities indirectly since they have been able to identify some opportunities and threats that will affect their future competitive priorities and capabilities. Thus they at least have the ability to sense some changes that occurs within their market environment. They have also been able to identify and improve some competitive capabilities that are needed in order to be competitive, such as increasing flexibility. Thus it can be argued that they have been able to seize some of the opportunities presented.

Considering that dynamic capabilities has not been discussed intensely in literature until 2008, when it gained increased attention that have continued since, it is not surprising that the case company is not aware of it as a strategic factor and has not pursued it yet. Although the company could be considered to indirectly and unconsciously have dynamic capabilities it is not enough to motivate a complete match between the literature and the case study. It is possible that the company will pick this up more extensively in the future in order to remain competitive.

## **6.3 Improvement actions and methods**

The following section presents the analysis of the concepts related to the second research question. Through the literature review a number of different improvement actions could be identified. These were *strategic alliances*, *product modularity*, *internal integration*, *alignment*, and *production methods / AMT*. Strategic alliances concerns exchanges between independent firms searching for mutual benefits for developing new products, processes, services, or technologies. This does, as indicated by using the term independent firms, mainly concern alliances across organization boundaries. However, these relationships may exist between firms belonging to same groups etc. Depending on how these alliances are organized (upstream, downstream, or horizontal) they may improve priorities and capabilities such as delivery in general, and speed and dependability in particular. The use of strategic alliances can also, according to authors like Fawcett et al. (2012), enable faster new product development, lower costs, and enhance quality amongst others. Product modularity concern the extent products and components are using modules, which are independent or separate, and the extent components are specific, transferable or

reusable within the production process. Using product modularity can help companies to cope with dynamic markets and fluctuations in demand. It can influence performance of important capabilities related to the delivery, flexibility and service priorities (Lau et al., 2007). Internal integration proposes that companies should integrate functions and activities within the firm to each other, and thereby increase the performance of these. This, in contrast to strategic alliances, concerns mainly internal functions of the firm. However information sharing, communication, and coordination, as mentioned by Antonio et al. (2009), could also exist over firm boundaries. The use of internal integration can improve the performance of quality, delivery, flexibility, innovativeness, and service. The alignment of priorities, capabilities, functions, and activities will also present performance improvements for firms that focus on this. Alignment may be considered as an obvious matter for many, however this is not often be the reality. Alignment can have positive effect on business performance (Avella & Vázquez-Bustelo, 2010), manufacturing units performance (Kathuria et al., 1999; Joshi et al. 2003), and supply chain performance (Vachon et al. 2009). However, alignment in contrast to the previously mentioned improvement actions and methods, does not specify certain priorities and capabilities that it increase the performance of and thereby business performance. Production methods and AMT concerns use of general approaches such as Lean and Six Sigma, but also more specific tools of AMT such as CAD/CAM, DFA, and DFM etc. These approaches and tools can be used by firms to increase the performance of certain priorities and capabilities, but also work as a way-of-working within the whole organization. Using specific tools like CAD/CAM may for example improve capabilities like broadening product range and decreasing product and production cost (Dangayach and Deshmukh, 2001), while using way-of-working like Lean and Six Sigma can improve priorities as quality and delivery (Drohomeretski, 2014). Applying these five improvement actions can help the organization to improve the priorities set and capabilities held, however they have to be adapted to fit the organizations goals and strategies.

In the case company it was identified that they are actively working with Kaizen, which stands for continuous improvements. This is accompanied by working with Lean to reduce waste and decrease unnecessary work that does not add any value to the products. Employees carry out the Kaizen work, but Japanese consultants and Kaizen gurus has also been used. A reintroduction of Kanban has also proven to be successful in the company. Beside these improvement actions identified, there were no other actions or methods pointed out by the company. This means that the match with research found in the literature is proven to be low when it comes to existing improvement work. The case company do apply production methods and AMT, as proposed as an improvement. What must also be taken into consideration is that the case company may not see actions such as strategic alliances and alignment as active improvement actions and methods due to their unspecific nature, and thereby not mentioned. However, when it comes to the future needs within priorities and capabilities of the company, strategic alliances, product modularity, and internal integration is mentioned. This provides evidence of the relevance of keeping these two actions and methods in this study.

## 6.4 Summary

In order to facilitate for the reader, this section summarize the analysis of the competitive priorities and capabilities. Section 6.2 has been analyzing competitive priorities and capabilities. This has been made in order to identify critical priorities and capabilities for achieving competitive manufacturing in the high cost environment of Sweden. Through the analysis of each priority and capability, it was found that cost, quality, flexibility, delivery, service, innovation, and people was either existing or wished priorities. Within these priorities 17 different capabilities could be found, also existing or wished (see Table 19). These capabilities included; Low manufacturing cost, low inventory cost, low price, high resource utilization, conformance quality, reliable products, product performance, volume flexibility, mix flexibility, broad product line, delivery dependability, delivery speed, advertising, broad distribution, innovation in product or service, knowledge, and collaboration. An analysis of this result shows that the framework created from the literature study is well supported by the empirical data found at the case company. The case company provided information that was possible to connect to the found literature, and thus creating a match in the framework. The priorities and capabilities identified at the case company are those that could be classified as critical for manufacturing in the high cost environment of Sweden.

There are differences identified between literature and empirical data collected in the high cost environment as well. Environmental protection was a priority not found at the case company, even though it is present in literature and following an increasing trend. This could imply that there is an increasing importance regarding environmental concerns as a priority among academics, but still disregarded as critical for manufacturing in a high cost environment. Further on, several capabilities were identified in literature but not in the case company. The results indicated that some capabilities such as product performance, design flexibility, some service related capabilities, and innovation in processes. This might be due to the competitive nature of Company X's business, but it could also indicate that these capabilities are less important for manufacturing in the high cost environment of Sweden. The concept of dynamic capabilities was identified during the systematic literature review. This concept does however refer more to a certain state that the competitive capabilities can be present in, and not to specific types of capabilities. There was no outspoken strategy to apply dynamic capabilities in the case company, however, as they are aware of future challenges and opportunities it could be argued that they are able to respond to changes in market to some extent. It could be explained due to that dynamic capabilities is mostly an academic concept that is not much researched, and not widely spread within the manufacturing industry. Manufacturing companies would more likely refer to dynamic capabilities as being 'responsive to changing environments', or similar terms.

Section 6.3 analyzed the improvement actions and methods identified in order to improve performance of the competitive priorities and capabilities. Five different improvement actions or methods was found and analyzed in relation to the empirical data gathered from the case study. The literature corresponded well with the empirical data and resulted in strategic alliances, product modularity, internal integration, and production methods/AMT being found present or wished in the company (see Table 20). Analyzing this result shows that literature on improvement actions and methods present data that is relevant for companies trying to improve certain priorities and capabilities.

## 7 Discussion and conclusions

*This chapter presents discussions concerning methods and findings. The chapter starts with a discussion of methods used to fulfill the purpose of the thesis. This is followed by a discussion of the results achieved and the strength and weaknesses of these. The validity and reliability of the study is discussed towards the end of the chapter.*

### 7.1 Result

Here, we discuss and explain the findings of this study, both theoretical and empirical in relation to the research question of this study. This will answer the purpose of the thesis.

1. What competitive priorities and capabilities are critical for competitive manufacturing in the high cost environment of Sweden?

With help of the extensive systematic literature review, a framework of competitive priorities and capabilities could be created. This included eight different priorities (cost, quality, flexibility, delivery, service, innovation, environmental protection, people), and 25 different capabilities within these (see Table 6). With the help of a case study including interviews at a Swedish manufacturing company, a set of existing priorities and capabilities could be identified, together with wished or needed priorities and capabilities for the future. The identified priorities and capabilities could be considered critical for achieving competitive manufacturing in the high cost environment of Sweden.

The priorities found critical for the case company was cost, quality, flexibility, delivery, service, innovation, and people. Under these priorities a set of capabilities, either existing or believed to be needed in the future was identified. These capabilities included low manufacturing cost, low inventory cost, and low price, conformance quality, reliable products, volume flexibility, mix flexibility, broad product line, delivery dependability, delivery speed, advertising, broad distribution, innovation in product or service, knowledge, and collaboration. In total, 17 out of 25 capabilities could be identified. These priorities and capabilities may be specific for the case company, or their business, or Sweden. However, they are the critical competitive priorities and capabilities that enable the case company to achieve competitive manufacturing in Sweden. The result implies that these priorities and capabilities are in fact critical for a company in order achieve competitive manufacturing in Sweden, however the specific set of capabilities could differ or may need to be adjusted depending on context.

Further, the result implies that the existing literature on competitive priorities and capabilities are relevant when put in a high cost environment. The majority of the parts in the created framework, which is based on the systematic literature review, were possible to identify at the case company. The one priority that was not possible to identify was environmental protection, however this does not necessarily mean that the company does not focus on the environment. This may just indicate that there is no outspoken environmental focus due to other important concerns. It is important to take into consideration that environmental aspects follow an increasing trend in competitive priorities and capabilities research and thus may get increased attention in the future. This result support both the relevance of the literature, as mentioned, but also the work conducted in this thesis.

2. How can companies in the high cost environment of Sweden improve the critical priorities and capabilities in order to increase the manufacturing performance?

In order to answer the second research question both the systematic literature review and the case study was applied. The systematic literature review revealed five different means of improving the critical competitive priorities and capabilities: strategic alliances, product modularity, internal integration, alignment, and production methods and advanced manufacturing technology. By utilizing these improvement actions companies can improve cost, quality, delivery, flexibility, service, innovation, and people. Any improvement actions related to environmental protection was not identified, but this was not classified as a critical competitive priority for manufacturing in a high cost environment.

The case company was found to be working mainly with Kaizen and Lean as means of improving their manufacturing. Their Kaizen process is formulated at the end of each year and spans for the upcoming year. The exact aim with the process is not initially set, but rather developed according to different problems or opportunities that arise. Continuous improvements through Lean are mostly carried out through the use of Kanban, of which approximately 50-60% of inbound material is ordered through. Other than these two methods there are not any additional improvement actions identified in the case. Interviewees do, however, express that product modularity, collaboration with suppliers and internal integration between departments are areas that the company could develop further. In order to remain competitive the company should investigate opportunities to improve these areas.

As some final concluding remarks, the purpose of this study was to identify the critical competitive priorities and capabilities that enable competitive manufacturing in Sweden and how they can be improved for increased manufacturing performance. A framework of competitive priorities and capabilities was developed through a systematic literature review, which then was applied to a case company in order to identify what priorities and capabilities could be considered critical for manufacturing in a high cost environment. The results imply that it is difficult for companies to isolate their competitive priorities to just a few, and they may change over time. It is therefore a rather complex concept that could be different depending on business area and environment. However, this study do confirm the relevance of competitive priorities and capabilities in the current literature, it defines what priorities and capabilities could be critical for manufacturing in a high cost environment and it identifies means to improve these. Thus the purpose of this thesis is considered to be fulfilled.

## **7.2 Implications**

This thesis makes a theoretical contribution to the literature on competitive priorities and capabilities in a high cost environment. The systematic literature review contributes by condensing and summarizing the existing literature in a structured and systematic manner. This provides an overview of the current state on the topic. The literature review also revealed that few articles used a combination of several methods, thus this thesis highlight the importance of using multiple methods within the area of competitive priorities and capabilities in order to make further developments. The review in combination with the case study conducted in a high cost environment provides a suitable starting point for further research by academics. Further, this thesis contributes to creating an understanding for practitioners in high cost environment regarding competitive priorities and capabilities that may be critical for their success on the market. In addition it shows how to improve the critical priorities and capabilities in order to increase manufacturing performance. Thus it contributes to create awareness among practitioners on what could become important

in the future. The study also contributes with social implications. It creates an understanding of what is of importance regarding manufacturing in high cost environment in order to be competitive there. An increased understanding of this topic could lead to reduced need of outsourcing, which in the long term will lead to more companies remaining in high cost environments. This could result in counteracting the reduction of employment in high cost environments and increase social welfare.

### **7.3 Limitations**

This thesis work is looking at what competitive priorities and capabilities that is critical in the high cost environment of Sweden. Further it identifies how these can be improved and proposes a set of actions and methods for this. However this research has a number of limitations. This research is looking at one single case study, which yields a limited amount of information. This in turn make it difficult to generalize the results of this study, additional case studies has to be performed in order to confirm the findings. Further this study does not treat how the proposed improvement actions and methods could or should be applied and used. This is due to that the extent of the research would be too large to handle. Additionally, the inclusion criteria used in the systematic literature review focused on competitive priorities and capabilities mainly and not on improvement actions and methods. This is motivated by the need to limit the extent of the research to create a good result.

### **7.4 Further research**

This study has made use of one case company located in Sweden, and is of explorative nature. To be able find support for the results and create possibility for generalization, further research should focus on conducting case studies in Sweden and other high cost environments. Further research should take into consideration how specific business areas, industries, and size of firms affect critical competitive priorities and capabilities, and what improvement actions and methods are suitable. Further research should also use combined methods to further develop the area of competitive priorities and capabilities. As this study has only focused on how companies can improve critical competitive priorities and capabilities in order to increase manufacturing performance, research should investigate how companies should implement and use the identified improvement actions.

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## Appendix

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