



**FACULTY OF ENGINEERING AND SUSTAINABLE  
DEVELOPMENT**

Impact of Critical Value Chain Activities on Product  
Performance in Process Industry—A Case Study of Korsnäs AB

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logistics

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# Summary

## Problem:

What are the most critical activities for process industry? Whether general view of impact of these value chain activities on product performance (quality, cost and innovation) applied to process industry? How do those activities impact to product performances? If they cannot affect product performance, what could be the reason behind it?

## Purpose:

This paper aims to conclude general view of impact of value chain activities on product performances (quality, cost and innovation). Accordingly we would create a conceptual model. And then test whether this model applies for process industry and further more figure out the reason behind through case study.

## Methodology:

In this paper, qualitative research is our approach. We choose single case study as research strategy and conduct three interviews. Documentation and interview data are collected and analyzed to provide theoretical framework and empirical evidence for the whole paper.

## Result:

Based on case study, and previous work, the model concerning impact of major activities for process industry (Marketing sales, Human Resource and Supplier management) on product performances (Quality, Cost and Innovation) is derived. This model contains answers to nine hypotheses assumed in theoretical part, giving reader a new and easy way to understand process industry.

## Conclusions:

Distinguished from other industry, process industry with its own unique characteristics does not lend support to all nine hypotheses. Fundamental analysis proved that some assumptions do not establish for process industry while the others may have more significant relationships. To be specific, there exists strong impact of human resource on product quality and cost, supplier management on product cost and also marketing and sales on product quality. But, to our surprise, the other assumed relationships are not that significant while product innovation has adverse affect on marketing and sales.

## Keywords

Process industry, Value chain, marketing and sale, human resource, supplier management, product cost, quality and innovation.

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## Table of Content

### Summary

<b>1. INTRODUCTION.....</b>	<b>1</b>
1.1 <i>Background .....</i>	1
1.2. <i>Purpose .....</i>	2
1.3 <i>Research question .....</i>	2
1.4 <i>Disposition of the thesis .....</i>	3
<b>2. METHODOLOGY .....</b>	<b>4</b>
2.1 <i>Research approach.....</i>	4
2.2 <i>Research strategy.....</i>	5
2.3 <i>Data collection .....</i>	7
2.3.1 <i>Documentation collection .....</i>	9
2.3.2 <i>Interview data collection.....</i>	9
2.3.3 <i>Data recording and storing.....</i>	10
2.4 <i>The respondents.....</i>	10
2.5 <i>Data analysis.....</i>	10
2.6 <i>Reliability and Validity .....</i>	11
2.7 <i>Methodological limitations .....</i>	12
<b>3. THEORETICAL FRAMEWORK .....</b>	<b>13</b>
3.1 <i>The Generic Value chain.....</i>	13
3.2 <i>Characteristics of Process Industry .....</i>	14
3.3 <i>Product Quality .....</i>	15
3.4 <i>Product Cost.....</i>	16
3.5 <i>Product Innovation.....</i>	17
3.6 <i>Marketing and sales.....</i>	18
3.7 <i>Human Resource .....</i>	19
3.8 <i>Supplier relationship .....</i>	20
3.9 <i>Summary: Conceptual Model.....</i>	21
3.9.1 <i>Major value chain activities for process industry .....</i>	21
3.9.2 <i>Impact of value chain activities on product performances .....</i>	22
<b>4. EMPIRICAL STUDY .....</b>	<b>24</b>

<i>4.1 Background of Korsnäs</i> .....	24
<i>4.2 Interview concerning major value chain activities for Korsnäs AB</i> .....	25
<i>4.3 Interview concerning impact of marketing and sales activities on product performances</i> .....	25
<i>4.4 Interview concerning impact of human resource activities on product performances</i> .....	26
<i>4.5 Interview concerning impact of supplier management activities on product performances</i> .....	27
<b>5. ANALYSIS/DISCUSSION</b> .....	<b>29</b>
<i>5.1 Major value chain activities for process industry</i> .....	29
<i>5.2 Impact of value chain activities on product performances</i> .....	29
<b>6. CONCLUSION</b> .....	<b>38</b>
<b>7. FURTHER RESEARCH</b> .....	<b>40</b>

## **REFERENCES**

### **Appendix 1 Interview questionnaire**

### **Appendix 2 Examples of Korsnäs AB products**

## **List of Figures**

Figure 1 Structure of this paper.....	3
Figure 2 Relevant situation for different research methods.....	5
Figure 3 Different sources of evidence.....	7
Figure 4 Data collection process.....	9
Figure 5 Process of data analysis.....	10
Figure 6 Case study tactics for four design tests.....	11
Figure 7 The generic value chain.....	13
Figure 8 One dimensional typology for process industry.....	15
Figure 9 Product quality dimension.....	16
Figure 10 Overall cost of product.....	17
Figure 11 Main steps to innovation.....	18
Figure 12 Conceptual model.....	22
Figure 13 The positive recycling of Human Resource impacts.....	34
Figure 14 Distribution of financial value in 2010 of Korsnäs.....	35
Figure 15: Summarized conceptual model.....	39

# 1. INTRODUCTION

*In this chapter we will deal with background, purpose of this paper. In addition, the research questions will be presented to illustrate our main focus as well as the importance of our research.*

## 1.1 Background

Process industry, as one of the most common standardized industries, is favored because of economics of scale and standardization through continuous and batch operation (Kallrath, 2002). It involves a wide range of industries such as drugs, chemical paper and also oil industry. Compared with customized and innovative mechanical industry, process industry has relative high speed production during which process add low value. (Fransoo and Rutten, 1993) However, there are not so many previous studies focusing on process industry, not to mention its vital activities.

The initial motivation of this paper is value chain model created by Porter (1985) and previous study done by Prajogo et al. (2008) through which they illustrate the impact of several value chain activities on quality and innovation for all firms. But what are major activities for process industry and are those hypothesis applied to all industries despite the poles apart of standardized and customized industry? Besides, what about those activities' impact on other product features?

According to Porter (1985), regardless of different size, various types, or diverse orientations of firms, all are striving to survive in this heated competition world with the same final goal—to create value for themselves as well as customers. He emphasized that companies shall systematically analyze value chain activities (primary and support) and opportunities and threats in macro-environment through which obtaining sustainable competitive advantages. But in the light of 20/80 rule (Basile, 1996), different types of firms shall focus on distinguished activities in order to create more value with limited resources. As indicated by Borna and Chapman (1993), firms are making every effort to convince the customers of their differentiation from others by continuous innovation. However, standardized firms barely make frequent innovation besides some small modifications during process. So is it always the case that, as suggested by most authors, well enhanced activities definitely lead to product innovation?

In order to assess the value created by process industry, Prajogo et al. (2008) focus on product quality and innovation. As mentioned above, we would make further investigation to test the impact of main activities for process industry on product quality and innovation. But as for process industry which is characterized by low added value and high production speed, boosting profit margin through cost reduction is always a vital focus (Fransoo and Rutten, 1993). Thus, we add another product feature—product cost—to the outcomes of value chain.

### **Problem definition**

During our work, we find out that seldom literature study lays focus on process industry and their critical activities. Besides, according to previous literatures, value chain activities have significant impact on product quality, cost and innovation, but is it really so for process industry? In sum, we would analyze previous literatures and figure out a conceptual model of value chain activities' impact on product features and then test it with process industry.

Only by identifying major activities that yield significant impact on business outcomes could firms allocate great effort properly and thus create more value with limited resources. After this study, we could provide process industry a technical framework concerning the relationships between those critical activities and product features.

## **1.2. Purpose**

This paper aims to conclude general view of impact of value chain activities on product performances (quality, cost and innovation). Accordingly we would create a conceptual model. And then test whether this model applies for process industry and further more figure out the reason behind through case study.

## **1.3 Research question**

We strive to solve two main research questions in this paper:

1. What value chain activities are important to process industry?
2. Whether general view of impact of these value chain activities on product performance (quality, cost and innovation) applied to process industry? How do those activities impact on product performances? If they cannot affect product performance,

what could be the reason behind it?

## 1.4 Disposition of the thesis

Our thesis consists of six chapters. The presentation of each chapter together with their component elements and objectives are listed below in figure 1:

Thesis part	Elements	Objectives
<b>Chapter 1</b> Introduction	Background of this study Problem formulation Aim of this paper	To give the reader a overview of research problem within the context
<b>Chapter 2</b> Methodology	Research strategy Data processing	To show the reader how we get the data and validity/reliability of it
<b>Chapter 3</b> Theoretical framework	Theories and concept that are relevant to this paper	To outline a conceptual model for further analysis
<b>Chapter 4</b> Empirical study	Record and secondary data	To present the systematically collected empirical data
<b>Chapter 5</b> Analysis /discussion	Discussion and comparison between theories and empirical study	To answer the research questions and discuss the analytical model
<b>Chapter 6</b> Conclusion	Summary of our findings	To summarize the main finding and contribution of this paper

Figure 1: Structure of this paper. Own design, Source: Gu and Yu.

## 2. METHODOLOGY

*In this chapter we would show our research approach, research strategy and data processing from data collection to analysis. Additionally, we would significantly illustrate the vital importance of validity and reliability and our obedience to them.*

### 2.1 Research approach

Research approach is classified into two categories: qualitative and quantitative. Qualitative research, according to Creswell (1998), is an inquiry process depending on different research background that explores a social or human problem. And the researcher designs a holistic but rather complex picture, analyzes qualitative information, and conducts the study in a natural environment. And Ritchie and Lewis (2003) believe that qualitative research is the perception or explanation of reality in a naturalistic setting by individual in addition to describing context using models and data.

Qualitative research is characterized mainly from five different aspects (Patton, 2002):

- Naturalistic setting: participants are within familiar context
- Emergent design flexibility: researchers could shift or adjust accordingly during research conduction
- Inductive analysis and creative synthesis: researchers could set up own themes and patterns
- Voice, perspective and reflexivity: concise and visual expression
- Multiple sources of information: rather than single data source, researchers could obtain plenty forms of data

Houman (2006) mentions five types of data collection methods in qualitative research (similar categorization is presented in detail in later section), respectively:

- In-depth interview
- Focus group
- Observation
- Documentation
- Narrative story telling

In contrast, quantitative research, as defined by Houman (2006) is a strategy which

measures and analyzes research variables in order to test a theory.

The limitations of quantitative research are:

- Variable control
- Manipulation
- Reductionism
- Reliance on measurement

In other words, compared with quantitative approach, qualitative approach is preferred under following situations: (Hair et al., 2003)

- Little is known about a research problem or context
- Previous research only partially explains the research question
- Current knowledge involves complex or evolving phenomena that needs to be simplified and organized further
- The primary purpose is to propose a conceptual model that suits current reality and could be tested by quantitative means

All in all, based on our research questions, expected outcome and also the fundamental comparisons above, we choose to use qualitative research as our approach. Since we need more qualitative tools to analyze and test the conceptual model we made, in-depth interview and documentation are conducted. Although quantitative research is a good approach, we know not so much about the problem context and our current knowledge includes complex phenomena that needed to be organized and analyzed further. Besides, due to secretary of company data, we have limited access to quantitative data, therefore we choose to collect qualitative data.

## 2.2 Research strategy

Research strategy, according to Marshall and Rossman (2006), is a road map which is critical to conduct and systematically explore the research.

Yin (2009) classifies five types of qualitative research methods, respectively experiment, survey, archival analysis, history and case study. And they are chosen according to different requirement or purpose of research papers. As illustrated by figure 2, three questions shall be identified before choosing the appropriate strategy.

Method	Form of research question	Required control of behavioral events?	Focuses on contemporary
--------	---------------------------	--	-------------------------

			events?
Experiment	How, why?	Yes	Yes
Survey	Who, what, where, how many, how much?	No	Yes
Archival analysis	Who, what, where, how many, how much?	No	Yes/no
History	How, why?	No	No
Case study	How, why?	No	Yes

Figure 2: Relevant situation for different research methods Source: (Yin, 2009)

Besides the characteristics mentioned above, case study is believed to be a strategy through which empirical investigation of a particular contemporary phenomenon is conducted within real context using multiple sources of evidence. (Robson, 2002:178).

Therefore, after a holistic review of the strategies and an understanding of the nature of case study, we choose case study as the right research strategy for this paper.

Further review suggests that case study consists of two basic types: single case study and multiple case studies (Blumberg et al., 2005). According to Yin (2009), single case study investigates only one case while multiple case studies refer to more than one case. Multiple case studies have intrinsic advantage as being more convincing and appealing than single case study but also remain unavoidable disadvantages. Compared with single case study, multiple ones require plenty of time and resources and accordingly investigate less deep or detailed. (Creswell, 1998)

Considering the above analysis, we use single case study rather than multiple cases. We assume that the case company could indicate scenarios for the whole industry. But further research and demonstration on a great deal of other process industry companies are needed to make this conclusion more convincing. And then multiple case studies using our logic in the paper shall be repeated to test the validity of our work.

## 2.3 Data collection

There are totally six sources of evidence available for our case study, respectively documentation, archival records, interviews, direct observation, participant observation and physical artifacts (Yin, 2009). So the next step is to fundamentally analyze these sources and choose the appropriate one for our paper. The strengths and weaknesses are listed below in figure 3 as mentioned by Yin (2009).

Source of evidence	Strengths	Weaknesses
Documentation	<ul style="list-style-type: none"> <li>● Stable—can be reviewed repeatedly</li> <li>● Unobtrusive—not created as a result of the case study</li> <li>● Exact—contains exact names, references, and details of an event</li> <li>● Broad-coverage—long span of time, many events, and many settings</li> </ul>	<ul style="list-style-type: none"> <li>● Retrievability—can be difficult to find</li> <li>● Biased selectivity, if collection is incomplete</li> <li>● Reporting bias—reflects (unknown) bias of author</li> <li>● Access—may be deliberately withheld</li> </ul>
Archival records	<ul style="list-style-type: none"> <li>● (Same as those for documentation)</li> <li>● Precise and usually quantitative</li> </ul>	<ul style="list-style-type: none"> <li>● (Same as those for documentation)</li> <li>● Accessibility due to privacy reasons</li> </ul>
Interviews	<ul style="list-style-type: none"> <li>● Targeted—focused directly on case study topics</li> </ul>	<ul style="list-style-type: none"> <li>● Bias due to poorly articulated questions</li> </ul>

	<ul style="list-style-type: none"> <li>● Insightful—provides perceived causal inferences and explanations</li> </ul>	<ul style="list-style-type: none"> <li>● Response bias</li> <li>● Inaccuracies due to poor call</li> <li>● Reflexivity—interviewee gives what interviewer wants to hear</li> </ul>
Direct observations	<ul style="list-style-type: none"> <li>● Reality—covers events in real time</li> <li>● Contextual—covers context of "case"</li> </ul>	<ul style="list-style-type: none"> <li>● Time- consuming</li> <li>● Selectivity—broad coverage difficult without a team of observers</li> <li>● Reflexivity—event may proceed differently because it is being observed</li> <li>● Cost—hours needed by human observers</li> </ul>
Participant-observation	<ul style="list-style-type: none"> <li>● (Same as those for documentation)</li> <li>● Insightful into interpersonal behavior and motives</li> </ul>	<ul style="list-style-type: none"> <li>● (same as those for documentation)</li> <li>● Bias due to participant-observer's manipulation</li> </ul>
Physical artifacts	<ul style="list-style-type: none"> <li>● Insightful into cultural features</li> <li>● Insightful into technical operations</li> </ul>	<ul style="list-style-type: none"> <li>● Selectivity</li> <li>● Availability</li> </ul>

Figure 3: Different sources of evidence. Source Yin, 2009, pp. 102.

According to the requirements to fulfill purpose of this paper, we would first need stable and broad data to form the theoretical framework including hypothesizes and also initial understanding of the case company. Then we need insightful and contextual evidence to test the theoretical framework. Therefore, after comparing the nature of different evidences and our requirement, we choose to collect both Interviews and Documentation. Specifically, we would use documentation as support and basis to interviews, and in turn, using interviews to test documentation. Accordingly, our data collection process is designed as illustrated in figure 4.

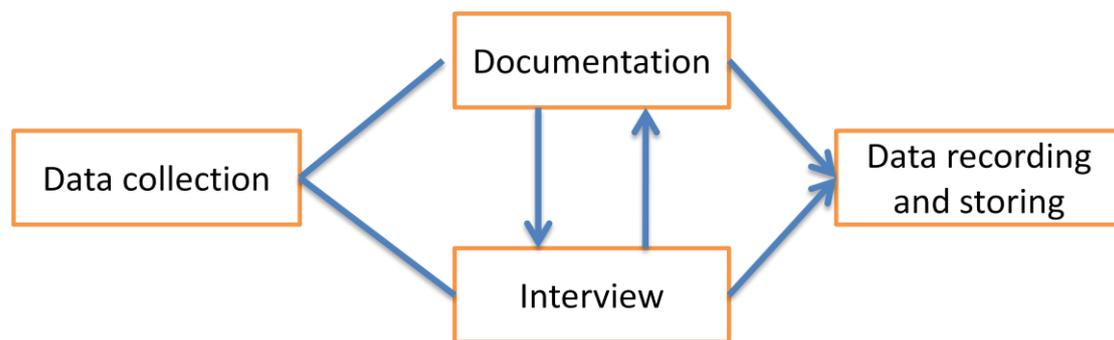


Figure 4: Data collection process. Own design. Source: Gu and Yu.

### 2.3.1 Documentation collection

Firstly, we select documentation in the forms of Internet webpage, books and articles. On one hand, select among a great deal of literature articles as well as books to obtain sufficient data for theoretical framework and creation of hypothesizes as basis for our paper. On the other hand, we get an overview from Korsnäs webpage to get preliminary knowledge to design the questionnaire before in-depth interview with the workers.

### 2.3.2 Interview data collection

As stated by Yin (2009), there are totally three kinds of case study interview: in-depth interview, focused interview and survey. He illustrates that through in-depth interview we could obtain facts as well as personal opinions about a matter from respondents. According to Merton et al.,(1990), focused interview is defined by interviewing for a short period of time during which words and conversational manner should be cautiously take care of to allow interviewee to provide a fresh commentary. Besides, a third type if interview is in the form of survey which requires structural questions and usually obtain quantitative data (Yin, 2009).

Because we choose qualitative research and would like respondents to share their personal opinions, we decide to select in-depth face-to-face interview.

### 2.3.3 Data recording and storing

We choose data recording and storing for future use and also for demonstrating its validity and reliability. On the first place, we cite data obtained from Internet, articles and books to form the theoretical basis for our paper and main hypotheses. On the second place, we take notes and record during the interview as double insurance of accurate information.

## 2.4 The respondents

We conduct two stages of in-depth interview with workers in Korsnäs. The first stage is preliminary interview with inter-mediator about the general information and identification of critical activities, and most importantly right person to interview in the next stage. Thereafter, the second stage is insightful interview with professional worker of specific department to test our hypothesis.

Interviewee 1: Social Relationship Manager

Interviewee 2: Chief of Technology Department

Interviewee 3: Senior Technical Customer Support

Interviewee 4: Chief Manager of Human Resource

## 2.5 Data analysis

In the light of Yin's (2009) suggestion of data analysis process consisting of examining, categorizing, tabulating and recombining and our own methodology construction, we attempt to construct our own steps in this procedure as shown below in figure 5:

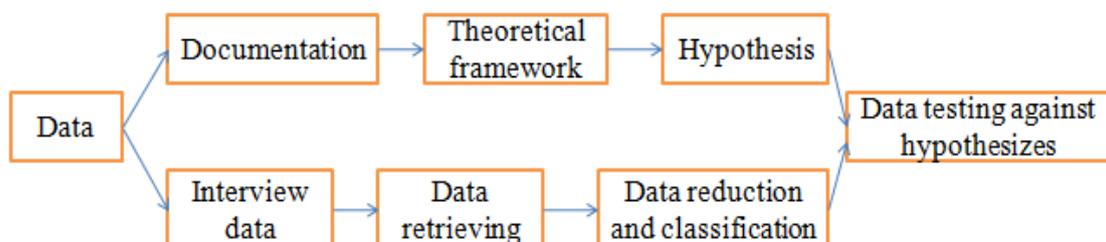


Figure 5: Process of data analysis. Own design, Source: Gu and Yu.

Since we gathered two kinds of data, namely documentation and interview, we make parallel analyzing procedure for each. For the collected documentation, we categorize them and form the main framework for this paper and then derive those hypothesizes according to literature review. For the interview data, we start with listening to recordings repeatedly to ensure an accurate understanding of it and then select the useful information meanwhile categorizing them corresponding to the theoretical framework made before. After these processes, we finally compare the categorized interview data with those hypothesizes and draw main conclusions.

## 2.6 Reliability and Validity

Reliability and validity characterized by trustworthy, credibility, conformability and data dependability (U.S Government Accountability Office, 1990) should always be in the mind of researchers (Yin, 2009). He defines validity as “the ability of an instrument to measure exactly what it is supposed to measure”. And according to Yin (2009), reliability refers to the consistency of findings using the same research techniques repeatedly. Further analysis of characteristics of validity and reliability combining with different phases of research are listed below:

TESTS	Case Study Tactic	Phase of research in which tactic occurs
Construct validity	● use multiple sources of evidence	Data collection
	● establish chain of evidence	Data collection
	● have key informants review draft case study report	Composition
Internal validity	● do pattern matching	Data analysis
	● do explanation building	Data analysis
	● address rival explanations	Data analysis
	● use logic models	Data analysis

External validity	<ul style="list-style-type: none"> <li>● use theory in single-case studies</li> <li>● use replication logic in multiple-case studies</li> </ul>	<p>Research design</p> <p>Research design</p>
Reliability	<ul style="list-style-type: none"> <li>● use case study protocol</li> <li>● develop case study database</li> </ul>	<p>Data collection</p> <p>Data collection</p>

Figure 6: Case study tactics for four design tests Source: Yin (2009)

In this paper, we use the table in figure 6 as a guideline to ensure the validity and reliability of our thesis. Firstly, we search among large amounts of literature from articles and books, and information from website and interviews. Secondly, we organize our own sequence of data collection, in which documentation is reviewed to consolidate the interview data. Thirdly, we make recording during the interview to remind and confirm the exact input information during the data analysis.

Besides, we choose single case study as it provides more insightful information and the case company Korsnäs AB could actually represent the whole process industry. Because Korsnäs AB as a paper company, as is shown in the figure 8, has moderate characteristics among all process industry and performs well in major activities relative to its size and scale. What's more, we choose sampling carefully. We consider the experience and profession of all available interviewees and then select the most suitable ones to conduct the research. Next, we would send the integrated empirical study part to interviewees and get confirmation from them concerning the accuracy of our content. Thus, we can make sure the data obtained is convincing and accurate.

## 2.7 Methodological limitations

In sum, we choose qualitative research and single case study approach. Further, we conduct interview and collect documentation. But due to the fact that we only conduct single case study and have four respondents as evidence of interview, we could not ensure complete validity of the findings. Accordingly, further research concerning test on different process industry companies shall be carried out. But the logic and procedure of our paper could be repeated on those studies.

### 3. THEORETICAL FRAMEWORK

*This chapter is divided into nine parts to serve the framework of the whole paper clearly and logically and also to help creating the conceptual model including major value chain activities and nine hypothesizes.*

#### 3.1 The Generic Value chain

Porter (1985) created the value chain model in order to help companies figure out their competitive advantages against other competitors. This general framework, shown in figure 7, consists of primary and supportive activities, mainly business processes and fundamental competences. On one hand, companies could use the value chain by determining its own core competence and then narrow it down to visible measurements to create sustainable competitive advantage. But on the other hand, the value chain is more market-orientated, therefore maybe not so applicable for those supply-driven or bi-lateral driven firms. (Svensson, 2003) Besides, it still remain a question which value chain activities contributes most to the performance of a innovative packaging company in the light of 20/80 rule.

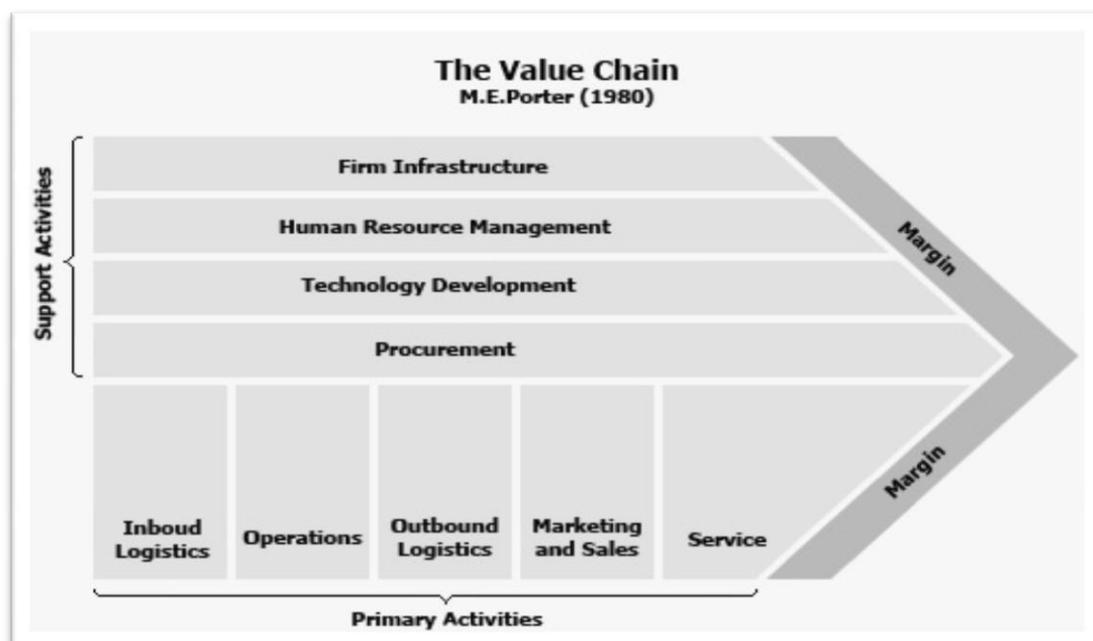


Figure 7: The generic value chain. Source: Porter (1985)

As illustrated by the general figure above, there are mainly two categories of business

activities, respectively primary activities and support activities.

Primary activities:

Inbound logistics: material handling and warehousing

Operations: transforming inputs

Outbound logistics: order processing, distribution

Marketing and sales: channel management, communication and pricing

Services: installation, repair and parts

Support activities:

Firm infrastructure: general management, financing, accounting, government relationship and quality management

Human resource development: hiring, training and compensation

Technology development: product and process improvement

Procurement: procedure and information system

### **3.2 Characteristics of Process Industry**

As defined by Wallace in APICS dictionary:

Process industries are businesses that add value to materials by mixing, separating, forming or chemical reactions. Process may be either continuous or batch and generally require rigid process control and high capital investment. (Wallace, 1984)

Process industry is characterized as a network involving several manufacturing units/machines, through which raw materials, semi-manufactured products as well as other chemicals are routed and processed.(Dutta et al., 2007) Still, another distinguished feature is batch production system, which means that plants produce low variable products but in relatively high volume typical through continuous process flow.

Figure 8 in next page shows the one-dimensional composition of process industry.

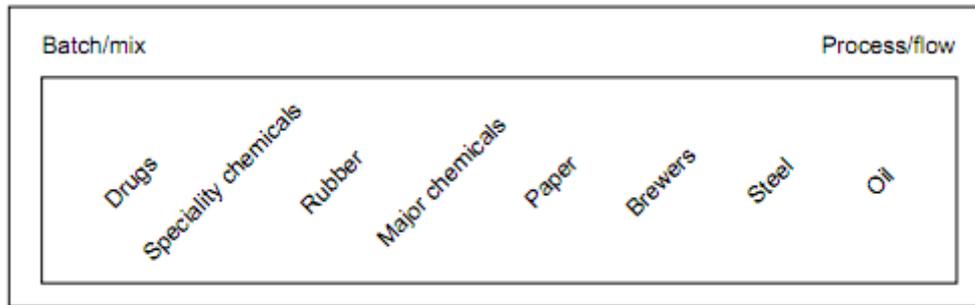


Figure 8: One dimensional typology for Process industry by Fransoo and Rutten (1993).

Additionally, in process industries production speed is relatively high and added value is substantial low (Fransoo and Rutten, 1993). Accordingly, process industries always benefit from economic of scale, but are less innovative and customized than mechanical industries. (Kallrath, 2002) Simultaneously, the relative disadvantage of process industries is that inefficiency remains a critical bottleneck. Since the components and units of whole linear process depend on each other closely, huge downtime could aggregate because of breakdown of single machine or links. In addition, lots of buffers and inventory (safety stock) increase unnecessary cost of capital.

### 3.3 Product Quality

Quality has been commonly defined as value, fitness for use, conformance with requirements and specifications, loss avoidance and meeting or exceeding customer expectations. (Reeves and Bednar, 1994; Anderson and Sedatole, 1998) The impact of product quality on competitive advantage and also on perception of firm performance is significant. Firm could charge a price premium on the unique or extraordinary quality dimensions, which, as illustrated by Sebastianelli and Tamimi (2002), involve six aspects, mainly performance, conformance to specifications, features, durability, reliability and aesthetic design. Detail illustration of each dimension is listed below in figure 9. Nowadays, the multiplication of product trend requires company be more unique and special compared with their competitors (Porter, 1985). Those six dimensions describe quality in different customer's expectations. And those dimensions could be the fundament to achieve quality advantage over competitors. Moreover, a great deal of empirical studies suggests the vital relationship between product quality and firm performance. For instance, studies from the PIMS database conclude that high quality leads to high-financial measurements of revenue through

better market share and leads to high profitability through lower cost (Buzzels and Gale, 1987; Philips *et al*, 1983).

Performance	<ul style="list-style-type: none"> <li>The primary operating characteristics of a product</li> </ul>
Conformance to specifications	<ul style="list-style-type: none"> <li>the degree to which a product's physical and performance characteristics meet design specifications</li> </ul>
Features	<ul style="list-style-type: none"> <li>The secondary characteristics of a product that supply its basic functioning</li> </ul>
Durability	<ul style="list-style-type: none"> <li>A measure of useful product life, i.e., the amount of use a customer gets from a product before it deteriorates</li> </ul>
Reliability	<ul style="list-style-type: none"> <li>The product's probability of failure-free performance over a specified period of time</li> </ul>
Aesthetic design	<ul style="list-style-type: none"> <li>How the product looks, feels, sounds, tastes or smells, a matter of personal preference</li> </ul>

Figure 9: Product quality dimension. Source: Sebastianelli and Tamimi (2002).

### 3.4 Product Cost

Blocher et al. simply explains that cost is incurred when resources are used for some purpose. (Blocher et al. 2008) There are different ways of classifications of cost. Costs generally consist of fixed cost and variable cost which including production, transportation, inventory, energy, utilities and external product procurement costs. (Kallrath, 2002) Today the focus is switched to value adding process instead of traditional financial measurement. The cost still plays an important role in commercial campaign. As Porter (1985) stated in *Competitive Advantage*, company mainly has two approaches to achieve competition advantage, cost or differentiation. At the same level of service or product, the lower the price is the higher competition advantage it will be. The intensity of competition to some extent requires manager to take everything into consideration. Cost could be one of the approaches to help company survive in the market place. Figure 10 below presents the flow of specific cost incurred from initial raw material to finished goods. Fully absorbed finished product cost including material cost and plant overhead is mentioned in this paper as product cost which represents one of significant product performances.

In addition, cost can be technically divided to direct cost and indirect cost. Direct cost can be economically and conveniently traced directly to a cost object or cost pool and

in comparison, indirect cost has no economical or convenient trace from the cost pool or from the cost pool to the cost object. Besides, there also exist relevant cost, opportunity cost and sunk cost. (Blocher et al. 2008)

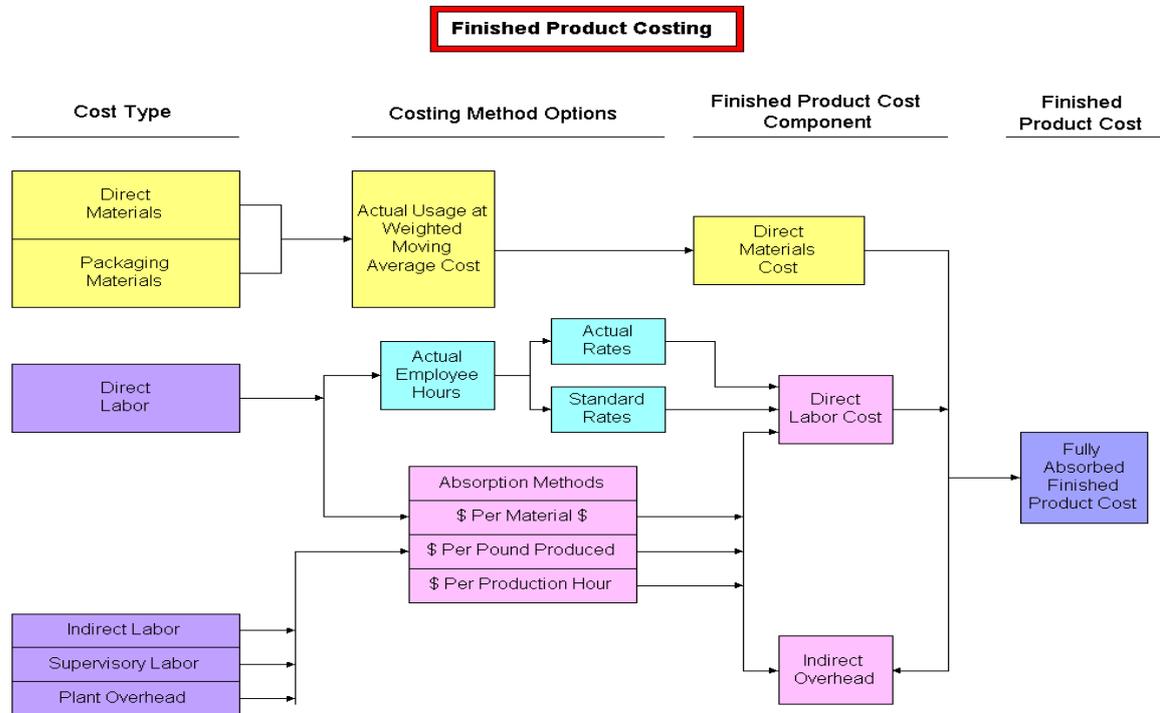


Figure 10: Overall cost of product. Source: <http://www.seihq.com/inv.htm>

### 3.5 Product Innovation

Innovation is a vital mechanism by which firms secure a competitive position in future success. (Ven, 1986) It is generally defined as the development and implementation of new ideas by firms engaging in transactions or projects. Moreover, according to Baregheh et al. (2009), “innovation is the multi-stage process whereby organizations transform ideas into improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace.” And this is extended according to figure 11 which illustrates main steps to innovation.

There are many classifications of innovation, for example, Nord and Tucker (1987) identified the routine innovation and radical innovation in product development. Accordingly, routine innovation means the introduction of something to organization that is similar to previous ones, while radical innovation means introducing something that is unprecedented to organization. A different view of classification divides innovation into incremental, discontinuous and institutional innovation. (Nelson and

Winter, 1982; Dewar and Dutton, 1986; McKee, 1992)

Porter (1985) considers innovation as a critical competitive advantage to success. Similarly, the impact of innovation on firm's overall performance is demonstrated by a substantial body of literatures. Deshpande et al. (1993), during their studying of Japanese firms, found out that innovation together with customer-oriented marketing is most positively correlated to performance.

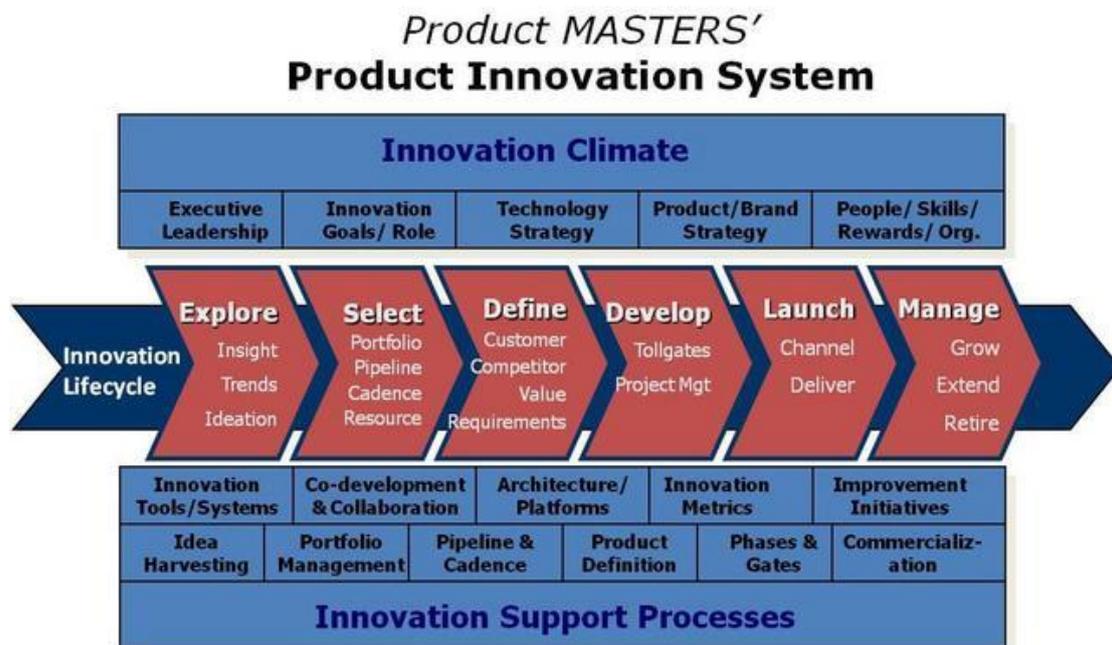


Figure 11: Main steps to innovation.

Source: <http://www.product-masters.com/aboutus.html>

### 3.6 Marketing and sales

Substantial studies demonstrate the critical role of marketing and sales in the value chain. (Souder and Moenaert, 1992; Prabhaker et al., 1995; Zhang and Ma, 2007) And also well coordinated marketing and sales contributes to creation of superior customer value and market performance. (Troilo and Guenzi, 2007) Marketing and sales perform as a vital hub between firm and customer from pre-development stage to post-delivery stage. At the pre-development stage, they are critical in identifying customer needs and incorporating those needs in design process. In the post-delivery process, they are used to collect feedbacks concerning customer perception and level of satisfaction against products. (Prajogo, McDermott and Goh, 2008)

Dahlsten (2004), in his case study, concludes that better customer involvement leads to product success. To be specific, deep insights have an opportunity by spending time with customers and actually taking part in activities with them. Besides, Finch (1998) indicates that rich information and adequate involvement from customer result in valuable quality conformance improvement. He listed assessing customer needs, being responsible to customer needs, close contact with customers, certified suppliers, and sharing process capability information with customers as examples of customer involvement. Surprisingly, by avoiding active feedback could firm identify more issues that merit response from customers and thereafter improve product quality.

Several scholars hint that well enhanced marketing is key to innovation success (Carnegie et al., 1993; Cooper and Kleinschmidt, 1987, 1993; Flores, 1993; Schew, 1994) Still, Scherman et al. (2000) suggest that effective connection between marketing and design activities would trigger product innovation. There are also substantial empirical works substantiate a positive impact of customer orientation on organizational innovation (Appiah-Adu and Singh, 1998; Han et al., 1998; Luckas and Ferrell, 2000). There-into, Appiah-Adu and Singh demonstrated that businesses that allocate significant resources to marketing activities result not only to developing new products, but also to achieving more success in product performance relative to those less customer-oriented counterparts.

Despite substantial benefits of customer involvement mentioned above, marketing activities also entail considerable cost in terms of both time and money. Moreover, while earlier involvement of consumers in design process is valuable, involving customers further in production process is costly and creates little benefit. (Lagrosen, 2005)

### **3.7 Human Resource**

More and more companies are now seeking multiply ways to gain competitive advantage, making themselves different from their competitors, in order to be more profitable or obtain more market share (Swink and Mabert, 2000). Company's success nowadays relies more and more on the capability of human resource. Corresponding with this trend, Strategic Human Resource Management (SHRM) gradually becomes one of the most important parts for organization management worldwide (Boxall and Purcell, 2003). According to Ulrich (1997)'s report, collectively, the challenges facing to the implementation of HR practice can be divided in three parts:

First of all, it is hard to measure the value which employee and HR function has created and delivered, and this will lead to complex work for identifying the relationship between HR cost and HR's contribution, such as quality improvement, higher customer satisfaction, better employee involvement;

Second, to develop an integrated and suitable discipline for organization to follow is rather complex and also needs plenty of time and energy from company;

Last but not the least, with the high speed of development, HR has been requiring more roles and functions than it used to. For instance, the cooperation with R&D department, assisting to Marketing strategy, service and building relationship with customers, etc. (Ulrich, 1997)

In this paper, we focus on the HR's effect on the performance of organization in order to make long term competitive advantage. But the target for success is changing all the time since the customer need and expectation is changing with the intense technology revolution. So the key point for company to strive in this scorching circumstance is to focus on the company's ability in innovation, improving and learning, thus making them directly connected to company's value creation process. And the foundation of this activity is HR department's support. (Kaplan and Norton, 1992) HR is the element for company makes process improvement and product innovation. (Swink and Mabert, 2000) Emphasis on HR can lead to more overhead for company, but at the same time, efficient utilization of human resource can bring more benefit to company. Compare the cost with the benefits, mostly of the time the solution is a surplus. (Rayport and Sviokla, 1995)

### **3.8 Supplier relationship**

The competitions now are no longer company against company, but rather supply chain against supply chain or indeed network against network (Fawcett and Magnan, 2002). Accordingly, supplier, as the critical determinant of superior quality and lead time, plays more and more fundamental role in the value chain. Besides, the performance features and cost incurred during creating and delivering inputs impact significantly on firm's product differentiation capabilities and cost. Thus, helping suppliers to control their quality of input material and processing variability and also to reduce their cost could, in turn, enhance the firm's performance and

competitiveness. (Prajogo et al., 2008)

Deming (1986) found that firms could save on administrative cost and quality variability through developing joint quality improvement programs. This is to some extent consistent with Clark (1989), Swink (1999) and Gupta and Souder (1998) who suggest that supplier involvement is positively related to project cost and product quality. Still, a successful sharing of useful information with suppliers would lead to reduction of inventory and manufacturing cost. (Petrovic-Lazarevic et al., 2007; Stein and Sweat, 1998)

As suggested by a great deal of empirical studies, strategic supplier partnership could improve firm's innovation as well as organizational performance. (Chong et al., 2011) Besides, Soosay et al (2008), in their study, indicated that collaboration with supplier through information sharing could influence positively on innovation. Further, McGinnis and Vallopra (1999) demonstrated the benefits of successful supplier relationship in promoting the new product success by means of implementation of supplier identification, selection and monitoring.

### **3.9 Summary: Conceptual Model**

#### **3.9.1 Major value chain activities for process industry**

Combining previous literatures presented above concerning generic value chain activities and characteristics of process industry, we identify three major activities, respectively marketing & sales, human resource and supplier management, as most significant ones for process industry, which is in accordance with previous work by Dutta et al. (2006), and Fransoo and Rutten (1993).

Specifically, for process industry with large capacity of production, scale of economy can provide high volume of profit. But when it comes to the profit margin, compared with other types of industry, this index is really low. So how to optimize this situation could be a great challenge. Combining production orientation and customer orientation these two strategies together while separating the risk could be a good approach. This could not be done without marketing and sales' help. There is no doubt that the human resource is more and more important than machines gradually from industrial revolution. The value adding process relies more and more on employee intelligence. How to explore and utilize the border intangible resource could be the

key determinant for company to success. Supplier also could be an extremely important part of competition since today's market pressure is spread among the industry chains. How to integrate and cooperate with supplier and maintain a long term relationship with them is really the fundamental infrastructure of company future.

### 3.9.2 Impact of value chain activities on product performances

Accordingly, based on the literature reviews above concerning the relationship between three major value chain activities (marketing and sales, human resource and supplier management) and product features (product quality, innovation and cost), we then make a conceptual model illustrating those relationships in figure 12.

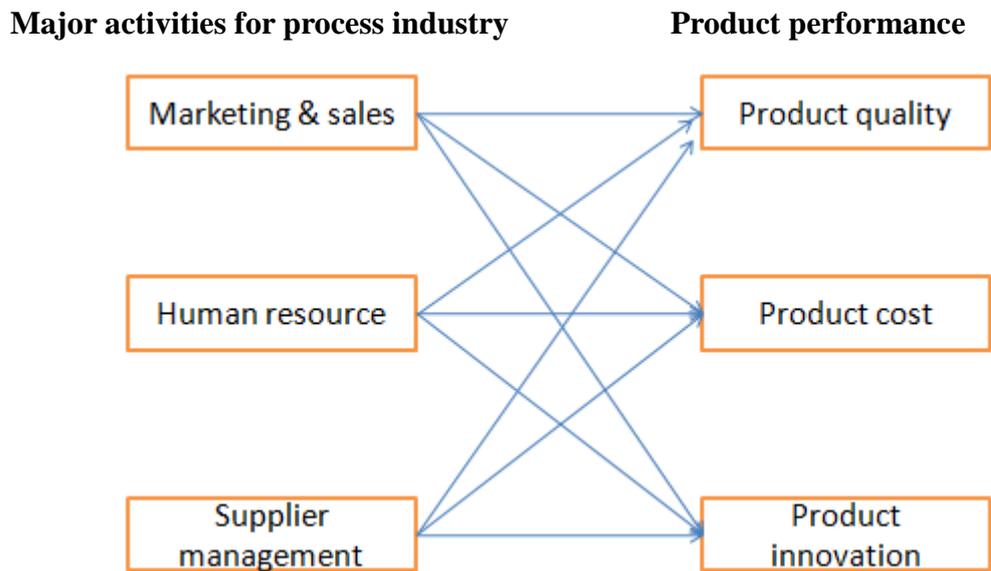


Figure 12: Conceptual model Own design. Source: Gu and Yu.

There exist nine relationship hypotheses as illustrated by the model below. The first hypothesis is that better marketing and sale is positively associated with product quality. And this kind of impact will establish regardless of different characteristics of product quality. The second hypothesis is that enhanced marketing and sales can contribute to product innovation incentive. As we can see, the pressure from market will definitely rise on the shoulder of product innovation. The third hypothesis is that if there is more emphasis on marketing and sales, there will be influence on product cost. If over serves customer, bringing the unnecessary supply, product cost will increase but company would not gain corresponding benefit from the investment.

Human is always the core of commercial campaign, and next three hypotheses are around human resource. Better human resource management will bring profound benefit to product quality and product cost, this is our fourth and fifth hypothesis. And obviously, human resource can help company improve product quality base on a broad perspective. Hence the sixth hypothesis is HR can support innovation. Supplier to some extent supports the whole production line, which cannot be ignored. Better cooperation will bring a profound benefit to product quality, cost and innovation are our last three hypothesis. With suppliers' contribution, we assume process industry can get better outcome of performance.

## 4. EMPIRICAL STUDY

*This chapter concerns about information and data obtained from our case company—korsnäs. This part contains mainly two sections, respectively the background of korsnäs and the interview data. And accordingly, we collect data from interview and also available information about korsnäs (website, reports) two sources.*

### 4.1 Background of Korsnäs

Korsnäs is a company focusing on the board making which is owned by Investment Kinnevik AB. It now has about 1800 employees. With the advance technology and high skill individuals, Korsnäs have made a great achievement in product quality and environment protection. As a wood consumption company, Korsnäs have made long term relationship with the forest company, ensuring the quality of the wood supply. Relying on the positive and activitive attitude, Korsnäs have invested in the premium, virgin fiber-based material to meet the need and expectation of packaging in future. Here is the Milestones for Korsnäs in Gävle:

- 1855 Korsnäs Sågverks Aktiebolag was founded.
- 1899 Operations move to Gävle
- 1910/1915 Sulphite and sulphate mills built
- 1925 First paper machine
- 1976 PM5 brought on line. Board production begins
- 1987 TM6 brought on line
- 1985–89 Extensive renovations and expansion
- 2000 LNHC calendar brought on line
- 2002 The sawmill was sold
- 2004 Korsnäs owned forestlands sold to Bergvik Skog
- 2005 Coating facility for PM4 brought on line
- 2006 Korsnäs buys AssiDomän Cartonboard AB in Frövi
- 2009 Korsnäs buys Rockhammar mill

## **4.2 Interview concerning major value chain activities for Korsnäs AB**

According to the social relationship manager, the most important value chain activities for Korsnäs are Human resource, supplier relationship management and marketing and sales. From his knowledge and experience in Korsnäs, human resource management including employee skill and competence training, position allocation and adjustment, and also inter-departments coordination plays a significant role in overall company performance. Besides, he mentioned that 90% of Korsnäs's products are exported, therefore marketing and sales which deal with customer focus is also of great importance. Additionally, their manufacturing procedure depends very much on the input material, and their flexible supply-demand relationship requires qualified and in-time delivery. Thereby, supplier management is a key value chain activity that provides competitive advantage.

## **4.3 Interview concerning impact of marketing and sales activities on product performances**

Case company's chief of technology department mentioned: Since the technology is hard to make breakthrough, most of the companies actually hold the same level technology which means that the competitive advantage is hard to achieve through R&D and product revolution. Consequently, case company is seeking various ways to obtain and remain competitive advantage. One of the most important ways case company used for a long time is marketing and sales strategy.

According to the senior technical customer support of Korsnäs, case company has conducted different marketing and sales activities depending on different situations, including short-term contract, long-term contract, advertisement in magazine, seminars, visit exhibitions and other media, etc.

When it comes to the product quality, senior technical customer support shares his opinion with us, "We make contract with customer, no matter short term or long term, they always ask for the insurance for product quality", "The relationship between our company and our customers is more complex than single methods can achieve. So how to make flexible movement is vital important and a high requirement for the

marketing managers. ” Korsnäs carries out active customer evaluation and investigation every quarter. Besides, questionnaires concerning product reliability, quality, delivery service and technical customer service are distributed to customers. And thereafter company makes corresponding adjustment or adds something to product to improve product quality perceived by customers.

Cost is another part we concern, and senior technical customer support mentioned that, “The price we bargain with customer relies more on the market need, since the fiber in our product is unique, even it looks not so advanced but actually it is very high technique. So somehow, the price is constant, since we have the advantage to control the price to some extent.” And in China, there are just two Chinese employees worked for case company in marketing area, the phenomena of low overhead and operation fee in Marketing process for Korsnäs can be acquainted through this reflection. Meanwhile counter measures of marketing activities are costly, take time and acquire right and proper calculations.

Korsnäs deals not so frequently with innovation because of its standardized size of packaging board. If case company’s customers need new type of board which they cannot supply, their customer will switch to other supplier who can offer their need immediately. Customer will not wait for them to make innovation and improve when they need new type of product harshly. Because in the product line, time is the most valuable thing which no one wants to waste or takes risk.

#### **4.4 Interview concerning impact of human resource activities on product performances**

The chief manager of human resource mentions that there are 1000 employees now work in Korsnäs located in Gävle who could be divided into two groups, namely blue-colored workers and white-colored workers. 300 white colored workers deal with sales, development and forest organization for whole concern. And the blue-colored workers mainly work with mechanical maintenance and working shifts. The production runs 24 hours per day because if the mill closes down, it would take a week to setup again. And even the production line stop for one hour, there will be hundred thousand Kronor lose.

According to chief manager of human resource, the performance and contribution of human resource does not have much relationship with product innovation. Because

human resource works more on soft part, including the training and expressing of core value, it does not have much to do with design innovation. But for employees, everyday is a learning day. Department managers set up the goals for each employee every year and evaluate their previous performance while settling forward new targets. Case company has reduce more than six hundred employees during last ten years, and employee's cost still be the second largest cost for case company. Furthermore, case company has shared the core value and perspective with their employees, enhance their skills, let employee could capable in different kind of work. And that kind of training at least needs two or three years to accomplish.

As for production cost and quality, the chief manager of human resource believes that successful human resource actually has significant positive impact on product cost and quality. The logic goes that if they successfully implement core values among workers, and let workers understand their short-term and long-term goals, then workers could continuously improve production line, so that relative cost could be reduced meanwhile quality performance could be improved.

#### **4.5 Interview concerning impact of supplier management activities on product performances**

“We have a long term co-operation with supplier, since the material we need mostly is wood, thus we really need a mature and good relationship with Forest Company.” Senior technical customer support answered when the topic switch to case company's relationship with supplier. According to senior technical customer support's statement, case company actually worry not so much about the price of wood supply, since they have a long term relationship with its supplier, so the price for the raw material is constant, it is not influenced by the supply-demand marketing principle very much. The mainly fluctuation is from chemistry supply. “Our company also needs some chemical resource to support our production, the relationship with them is not as stable as we do with the wood company, but this part is not big, I mean, it is not so big to affect our overhead.” After finishing the question about the cost, we move forward about quality and innovation. “Of course we need the guarantee of lumbers quality, but most of the time, the quality of the wood does not change very much.” said by senior technical customer support. “Product quality and product innovation are not our supplier's business, they just need to do their part well, that's it.” Based on the

experience from senior technical customer support, case company does not rely on its suppliers too much in product quality and innovation field.

## **5. ANALYSIS/DISCUSSION**

*In this chapter, we present the fundamental discussion of research question including major value chain activities for process industry and hypotheses from documentation and empirical results from interviews. Accordingly, this part is divided into two parts, each with detailed comparison and analysis.*

### **5.1 Major value chain activities for process industry**

Our finding is that data from interview is consistent with previous literature studies (Dutta et al., 2006; Fransoo and Rutten, 1993) in identifying most important value chain activities. To be specific, major value chain activities in process industry are human resource management, supplier management and marketing & sales. But due to the fact that only two literatures are available for supporting this assertion, our demonstration or validity is weak and thus further research is needed to test this assertion on large numbers process industries or find out more related literatures. Combining literatures above in theoretical part, our attempted explanations are that: Marketing & sales and supplier management, as primary activities, are significant components for the whole supply (or demand) chain and they act as critical role in majority industries including process industry. Especially the situation nowadays turns out to be competition among supply chains (no longer among single companies), enhanced supplier and customer relationship is vital important in creating sustainable competitive advantage. Besides, as a soft supportive activity, human resource management involving hiring, training and compensation is playing more and more fundamental role in the heated competition. In order to adapt to the rapid developing technology, employees should accordingly improve themselves in knowledge and skill perspectives to satisfy the changing demands. After all it is human with creative thinking that could sustainably add value to whole process.

### **5.2 Impact of value chain activities on product performances**

*We divide this part into nine sections, each dealing with comparison between hypothesis assumed in chapter 3 and empirical findings in chapter 4. And the conceptual model is listed below in figure 12.*

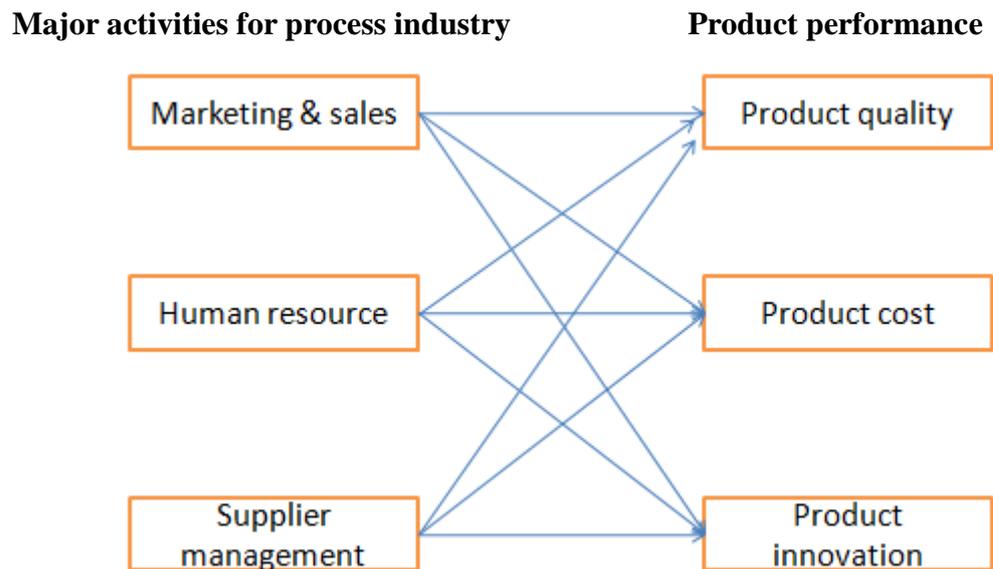


Figure 12: Conceptual model Own design. Source: Gu and Yu.

**1. First hypothesis assumes that Marketing& sales has positive impact on product quality.** There are six dimensions of quality, mainly performance, conformance to specifications, features, durability, reliability and aesthetic, presented Sebastianelli and Tamimi (2002), which can impact quality performance in different ways. Relying on the study we can tell, marketing and sales really have a strong effect on product quality. The reason is, as for the marketing department, when they negotiate with customers about cooperation, the pre-condition is that company can provide and guarantee product quality. The main performance must be ensured, in this case, paper board's intensity must catch the standard which is commonly agreed throughout the world. The specification requirement must be fulfilled. For instance, in paper industry, customer may ask for easy painting surface. The durability must be guaranteed, so does the reliability. Features and aesthetic design may not so close to the requirement of process industry's product, since process industry mostly cannot make break through due to the inflexible of product characteristics and the rigid process. Even though, six dimensions in terms of product quality, process industry fulfill four out of six. The positive impact marketing & sales to product quality is pretty obvious.

Needless to say, if against the contract and expectation, there will be enormous cost waiting for the company to pay, both direct and indirect. Direct cost such as

fine for contract break, and indirect cost, such as reputation hurt and potential customer loses, etc. With the development of business field, market becomes more and more mature. The existence of benchmarked provide customer great convenience to bargain with their supplier. Therefore this kind of situation no doubt brings enormous pressure to product's quality. All in all, marketing & sale could be a big invisible hand which pushes company to enhance product quality. The empirical result is consistent with hypothesis in assuming a positive impact of marketing & sales activities on product quality.

- 2. The second hypothesis is that marketing and sales can have a positive impact on product cost.** The empirical result shows inconsistency concerning the positive influence of marketing and sales activities on product cost for process industry. Based on Kallrath (2002)'s statement, Costs generally consist of fixed cost and variable cost which including production, transportation, inventory, energy, utilities and external product procurement costs.

First of all, marketing and sales does not have affair with constant cost, for example, the land cost, machine cost, building cost and so on. Case company's property and equipment investment do not have affair with customer. And there is not sign to say customer could affect Rubber, Chemicals, and Oil industry's constant cost. As Wallance(1984) defined, process industry mostly needs high capital investment. Which means it will not be easy for customer back ward invested in process industry, because of the limitation of capital. In this case we don't discuss the stock company, since case study is carried out in a family owned company. But if some process company published in stock market, it will be more complex. Their customer also could be the owner. In that occasion, customer could be the host meanwhile when they play the role of guests. Accordingly, customer could affect the constant cost, but it will just in original stock publish, use property and sort of discount to gain stock. Or affecting the stock market price, but this method merely can affect the reality properties.

Furthermore, within the field of various costs, marketing and sales also appears to have weak impacts. Even though the sales pressure can affect costs, such as production, transportation, inventory, energy, utilities and external procurement. But if put each of the cost elements into the context of marketing and sales process, the entire picture can be seen very clearly. None of the elements could be impacted by marketing and sales' subjective willing profoundly. Since the various

costs often touch the downward limitation already. And the downward limitation exists objectively, no matter how much pressure it is, the basic principle will not change for the entire production process. So as we can see, in process industry product cost is not so easily influenced by the marketing & sales, the cost for the product is hard to make big fluctuation. Altogether, the impact from marketing and sales to cost reduction is really little.

- 3. The third hypothesis explores impact of marketing & sales on product innovation.** However, the result of case study interview shows us that there is little relationship between these two elements. According to Baregheh et al. (2009)'s Product Innovation System illustrated in figure 11, there are six steps to operate innovation process, explore, select, define, develop, launch, and manage. Even marketing and sales can help company to implement "explore" and "select" steps. As Prajogo, McDermott and Goh (2008) stated in previous study, in the pre-development stage, how to identifying customer need and incorporating those needs in design process is vital important, and it could be achieved through marketing & sales' assist. But differed from customer orientation industry, process industry is not driven by customer's need and expectation too much in the innovation field. Most of the time, it is easy for process industry to acquaint customer need, since the low flexible of product characteristic. They do not need to anticipate or invest more energy on it. Therefore they can save some unnecessary cost. Needless to say, marketing & sales does not have impact to rest of four steps of innovation. But on the contrast, the product revolution can have a profound influence to marketing and sales process. The case company Korsnäs had developed a new type board which can hold cold and solid product before marketing's expectation. And that kind of high technique board really brings quite good profit and marketing shares to case company. And before their competitors figure out that type product, during that period, marketing indeed was cash cow to case company. Therefore, hypothesis three is not right forward, but is strongly success backward.

Collectively, marketing and sales strategy can not affect product innovation. Process industry does not like other type of business which needs to catch up with customer needs. Instead, most of the time, the expectations from customers do not change frequently. One basic characteristic of process industry is high production capacity. With qualified standard, customer usually do not ask product's new function too much or too harsh. What customers want most is constant supply

which can meet the downstream process production capabilities. So marketing & sales rarely can impact product innovation.

- 4. Hypothesis four is true according to the interview. The interviewing outcomes are consistent with hypothesizes about the positive impact of better human resource performance on product quality.** As a vital important intangible asset, human resource is more and more appearing in manager's view. In terms of process industry, rigid process, high production capacity, employee seems not as important as generally thought it was. But through the case study, we find the potential relationship between HR and quality is closer than general perspective. As we know, case company is conducting lean process management system, which means the reliable of every step will impact the whole system profoundly. Since the process mostly is a linear process, which means if one step broke down, the whole system would crash. Hence how to ensure the reliability of every single step is critical for process industry. As a process type industry, they most of the time operate the machine all day long to maximize the utilization rate of high capital investment. That is means employee is not allowed to have an absence from work. But there is no such thing called absolutely. The absence due to illness and injured cannot be avoided. So company needs to make sure switch work is capable to reduce the risk and threat to entire process's reliability.

HR is responsible for education and training, sharing the core value of company. Once the company's mission is set, HR will spread it throughout of company, letting employee share organization's perspective, basing on the goals and mission and training employee correspondingly. Right training will lead to right behaviors. Right perspective will lead to right attitude. And of course, after employee do the right things and do things right, the result will be excellent. An excellent performance will encourage employee and organization to seek new goal to fulfill their growth ambitions. See Figure 13. And tracing on the recycling, it will bring sustainable growth ability for company to achieve long term improvement.



Figure 13: The positive recycling of HR impacts. Source: Gu and Yu.

**5. Hypothesis five assuming positive impact of human resource management on product cost is also demonstrated true by case study research.** Depending on the data presented on Korsn's annual report, figure 14, wages and social security cost are the second biggest part of total cost, just after cost of input good and services. And during the last ten years, case company has already decrease employees from more than 2000 to 1500, one over four is declined. But the quality of worker is increase. For instance, increase the awareness of technology, enhanced switch working ability and working domain. Based on Rayport and Sviokla' (1995) opinion , emphasizing on HR can lead to more overhead for company, but at the same time, efficient utilization of human resource can bring more benefit to company. Compare the cost with the benefits, mostly of the time the solution is a surplus. As we mentioned above, process industry mostly are linear process, there will not allow any step to break down or fail to work. Therefore, high requirement of employee skill domain is inevitable. In case the absence due to illness and injuries, employees need to be familiar with not only their own work, but also with a broad skill in different area. And each type of work need two or three years to familiar with at least. Thereafter it would be easy and safe for the entire process running. Consequently, decreasing the number of workers and increasing the individual's capability will be the trend of process industry.

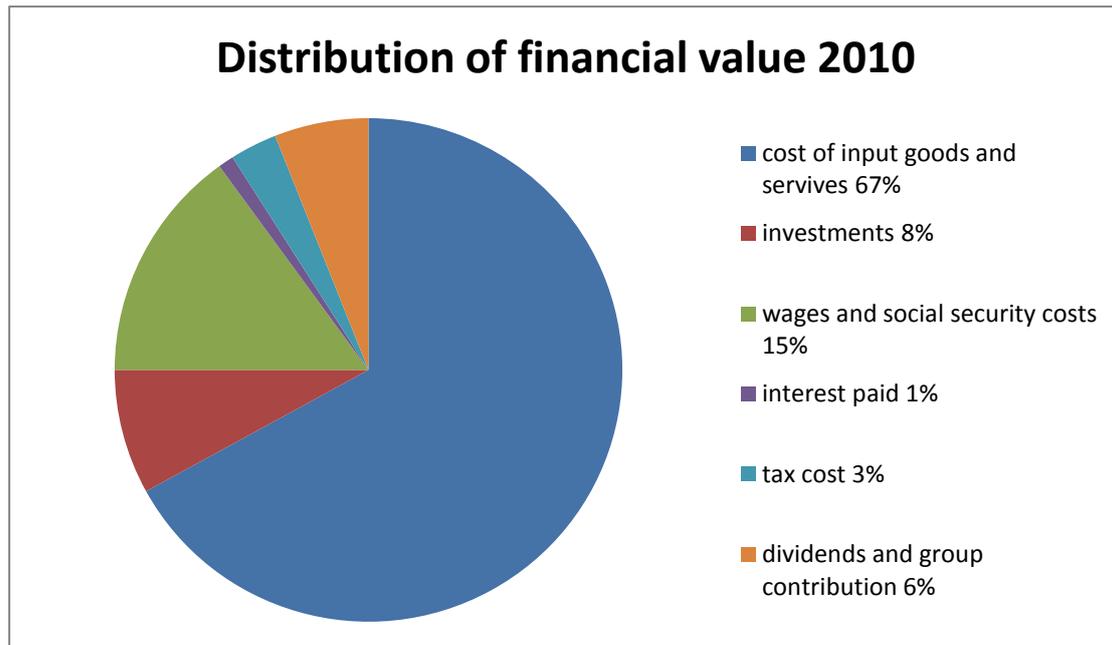


Figure 14: Distribution of financial value in 2010 of Korsnäs. Source: Gu and Yu.

**6. The sixth hypothesis assuming positive influence of human resource on innovation cannot find supportive evident to establish.** HR does not affect innovation too much. During the research study, a clear boundary among different department clarifies the duty. HR department focus on their own jobs and responsibilities most of the time. Even though HR can have some impacts on innovation process, as we mentioned above, process, explore, select, define, develop, launch, and manage. But none of them have a direct and tangible relationship with HR. Kaplan and Norton (1992) interpret that the target to success is changing since customer's need and expectation switch too fast. Hence they emphasis on the HR, striving leaning and training could the way always compass to the success. But in process industry field, HR and innovation are two different direction elements. Vertical as HR is, horizontal as innovation is. Their tangible intersection could be just a point. The point means they should co-operate with each other to support organization. Beside that there are no empirical proofs to support the hypothesis. The explanation could be that, on one hand, process industry is not in the nature to be innovative since the low flexible of product characteristics and product features, so the human resource is initially not required to help boost innovation performance. On the other hand, we find out some boundaries among different department and innovation is more a function and responsiveness for research and development department not for human resource. Even they have immeasurable impacts, but as far as we concern, HR cannot obviously impact innovation process positively.

7. **The seventh hypothesis we present is “Better supplier management has positive impacts on product quality”.** Deming (1986) stated that the performance features incurred during creating and delivering inputs impact significantly on firm’s product differentiation capabilities. Thus, helping suppliers to control their quality of input material and processing variability, in turn, enhance the firm’s performance and competitiveness. But, on the contrast, based on the case company study, we cannot prove this solution. Based on APICS’S definition of process industry, material will be add value by mixing, separating, forming or chemical reactions. Since process industry relies more on internal process to create product adding value. And through the internal process, the characteristic of raw material mostly change a lot, in this case, from lumber to paper board. It is the same to Rubber, Steel and Oil type companies. Hence the key element to obtain and maintain product quality is internal process instead of supplier’s effects. Supplier management is important which varies from different situation, and apparently it does not play an important role to process industry.

8. **“Better supplier management has positive impact on product cost” is the next hypothesis.** As we can see from the interview, case company can be influenced by the supplier product cost area. As a process industry type manufacture, the more value they have added to material, the more independent they will be from their suppliers. Meanwhile, the level of material’s rarity could also be an important part to be considered. The case company has already builds a long term relationship with forest suppliers. Their supply will not fluctuated by the global wood price trend. And it is a good way to avoid cost unpredictable. Assuming there is a computer sale agent, who is from tertiary industry, it is definitely relying on their supplier since what they can offer to customer mainly is service, but what customer wants is product not sale channel or purchasing ways. So in the second case, supplier management will influence product cost in a profound way. Process industry has an ordinary profit margin. Base on the annual report of case company, the net profit after tax is 701 Million. Compared with the total cost, 7 477 million, the percentage is 9.3%. And the 7477 million costs contain 5476 million for costs of input good and services. This kind average profit margin means process industry is not so competitive in financial field. So they need supplier’s help. Without a long-term relationship, suppliers are easy to switch to higher price offering customer, especially when the resource becomes rare. It is constant with the statement of prajogo(2008), good supplier relationship will reduce the cost and enhance competitive advantages. So how to maintain long term relationship with

supplier is vital important for process industry.

**9. The last hypothesis is “Better supplier management has positive impact on product innovation”.** From the empirical study, positive relationship between supplier management and product innovation does not establish. As indicated by the interview, process industry most often stands on its own feet in the product innovation area. Why this happen to process industry? That is because as a supplier of process industry organization, what they can offer are mostly low value and low technological material. Supplier just relies on high sale capacity to obtain profit. They have no interest and no space to develop more advanced material support since the downstream already have a high pressure competition. In terms of technology, process industry companies and their suppliers are pretty independent to each other. The cooperation across boundary in innovation part seems too difficult to achieve. If cooperate in innovation part, the communication problem, the mutual investment, the highly innovation risk, all of them will lead to a negative position in market place. Hence, supplier merely cannot have positive impact on process industry innovation.

## 6. CONCLUSION

*In this chapter, we mainly summarize findings from overall paper to throw light on research questions. And the adjusted conceptual model is presented to illustrate the significance of different influences.*

Major value chain activities for process industry are marketing and sales, human resource management and supplier management. This finding is consistent with previous literatures. But further research is needed to ensure the validity of this assertion.

But for those nine hypotheses, fundamental analysis reveals that not all findings from standpoint of case company are consistent with hypotheses. To begin with, enhanced marketing and sales activities proves strong impact on product quality while product innovation results in reverse effect on marketing and sales. Because among the features of product quality, customers of process industry concerns most about performance, conformance to requirement, durability and reliability, thus enhanced customer involvement in these four aspects could lead to significant improvement in perceived quality. But because of standardized and rigid characteristics of process industry, innovation does not have much space. Besides, marketing and sales activities do not impact much to cost which consists of fixed and variable cost. The reason lies that activities such as market investigation do not have obvious pressure on downside cost limitations.

Human resource impact significantly on product quality and cost, but appear not so obvious on product innovation. The explanations are that proper training and education could ensure employees do things right and improve during daily work, through which excellent performance of quality is reached. Additionally, labor cost constitutes second largest cost in process industry; therefore appropriate management of human resource including reducing number of labor could boost margins by saving great deal of labor cost. Again, innovation is not a vital concern for process industry and human resource is responsible for soft part including training and learning not for innovation and research, thus human resource impact not so obvious on innovation.

Supplier management has vital affect on product cost but the influence appears not so obvious on product quality and innovation. For process industries involving oil,

rubber and paper industries, internal process contribute more to quality improvement than external support. Besides, the gap between supplier and process industry companies is large in terms of techniques and manufacturing process. Therefore the influence of supplier on product innovation appears weak in process industry. However, because downtime along with its huge cost could be fatal if there are breakdown in manufacturing processes. Thus process industry requires continuous and constant supply of raw material from supplier and usually maintains long-term contracts with suppliers. There we could derive strong impact of supplier relationship on overall cost.

The summarized conceptual model illustrating different levels of significance of those impacts from critical activities for process industry to product performances is listed below in figure 15. The thin arrow means that critical activity has relatively weak impact on product performance, and the thick arrow means that there is a strong influence from critical activity to product performance.

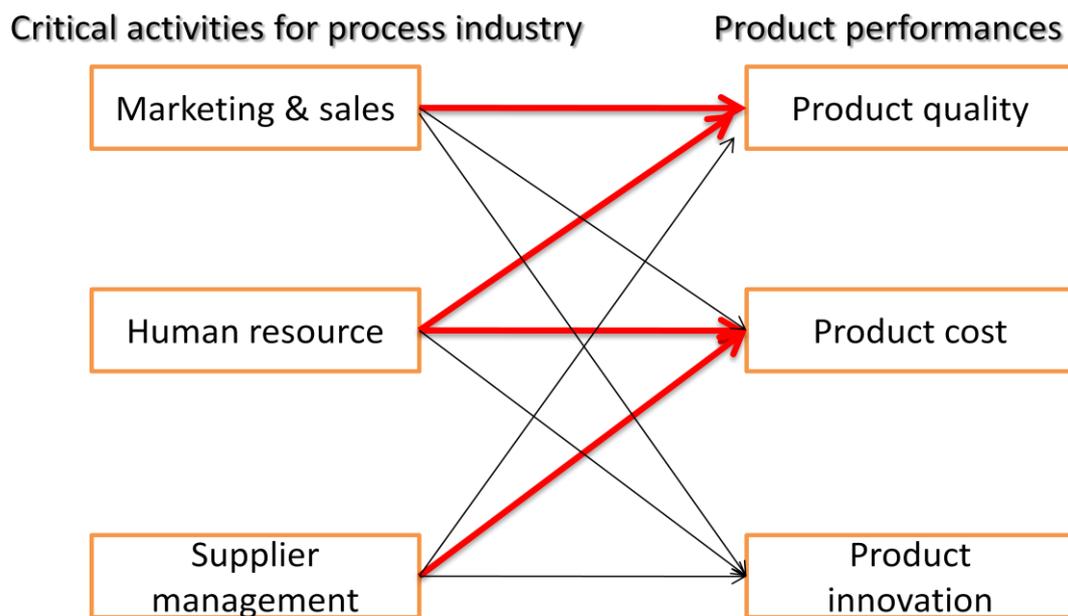


Figure 15: summarized conceptual model Own design. Source: Gu and Yu.

## **7. FURTHER RESEARCH**

Generalization of analysis against originally derived model in this paper might appear weak since it was based only on one case and four interviews, although we get in-depth insight into that single case and collect multiple data. In addition, availability of previous literatures which provide foundation for the whole paper is limited. Therefore, referring back to relevant previous studies is recommended. Besides, to ensure the validity of findings in this paper, a great deal of process industries shall be investigated but may follow the identical logic and procedure in this paper. What's more, it would be more convincing if accurate figures of case company illustrate that product performance is improved because of enhanced critical value chain activities.

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### **Interviewed people:**

- Per Eriksson, social relationship manager, Korsnäs AB. interviewed 2011-04-26,  
during 30 minutes
- Rean, chief of technology department, Korsnäs AB. Telephone interviewed  
2011-05-06, during 30 minutes
- Mats Hubinette, Senior Technical Customer Support, Korsnäs AB, interviewed  
2011-05-09, during 2 hours
- Thomas Tress, Chief manager of Human Resource, Korsnäs AB, 2011-05-19, during 1  
hour

# Appendix 1 Interview questionnaire

## Preliminary questions

1. Could you please state how long have you been working at Korsn äs?
2. What is your job title and which department do you work in?

## Major value chain activities

1. What are the vital value chain activities for Korsn äs? Please look carefully at the detailed and extended value chain framework and select the significant ones.
2. Why, according to you, are those activities most important for Korsn äs?
3. Are information related to those activities available and updated in your website?
4. Could you please find some professional and experienced employees for us to interview relevant questions about those activities?

## Marketing and sales performance

1. What kind of marketing and sales activities does Korsn äs usually hold?  
For example how do you usually promote or advertise your products?
2. What do you think is the core value of the products? (quality, innovation or environmental friendly? )
3. We noticed that 90% of Korsn äs's products are exported, through which channels do you find new customers and communicate with customers?
4. Do you actively involve customers in product design process? What if there are conflicts in perception?
5. How do you think is the relationship between marketing and sales and product quality? In other words, do you think enhanced marketing and sales could actually advance product quality significantly or not have so much to do with it?
6. Besides, as we know, promotions, advertisings and frequently close communication with customers cost plenty of time, money and resources, but on the other hand, consolidated customer loyalty may actually boost revenues and may even offset those transaction cost. So how do you consider the relationship between marketing & sales and product cost?
7. Could you share some successful marketing examples?

## **Supplier relationship management**

1. Do you actively involve key suppliers in new product development or product design process?
2. Do you have continuous improvement programs pr projects with suppliers?
3. What is the relationship between Korsnäs and its suppliers? Long-term or short-term relationships?
4. What kind of rating system do you use to select and monitor their performance?
5. How do you consider the relationship between supplier management and product quality, significant or not?
6. Similarly as mentioned before, strategic supplier relationship consume plenty of time and resources, but better enhanced inbound logistics could in return ensure product quality and reduce lead time. so how do you treat the relationship between supplier management and product cost?

Other questions concerning product features

1. Which quality dimension has so far been doing best relative to major competitors in you industry?

Performance Conformance to specifications Reliability or Durability

## **Human resource**

1. How long have you worked in Korsnäs?
2. How much employee in Korsnäs?
3. Can you divide your employee in different groups or levels?
4. Do you know your company's mission?
5. What role does HR department play in Korsnäs?
6. What contribution and value does HR department do to Korsnäs?
7. Does HR department have a system evaluation for employee's performance?
8. Do you think the reward system in Korsnäs is justice, efficient and comprehensive?
9. Do you think your company treats the employee as a kind of cost or resource to create values?
10. Do you think everyone in Korsnäs has the opportunity to make self improvement?
11. A good worker compared with bad worker, how much it will be in work outcomes?
12. Do you think it have a strong relationship between HR and product innovation?

13. HR as a resource to create value, can you find some example that your employees make some improvement in product cost?

14. If you are the top manager of Korsnäs, what is the most you want to change about Korsnäs HR department?

## Appendix 2 Examples of Korsnäs AB products

Liquid Pachaging Board:

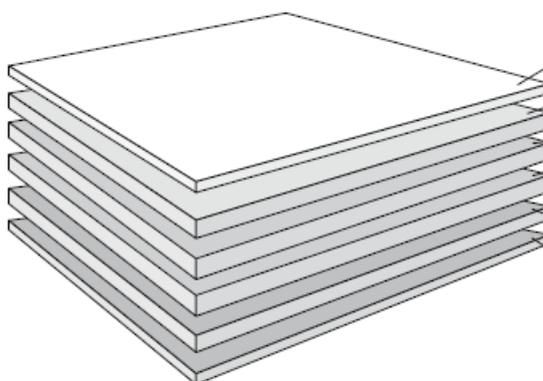


Korsnäs Classic:



### Declaration of Contents

#### DECLARATION OF CONTENTS



CLAY COATING FOR EXCELLENT PRINTING RESULTS AND HIGH WHITENESS

TCF BLEACHED FIBRES FOR EXCELLENT PRINTING RESULTS AND SMOOTHNESS

TCF BLEACHED FIBRES REINFORCED BY STRONG CHEMICAL PULP AND BLEACHED CTMP FOR MAXIMUM DESIGNABILITY, CONSUMER FRIENDLY FEATURES, GRIP STIFFNESS AND PACKAGING MATERIAL OPTIMIZATION

TCF BLEACHED FIBRES FOR REVERSE SIDE WHITENESS

CLAY COATING FOR EXCELLENT PRINTING RESULTS ON THE REVERSE SIDE