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Innovation within the Transport Packaging Industry

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Abstract

| | |
|-------------------------|--|
| Title | Innovation within the Transport Packaging Industry |
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| Tutor | Professor Allan T. Malm |
| Areas of Inquiry | <ul style="list-style-type: none">• What characterises the transport packaging industry innovation environment?• What does the evolution of transport packaging innovations look like?• What are the major driving forces of innovation within this industry?• What role do innovations play within transport packaging companies?• Are innovations an important mean of differentiation within the transport packaging industry? |
| Purpose | The purpose of the thesis is to examine, describe and analyse how innovations and innovative ability is used when creating competitive advantage within the transport packaging industry. |
| Methodology | This thesis is conducted through case studies of transport packaging companies together with a brief examination of two transport packaging customers. The theoretical framework is based on basic strategy theory concerning differentiation and competitive advantage along with general and strategy focused innovation theory. |
| Conclusions | The transport packaging industry is characterised as having low innovative opportunities. Companies tend to create competitive advantage through close customer relationships that enable them to innovate unique customer solutions. The basic product offer is enhanced by innovative value adding services that can be a mean of differentiation. The industry tends to be marked by incremental innovations aimed at improving the customisation abilities rather than the creation of groundbreaking and revolutionary innovations. |
| Keywords | Innovation, Transport packaging, Competitive advantage, Strategy, Customer involvement |

Preface

We would like to thank everyone that has made the completion of this Master Thesis possible. First of all, a sincere thanks to all our interview respondents at SCA Packaging, Kappa Förenade Well, LINPAC, Wellplast AB, IKEA and Kraft Foods. Without your committed participation and willingness to dedicate time and effort in sharing your invaluable knowledge this thesis would not have been able to complete. Our tutor Professor Allan T. Malm has been supportive of our work and has helped us overcoming the difficulties of writing a Master Thesis.

Lund 11th June 2004

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1 Introduction

This thesis aims to analyse the importance of innovations and innovative ability within the transport packaging industry. The introduction begins with a brief presentation of the background of the industry, which is followed by a problem discussion that identifies the areas of inquiry. Thereafter the purpose of the thesis is presented, which is further clarified by the succeeding section that defines the definition of innovation. The last section describes the thesis' target audience.

1.1 Background

The transport packaging business is an essential part of the world economy due to the need for product protection and handling during transportation and distribution. It has been proven that the demand for transport packages is positively correlated to GDP and industrial output (www.fefco.org). The value of the European transport packaging market is approximately 200 billion SEK. The total packaging market consists of primary packaging and secondary packaging. Primary packages are those packages that the end-user comes in direct contact with through the purchase and marketing of end products. Secondary packages are also known as transport packages and consists mostly of corrugated board, plastic, wood and cartons.

Corrugated board is the most widely used transport packaging material and it stands for about 63% of the total transport packaging market. Three large companies dominate the European corrugated packaging industry: SCA Packaging (SCAP), Kappa Packaging and Smurfit. Together, the three companies hold around 38% of the market and they constantly expand their market shares, mainly through acquisitions (SCA Annual Report, 2003). During the past decade the industry has experienced an ongoing consolidation that has resulted in a fierce competitive environment surrounding the largest players on the market. Since the similarities among these companies are substantial, both concerning product range and technical competence, the corrugated box has become a standard product and is threatened by commoditisation (Malm, 2001).

The second most used transport packaging material is plastic and makes out 18% of the European market (SCA Annual Report, 2003). Re-usable injection moulded plastic boxes dominate this segment of the transport packaging market. The market shares of these plastic boxes are currently increasing rapidly. This trend is evident in Sweden where plastic boxes are replacing corrugated boxes in the entire food sector. LINPAC Materials Handling is one of the world leaders in this area and their major competitor in this arena is the company Arca (Rabe, Interview).

It has, for centuries, been widely accepted that innovations and technological developments are crucial contributors to companies' growth and efficiency gains. It has also been proven that innovations play a major role in both the destruction and the foundation of jobs and employment (Edquist, 1997). A firm's innovative

process has also been a subject of examination when aiming to explain how specific companies in an industry differ regarding their business performance (Leiponen, 2000).

Drawing from this background information we find it interesting to examine the transport packaging industry and how companies within this sector try to differentiate themselves in order to create competitive advantage. In this thesis we focus on companies' possibilities to differentiate themselves through innovations and thus, use innovations and technology developments as a source of competitive advantage and whether they are sustainable or not.

1.2 Problem discussion

Between the years of 1990 and 2000 the European transport packaging industry has experienced a substantial degree of consolidation. The six largest companies have increased their total market share from 33% to 50%. (www.fefco.org) In other words, the industry tends to be dominated by a smaller number of large multinational companies. The triggering factors of the consolidation seem to be the ongoing globalisation and the increased importance of creating high customer value. It is obvious that growth within the dominating transport packaging companies mainly derives from distinctive expansion strategies focused on acquisitions (SCA Annual Report, 2003).

Due to the simplicity of the basic corrugated box and the fierce consolidation driven competition, companies are constantly forced to try to differentiate their products in order to attract new customers, retain existing customers and deliver high customer value. Innovations play an important role in this process. Over the past years, product innovations concerning material, design and print have been presented in order to attract customers who seek high quality, process efficiency and new marketing tools.

However, when examining the transport packaging industry it appears to be characterised by transparency. In other words, competitors who seek to gain market shares often easily and rapidly imitate new product features. As a result, it seems to be difficult to achieve sustainable competitive advantages through pure product innovations. However, previous research has shown that there is correlation between a firm's innovative ability and its performance (Leiponen, 2000). Existing literature also explores the sectoral differences among industries and their differing ability to innovate (Edquist, 1997). Innovations have also proven to be important in present times when the traditional spring of competitive advantage seems to decline. It is further claimed that innovative companies, as well as early followers, enjoy a higher rate of profit compared to those who do not invest in innovative activities (Jagersma, 2003).

The above stated discussion leads to the following questions:

- *What characterises the transport packaging industry's innovation environment?*
- *What does the evolution of transport packaging innovations look like?*
- *What are the major driving forces of innovation within this industry?*
- *What role do innovations play within transport packaging companies?*
- *Are innovations an important mean of differentiation within the transport packaging industry?*

1.3 Purpose of the thesis

The purpose of the thesis is to examine, describe and analyse how innovations and innovative ability is used when creating competitive advantage within the transport packaging industry.

1.4 Definition of innovation

A central distinction is the one between product innovation and process innovation. This way of viewing innovations has its heritage in the work of Joseph Schumpeter. Schumpeter, as quoted in Edquist, Hommen & McKelvey (2002), defined a product innovation as "the introduction of a new good ... or a new quality", whereas a process innovation is characterised as "the launch of a new production method ... or a new way of marketing a good" (Edquist et al, 2002, p.29).

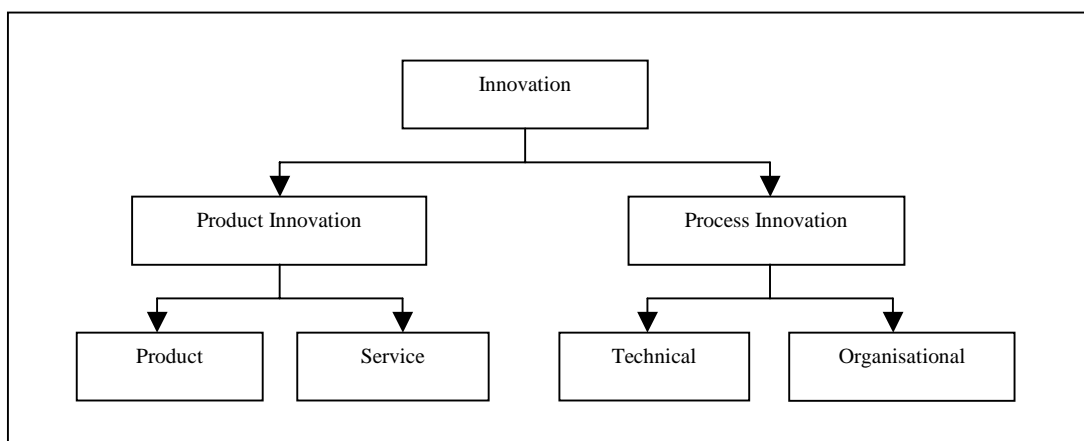


Figure 1.1 Definition of innovation (Edquist, Hommen, McKelvey, 2002, p. 40)

Product innovations are hence viewed as new or better products that are developed and manufactured. It is a question of *what* is produced. The category of product innovation can, however, include both new goods and new services. Process innovations are on the other hand new ways of producing goods and

services, and are consequently a matter of *how* existing products are produced. Process innovations can either be technical or organisational, where a technical process innovation can be defined as a reduction of the required amount of input, as a result of a technical change. Organisational process innovations are new ways of organising the work, often by introducing a new organisational form (Edquist et al, 2002). This thesis has been delimited regarding the definition of innovation to not include organisational process innovations since an examination of these innovations would be too time consuming to include within the frame of this thesis.

1.5 Target group

This thesis targets:

- The entire transport packaging industry and other mature industries facing a similar market situation.
- Researchers and people who are active or interested in innovations.
- All companies who actively pursue an innovative strategy and are interested in how this affects their ability to gain competitive advantage.
- Ambitious students who aim to gain a deeper knowledge within the transport packaging industry and have a dedicated interest in innovation.

2 Methodology

The basic methodological view of the study is presented in this chapter. The different procedures used to gather, summarise and analyse the information are presented. The intention is to give the reader a chance to reflect upon the methodological considerations of the study and thereby achieve an enhanced understanding of how the research is conducted.

2.1 Methodological considerations

We have chosen to use a qualitative research approach in order to fulfil the purpose of the thesis. The qualitative approach will help us explain and create an understanding of the subject and thereby identify the important patterns in order to draw conclusions. According to Andersen (1998) the purpose of choosing a qualitative research approach is that one wants to create an understanding rather than appoint a specific causal connection. The reasons for not choosing a quantitative approach that is based on statistical data are threefold. Firstly, it is difficult to gain access to necessary company specific data that is too sensitive to be spread outside the organisation. According to Halvorsen (1992) the ability to measure the variables is a requirement when using a qualitative approach. Secondly, to be able to draw general conclusions the quantitative approach requires a large amount of interview respondents, which is too time-consuming in relation to the thesis' time frame. Finally, there is a great risk that the respondents will, subjectively interpret relatively unfocused questions that are distributed as a questionnaire. The answers will consequently be difficult to compare, which will undermine the validity and reliability of the study.

The qualitative study consists of case studies of four transport packaging companies where we have conducted deep interviews with key personnel. In addition to the case studies interviews have been carried out with two different customers of transport packages. The first step of the research process is made out of explorative interviews with representatives from companies and organisations that are active within the transport packaging industry as well as their customers. The explorative interviews is meant to deepen our knowledge and understanding of the industry and help us to find respondents, who are suitable and willing to participate in more thorough and in-depth interviews. These deep interviews make out the basis when determining the important sources of differentiation leading to competitive advantage within the transport packaging industry. The interview respondents, furthermore, facilitate the gathering of appropriate information regarding the importance and the achieved impact of innovations within the sector. This information, in combination with the respondents' qualitative opinions as well as theories on the subject, provide us with sufficient knowledge needed in order to draw conclusions about the relationship between innovation and achieved competitive advantages within the industry.

The researcher's main task is to link the theoretical framework and the observed reality. How theory should be related to reality is, thus, one of the central problems within scientific work. The two alternative ways, in which the theory production can be pursued, are called *induction* and *deduction* (Patel & Davidsson, 1994).

With a deductive way of working the researcher draws conclusions on specific phenomena based on general principles and existing theories. When using this approach, hypotheses are derived from already existing theories and then examined empirically. When the researcher has gathered the theories, he determines which empirical information shall be gathered and how that information shall be interpreted and related to the chosen theories. An inductive research approach is the opposite of a deductive, since relevant theories are chosen after the empirical studies have been gathered (Patel & Davidsson, 1994).

This thesis is conducted through a mix of both the deductive and inductive methodological approach, which Patel & Davidsson (1994) have named abduction. The theoretical studies make out the research basis for the empirical studies. The inductive approach is used when complementing the theoretical framework after the empirical study is accomplished. The chosen theory facilitates the analysis of the empirical studies enabling us to fulfil the purpose of the thesis.

2.2 Theoretical studies

Theories dealing with innovation systems are used to facilitate the understanding of which factors influence a firm's innovative abilities. These theories are designed to describe, understand and explain the processes of innovation by considering all the important factors that shape and influence innovations. Since we focus on innovations specific to the transport packaging industry, our chosen focal point is sectoral innovation systems (SIS). The SIS comprise a theoretical framework describing dimensions of innovation processes in relation to different industrial sectors.

The theoretical framework thereafter presents a brief summary of various basic strategy theories regarding how competitive advantage is created and how the resources and capabilities of the individual firms affect the competitive situation. First off, literature describing the industry's key success factors and possibilities of creating competitive advantage is explored. Basic strategy theories are used to illustrate and understand what strategies transport packaging companies may use when positioning their products. These theories are further expanded with the use of contemporary literature on the subject.

We subsequently refer to the resource-based view (RBV) that will provide insight to the importance of firms' resources and capabilities and how these are related to competitive advantage. This view is complemented with literature describing competences in relation to innovation.

To further deepen our knowledge of the effects of innovations within the transport packaging industry we acknowledge theories constructed in similar industry situations. Since the transport packaging industry is nowadays a mature and stable industry we need to explore theories that are more closely related to the situation. We also find it necessary to explore literature dealing with the effect of incremental innovations, customer involvement in the innovative process and pioneering advantages of innovations.

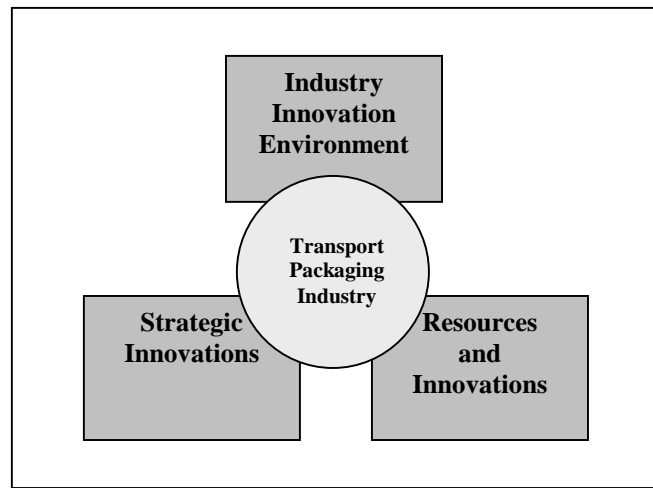


Figure 2.1 Theoretical studies

2.3 Procedure of the empirical study

The empirical studies are based on primary data gathered from interviews as well as secondary information assembled from the studied companies' annual reports, information material and company websites. In order to find people that possess the required knowledge our tutor Professor Allan T. Malm helped us to arrange a meeting with Dick Sanders who works as Research Director at SCAP. Sanders provided us with names of experts working at SCAP that he thought would make out good potential interview respondents. These persons could in turn supply us with additional names of suitable people within SCAP.

| Explorative interviews | | | |
|-------------------------------|---------------------------|-----------------------------|--------------------------|
| Name | Position | Company | Form of interview |
| Begeli, Gerald | ScanStar committee | Packforsk | Telephone |
| Belfrage, Magnus | Marketing & Sales Manager | SCAP | E-mail |
| Henriksson, Kjell-Åke | Product Testing | Packforsk | Telephone |
| Hillvall, Anders | Customer Support (Print) | SCAP | Telephone |
| Jönzon, Anders | Managing Director | Wellplsat AB | Telephone |
| Karlsson, Lars | Designer | Smurfit (Nybro) | Telephone |
| Klackenberg, Madeleine | Manager of ScanStar | Packforsk | Telephone |
| Leckt, Johan | | Svenska Wellpapp Föreningen | Telephone |
| Lindbom, Per | Sales Manager | Smurfit (Jönköping) | Telephone |
| Söderlund, Ulf | Customer Support (Print) | SCAP | Telephone |
| Tillander, Olof | Packaging Consultant | Packforsk | Telephone |
| Pettersson, Göran | Packaging Concepts | Stora Enso | Telephone |
| Österber, Folke | Rsearch Program Director | SCAP (Sundsvall) | Telephone |

The table above presents the respondents of the explorative interviews. These interviews were conducted with companies and industry trade organisations in order to gain a deeper knowledge and to broaden the study to an industry wide perspective.

The explorative interviews resulted in three transport packaging companies besides SCAP, as well as two major customers that were willing to participate in deep interviews. Initially, we wanted to include the three largest corrugated producers in Europe and therefore Kappa Förenade Well (Kappa FW) and Smurfit were contacted. However, Smurfit eventually decided not to participate in the study due to lack of time. Since we aimed for the study to cover the entire transport packaging industry we also chose to include a player active within the plastic segment of the market. We also wanted to capture novel thinking and by including a small player, who uses an innovative product to compete with the traditional packaging producers. These companies, represented by Kappa FW, LINPAC Materials Handling Scandinavia AB and Wellplast AB, are all different in respect to SCAP. Kappa FW is one of SCAP's major competitors on the European market and is also specialised on corrugated material. LINPAC, on the other hand, is specialised in plastic materials and produce reusable plastic boxes. However, LINPAC has also a global reach and a strong market hold in Europe. Wellplast AB is remarkably different from the larger and more established competitors that we have examined. Wellplast AB are specialised in the material called Wellplast® that they are the sole producer of. Figure 2.1 illustrates the different companies' market position.

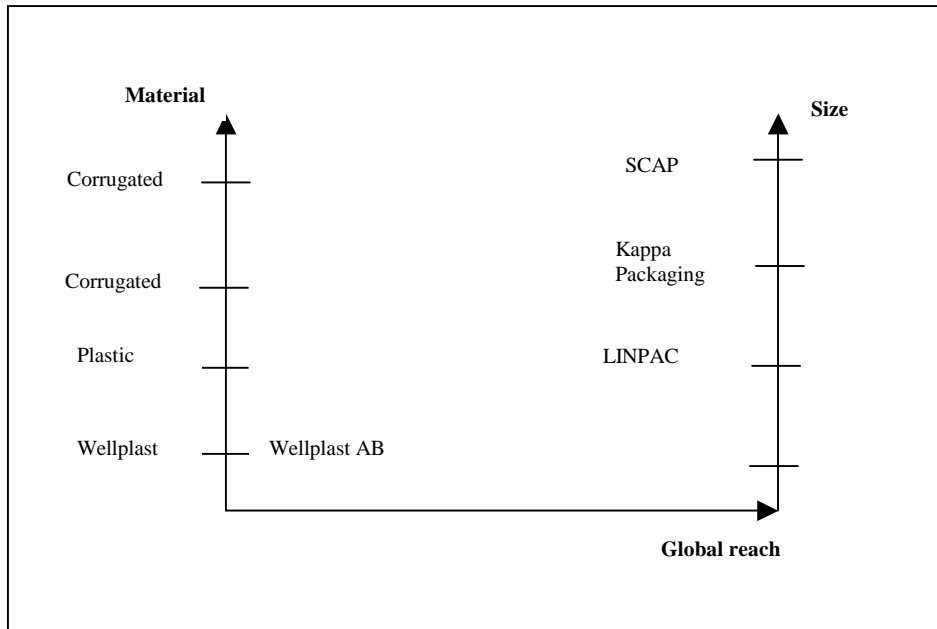


Figure 2.2 Case study positioning

The transport packaging customers that we have interviewed are IKEA and Kraft Foods. Our goal was to include two large buyers of corrugated board that would nevertheless be rather different as customers and therefore contribute with differing and interesting opinions. Since IKEA has access to in-house

competences regarding packaging development they have quite different needs and demands than Kraft Foods that is a more traditional customer.

The chosen interview respondents consist of employees working at the above-mentioned companies. The respondents work within various departments and they also have different educational backgrounds as well as different professional competences. The idea is to cover a wide aspect of opinions gathered from different parts of the industry. However, all respondents have in common that they hold high positions within their respective company and the fact that they have several years of experience of working within the transport packaging business.

2.3.1 Deep interviews

The interviews were arranged by telephone or e-mail contact, and were carried out as personal meetings with the respondents at their respective workplaces when it was possible. The respondents were provided, via e-mail, with a brief interview guide a couple of days in advance covering the main content of the interview.

In situations where we have been constraint regarding the respondents' geographical position and therefore have not had the possibility to meet them in person we have mainly carried out interviews over the telephone. On a few occasions, circumstances have made it impossible to carry out verbal interviews and we have in those cases chosen to conduct interviews via e-mail. In this case a brief introductory text describing the purpose of our thesis was followed by a questionnaire, all distributed via e-mail.

The personal as well as the telephone interviews were conducted inline with the Semi-Structured model described by Denscombe (2000). The dialogue was structured according to the questionnaire that we had created beforehand and distributed to the interview respondent. Even though the questions were tailored to suit the individual respondent, all interviews cover the same general topics. Although the questions were created beforehand, emphasis was given on posing the questions in an open manner that encouraged the respondent to do the most of the talking. This also promoted us to come up with additional questions covering areas that we in advance had not thought about. All the interview respondents were positive towards our use of a tape recorder and accepted its usage when documenting the results. The respondents of the deep interviews are presented in the table below.

| Deep interviews | | | | |
|------------------------|-------------------------------|--|--------------------------|-------------|
| Name | Position | Company | Form of interview | Date |
| Bergquist, Lena | Buyer of packaging material | Kraftfoods Sweden AB | Telephone | 2004-05-27 |
| Dickner, Alan | Manager of packaging concepts | IKEA | Telephone | 2004-05-14 |
| Dölling, Ragnhild | Researcher | SCAP (Sundsvall) | Telephone | 2004-04-20 |
| Eriksson, Erland | Product Development | SCAP (Mariestad) | Telephone | 2004-05-17 |
| Holmlund, Lars-Peter | Marketing Director | Kappa FW | Telephone | 2004-05-04 |
| Holmlund, Lars-Peter | Marketing Director | Kappa FW | Personal | 2004-05-11 |
| Rabe, Mats | Managing Director | Linpac Materials handling Scandinavia AB | Personal | 2004-05-03 |
| Rabe, Mats | Managing Director | Linpac Materials handling Scandinavia AB | Personal | 2004-05-17 |
| Renman, Magnus | Development Nordic Region | SCAP (Järfälla) | Telephone | 2004-04-20 |
| Renman, Magnus | Development Nordic Region | SCAP (Järfälla) | Telephone | 2004-05-17 |
| Traerup, Michael | Managing Director | SCAP (Denmark) | E-mail | 2004-05-18 |
| Volckerts, Jacob | Marketing & Finance | Wellplast AB | Personal | 2004-05-03 |
| Wernersson, Lennart | Manager of Construction | SCAP (Värnamo) | E-mail | 2004-04-28 |
| Österberg, Folke | Research Program Director | SCAP (Sundsvall) | Telephone | 2004-05-16 |

2.3.2 Strengths and weaknesses

There are numerous advantages of conducting oral interviews compared to written surveys carried out through questionnaires. First of all, oral interviews make it easier to ask open questions that promote the respondent to talk freely, which often results in more in-depth answers. During this kind of interview it is also possible to sort out any misunderstandings that might appear regarding the questions asked. The interviewer is also given the opportunity to raise spontaneous questions that emerge during the interview or to ask the respondent to expand their answer on a specific question. The oral interviews that have been conducted either as personal meetings or over the telephone, each have their benefits. The personal meetings make it possible for the respondent to show graphical pictures and hand out information material. The interviewer can also reflect over body language and other implicit expression that might enhance the meaning of the answers. The main advantage of conducting telephone interviews is that it is convenient and not as time consuming as personal meetings.

The main disadvantage of carrying out personal interviews appears as a result of the so-called Interview-effect. The Interview-effect implies that the respondent may be influenced by the interviewer and subconsciously answer differently depending on the perception of the interviewer. Denscombe (2000) argues that variables such as sex, age and ethnical origin of the interviewer are possible factors that might determine the answers given. It may also happen that the interview respondent tends to be willing to give answers that satisfy the

interviewer, which affects the correctness and honesty of the answers (Denscombe, 2000). Another disadvantage of booking meetings with the respondent is that it is time consuming and difficult to find a time that suits every schedule. A clear disadvantage of conducting interviews via e-mail is that the interviewer is not involved at all during the information gathering process. It is difficult to know how much time the respondent has put into the answers and even who actually has provided the answers.

2.3.3 Validity

Validity is defined as an instrument's capacity to measure what is supposed to be measured (Eriksson & Wiedersheim-Paul, 1997). In order to create a study with high validity, it is crucial that the chosen interview respondents possess knowledge that facilitates the fulfilment of the purpose of the thesis. Since all the interview respondents have many years of experience within the transport packaging industry and the fact that they hold high positions within their respective companies, indicates that they possess the required knowledge. In addition to this they are all deeply involved within the transport packaging industry on a daily basis, which brings high validity to the method used. However, the different respondents will obviously possess varying degrees of experience on the subject, which in turn generates differences in validity between the interviews. We are also aware that the interview respondents may not always express an objective view since it is likely that they will present a positive picture of their own company. We have tried to compensate this by including a wide spectrum of market participants. The customer view will further balance the views presented in the empirical studies.

2.3.4 Reliability

A high reliability indicates that the instrument used provides identical data regardless of how many times the research is carried out. Possible variations in the output only depend on variations of the object measured and not due to instability of the instrument used to measure it (Backman, 1998). Personal interviews tend to result in high reliability since misunderstandings can be clarified and additional questions can be asked when necessary. Since the interviewer is personally involved throughout the information gathering process it is possible to influence how much time is put aside to answers the questions. However, it shall be noted that not all interviews have been carried out as personal meetings. Concerning the interviews carried out via e-mail it is, for instance, impossible to know how much time and effort the respondent has devoted, which naturally affects the reliability negatively.

2.4 The analysing process

Our analysis will focus on relating our empirical studies to the chosen theoretical framework in order to identify the essence of the empirical studies. The aim is to discover patterns not only between the theoretical framework and the empirical

studies and thereby be able to draw conclusions that will fulfil the purpose of the thesis.

Our analysis will be conducted according to the following steps:

1. We analyse how different sectoral specific dimensions affect and influence the innovative environment within the transport packaging industry.
2. We use theories regarding the creation of competitive advantage in order to analyse how different transport packaging solutions are positioned.
3. Analysis of the driving forces of innovation within the industry
4. Analysis of the effects of innovations within the industry.

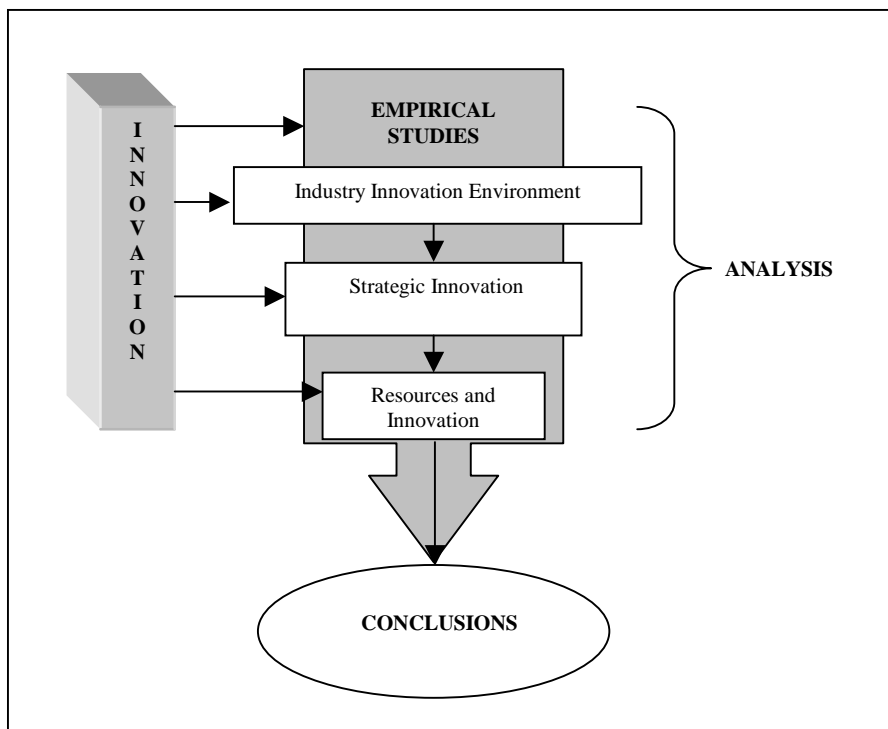


Figure 2.3 The analysing process

2.5 Thesis outline

The introduction includes a brief presentation of the background of the industry, which is followed by a problem discussion that identifies the areas of inquiry and finally the purpose of the thesis is presented.

The methodology chapter presents the different procedures used to gather, summarise and analyse the information that is presented. The intention with this chapter is to give the reader a chance to reflect upon the methodological considerations of the study and thereby achieve an enhanced understanding of how the research was conducted.

The theoretical framework provides the reader with a presentation of the theories that are later used to analyse the empirical studies. This chapter ends with a

summary that concludes what we consider is essential to remember when reading the thesis.

The empirical studies commence with a brief overview of the evolution of innovations within the transport packaging industry. Thereafter the four case studies are reported, aiming to present the activities of the firms and their approach as well as their day-to-day work with innovation and innovative capabilities. Finally the chapter examines two major transport packaging customers and their view on the importance of innovative activities within the industry.

In the analysis chapter we have analysed and explained the empirical studies in relation to the theoretical framework earlier presented. We have tried to distinguish patterns of similarities and differences between the conducted case studies.

The final chapter consists of conclusions that summarise our findings in relation to questions of inquiry.

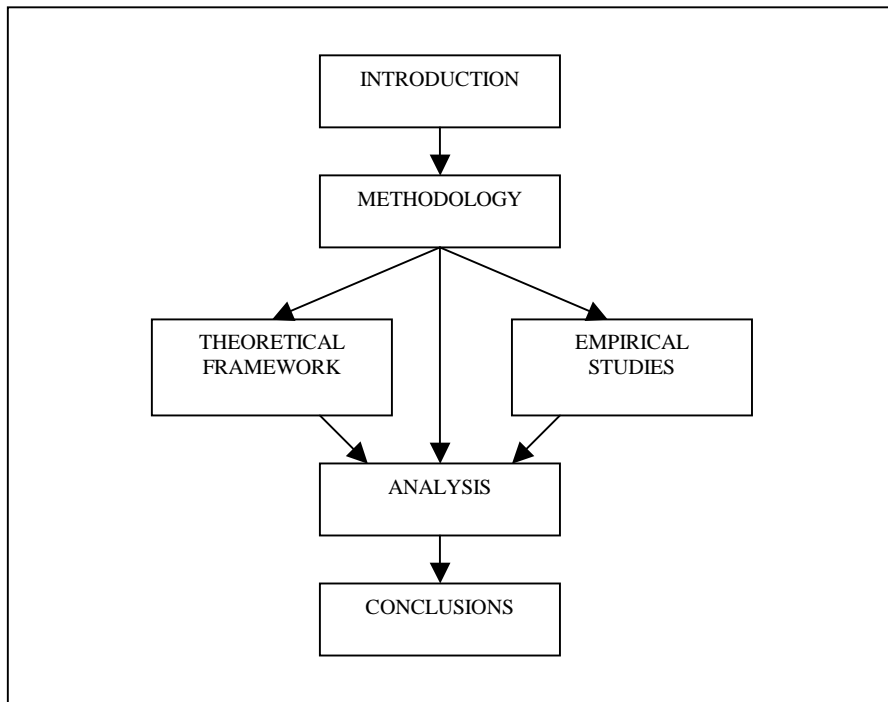


Figure 2.4 Thesis outline

3 Theoretical framework

This chapter is introduced by a theory describing variables that can be used to analyse the industry innovation environment. This theory is followed by a section providing a brief summary of various theories dealing with differentiation and competitive advantage. The chapter also includes various strategy theories focusing on innovation. Finally, theories dealing with the connection between firms' resources and innovation are presented.

3.1 The industry innovation environment

It has, for centuries, been obvious that different innovations play a major role in increasing productivity and creating economic growth. Not surprisingly a vast amount of literature has therefore been published aiming to study and describe the innovation phenomena and also explain different kinds of technical change. The systems of innovation approach represent a contribution within this domain (Edquist, 1997).

It is rather complex to fully understand what affects the innovation process since numerous influencing factors exist simultaneously. This complexity implies that firms seldom are able to create innovations in isolation but are constantly interacting with the surrounding environment. The systems of innovation approach identify organisations and institutions as the two major sources that influence the innovation process. Organisations in this context include other firms, universities, research institutes, investment banks etc. Through interaction with these organisations firms often create relationships with each other in order to facilitate the emergence of new innovations. However, existing institutions also influence the innovative behaviour of firms. In this context institutions are known as laws, cultural norms, technical standards, or similar aspects that can constraint or create incentives for innovative activity. The organisational actors together with the surrounding influencing factors make out what is called: systems of innovation. The systems of innovation approach is designed to take all the important factors that shape innovations into account, and thereby create a basis that can be used when describing, explaining and studying the innovation processes (Edquist, 1997).

Within the literature dealing with innovation systems a number of different concepts and constellations have been presented. National Innovation Systems (NIS), Local Innovation Systems (LIS) and Technological Systems (TS) are three different forms of innovation systems that emphasises different aspects of the innovative process. Yet another system, that will be given the greatest amount of attention in this text, is the concept of Sectoral Innovation Systems (SIS).

3.1.1 Sectoral Innovation Systems (SIS)

The SIS consist of a group of companies that are all involved in producing a specific sector's products and the development of this sector's utilised technologies. These firms are connected not only through relationships of interaction and cooperation but also since they are actively competing against each other within the same market and innovative environment (Edquist, 1997).

Since SIS emphasise that different firms have access to different capabilities and hence different innovative performances, the main actors in this concepts are the individual firms. This, however, does not undermine the important interaction earlier described between organisations and institutions, but merely has a slightly different point of focus (Edquist, 1997).

3.1.2 Technological Regime (TR)

The forces that affect the dynamics of SIS can all be summarised in the concept of Technological Regime (TR). It has been shown that the technological environment in which a firm is active has a large impact on the intensity of competition, the degree of industrial concentration and the prevailing entry barriers in an industry. The TR can be described as the relationship and combination between two basic variables:

- Opportunity conditions
- Appropriability conditions

It has been shown that a sector's innovative environment can be described and analysed according to these two variables. It has furthermore been proven that opportunity and appropriability conditions have major effects on the intensity of innovation, the degree of industrial concentration and the entry barriers within a sector (Breschi & Malerba, 1997).

3.1.3 Opportunity conditions

The opportunity condition of a specific firm is the probability that a certain amount of money invested will result in an innovation. When measuring a firm's opportunity conditions this can be done according to four dimensions: *level, variety, pervasiveness and sources* (Breschi & Malerba, 1997).

First of all, Breschi and Malerba (1997), characterise a company's opportunity *level* as high or low. High opportunities exist when there is a powerful incentive to innovate and where the economic environment encourages innovators and facilitates the emergence of innovations.

Whether a firm has a low or high level of opportunity conditions can be explained by where in the industry life cycle the company is situated. In early stages of the life cycle there is often a wide *variety* of possible technological solutions, which naturally leads to a higher level of innovative opportunities. However, when a company is active in an industry where a dominant design has been introduced

possible technology variations is heavily reduced. In this case innovations are more about improving the efficiency of production processes and the performance of the existing products (Breschi & Malerba, 1997).

The level of *pervasiveness* within a sector has to do with whether new knowledge can be applied to a wide range of products and markets or if new knowledge mainly is relevant for only one product or market. If it is possible to apply new knowledge to wide variety of products and markets, the sector is known to have high pervasiveness (Breschi & Malerba, 1997).

The *sources* of innovation and hence opportunity conditions vary quite remarkably between different sectors and industries. While some sectors heavily rely on major breakthroughs carried out at universities, others are more concerned with advancements in R&D and from internal learning. In other sectors the external learning plays a major role where customers and suppliers contribute with new knowledge and ideas (Breschi & Malerba, 1997).

3.1.4 Appropriability conditions

Appropriability conditions deal with the difficulty to protect innovations and technological developments from imitating competitors. It also involves the possibilities of creating innovations that actually earn profits. A firm's ability to protect its innovations can be categorised according to a high or a low level of appropriability. A high level indicates that a sector has a high ability to protect their innovations from imitation. The means of protecting one's innovations differ between different sectoral systems. Means of appropriability include patents and other forms of secrecy and licensing abilities (Breschi & Malerba, 1997).

3.1.5 Schumpeterian dynamics of innovators

This section will examine the relationship between TR and SIS according to the dimension of Schumpeterian dynamics of innovators. This dimension refers to the competition between firms as well as specific sectoral dynamics, such as size, number of firms and concentration of innovators. The Schumpeterian dynamics of innovators examine how the competitive process is affected under different forms of opportunity and appropriability conditions (Breschi & Malerba, 1997).

If the TR is known to have a high level of innovative opportunities, the innovators are according to Schumpeterian dynamics expected to experience sectoral concentration and consequently a low number of innovators. The high level of opportunities will on the other hand result in many new innovators entering the sector and trying to gain market shares. The increased competition may also result in increased innovative activity within the established firms, which in turn will lead to the elimination of non-successful innovators. If the opposite is true, that is, if there is a low level of opportunity conditions, the sector will not attract as many innovators to enter. However, with less competition this will in turn limit the incumbents' innovative growth and will as a consequence lead to a higher

concentrated industrial sector where the major innovators will experience a secure market position (Breschi & Malerba, 1997).

A high level of innovation appropriability, which makes it difficult for competitors to imitate successful innovations, will result in increased growth for the innovators and will consequently lead to a higher degree of industrial concentration and fewer innovators. On the contrary, if there is a low level of appropriability and innovations therefore are discouraged by the system, this will have the reverse effect and result in a sectoral structure including a large number of innovators (Breschi & Malerba, 1997).

3.1.6 Schumpeter Mark II

In a sector characterised by high opportunities and high appropriability conditions there is often a high innovative concentration, a low number of innovators and an extremely stable environment for the market leaders. Schumpeter himself in 1942 named this condition Schumpeter Mark II. Schumpeter showed that under these conditions “*successful innovators can rapidly gain substantial shares of the market, keep them over time, and edge out less successful firms*”, which leads to a low number of serious innovators (Breschi & Malerba, 1997, p. 139).

3.1.7 Schumpeter Mark I

The predecessor to Schumpeter's Mark II is, maybe not surprisingly, the condition labelled Schumpeter Mark I, which was introduced in 1934. This condition is found when there is a high level of opportunity and a low level of appropriability. These factors lead to a low concentration of innovations among a large number of players, low entry barriers and a high instability for the market leaders. Still, companies can achieve competitive advantages through increased investment in innovative activities, but they will not be of a sustainable nature since they will not be possible to protect from imitators and will by itself not result in a dominant market position. It should also be noted that in the case of low opportunity conditions, the Schumpeter Mark I pattern will only be reinforced (Breschi & Malerba, 1997).

3.1.8 Characteristics of SIS within a traditional industry sector

Breschi and Malerba (1997) claim that the various dimensions of TR, described in the previous section, affect the characteristics of SIS in various ways. They have also attempted to sketch five major examples of SIS characteristic for five different industrial sectors including: traditional sectors, machinery and the industrial sector, the auto industry, the computer mainframe industry and the software and microelectronics industry in Silicon Valley. However, due to the purpose of the thesis this text will only cover the example regarding the traditional sector (Breschi & Malerba, 1997).

The traditional industry sector includes sectors such as agriculture, textiles, clothes, wood and paper. In general, the TR in traditional sectors tends to be

distinguished by low levels of opportunity and appropriability. The relevant technological knowledge base that is required for innovative activities is normally characterised as simple, standardised and represented by equipment and materials. The innovative opportunities often deal with the ability to decrease the production cost or by increasing the product's performance through new materials coming from suppliers (Breschi & Malerba, 1997).

The sector is furthermore known to have a low level of appropriability, which leads to rapid imitation and the erosion of competitive advantages. The competition rather takes place on low price as well as post-sale assistance. It is also believed that the low innovative opportunities will limit the sectoral concentration (Breschi & Malerba, 1997).

3.2 Strategic innovation

There are two influential schools of thinking within strategic management, namely the Industrial Organisation (IO) view and the Resource Based View (RBV) of the firm. The latter will be further presented in section 3.3. The industrial organisation sets out to evaluate the competitive situation and the factors that determine profitability within an industry. Porter's five forces is the most commonly known framework for assessing industry attractiveness. The framework consists of factors that affect the companies within the industry such as bargaining power of suppliers, bargaining power of buyers, the threat of substitutes and the threat of new entrants. The model is sometimes extended to include the existence of complement suppliers as well. After evaluating the industry, an image of the industry key success factors and how the driving forces of competition are determined by the industry structure appears. This information, in turn, is the basis for future strategic choices (Grant, 2002).

Porter's generic strategies distinguish two main directions a company can choose in order to compete in an industry-wide market: differentiation and cost leadership. The prior means that the company tries to offer the customer something unique for which the customer is willing to pay a premium price that exceeds the cost of differentiation. Such unique features can consist of high quality materials, special product characteristics or high quality after sales service. The latter represents a strategy focused on producing standard products, so-called commodities, at a lower cost than the competitors but with equal product features (Cullen, 2002).

A company creates a competitive advantage when it succeeds in outmatching the competitor in attracting and retaining customers. Both these generic strategies can be used in order to achieve and sustain a competitive advantage. A sustainable competitive advantage is created when a company's strategy is not easily neutralized or attacked by competitors. This is the key for creating a long-term profitability (Cullen, 2002).

The Industrial Organisation view and Porter's Five Forces focus on the rivalry between competitors. However, this is criticized by Hax and Wilde II (2001),

since they mean that a focus on competitors will lead to commoditisation and a following price war when companies try to create competitive advantages. The authors have developed The Delta Model, which contributes to strategy with a new collection of strategic options. Instead of starting out from the firm's industry or environment The Delta Model advocates that strategy should be based on consumers and complement partners. In other words it recommends a differentiation strategy in order to create sustainable competitive advantage, which is further clarified in the next section (Hax & Wilde II, 2001).

3.2.1 The Delta Model

Before the description of The Delta Model Hax and Wilde II (2001) discuss three principles of strategy, where the first one defines the central purpose of strategy and the remaining two describes how to fulfil the purpose (Hax & Wilde II, 2001).

The first principle of strategy deals with the creation of economic value. The fundamental objective of a firm is to achieve a superior profitability that is sustainable over the long-term, which according to the authors leads to various challenges for a firm. They argue that a creative force, in order to achieve uniqueness and originality, is critical for a company to be able to create a superior profitability, because imitation of competitors will never lead to superiority. To be able to achieve sustainable superior financial performance the firm has to continuously transform the organisation in order to adapt to new circumstances. In other words, the firm should have a forward-looking perspective that promotes continuous learning and a readiness to adopt to changes in the environment. Moreover, the uncertainty of the future as well as the pressure to create short-term profitability makes it difficult to maintain a genuine focus on long-term goals (Hax & Wilde II, 2001).

The second principle is a question of how to create unique customer value and describes how the firm should manage to attract, satisfy and retain customers. It is, according to Hax and Wilde II (2001), important to create bonds with the customer. The bond creating process will only be successful when the firm manages to fully understand the customer and how they are able to offer them a unique value proposition. The authors argue that many companies lack this customer focus and tend to offer standardised products with no attempt to understand each customers needs. This is mainly a result of the fact that distribution channels often block the firm from the end customers (Hax & Wilde II, 2001).

The final principle describes how the firm should manage to attract, satisfy and retain superior employees. The net flow of talent is, according to Hax & Wilde (2001), an important indicator of how well the company will perform in the future.

3.2.2 Strategic positioning

The triangle, which makes out the basis of the Delta Model, proposes three different approaches in order to create customer bonds. Firstly, competition can be based upon *best product* economics, meaning a low cost or a differentiated positioning of the product. The focus of attention lies on the competitors and the main goal is to achieve an efficient production. A best product strategy is dependent on mass channels of distribution, typically supermarkets. The distribution channel will often block the firm from the final customer, thus making it hard to really get to know the customer and develop a customer-oriented strategy. Moreover, innovation is focused on the internal product development process. As a result of these factors, this approach leads to low customer bonding with the firm solely dependent on the product characteristics. This strategy will often result in a wide range of imitation and price wars between competitors. However, this approach can be the most appropriate one for a specific company, but it is important to not forget to consider the other strategic options (Hax & Wilde II, 2001).

Secondly, competition can be based upon *Total Customer Solutions*. The fundamentals of this customer-focused approach are to reduce customer costs or increase their profits. Instead of commoditising the customer, the firm seeks a close relationship and a deep understanding for each individual customer. The composition of products is customer oriented seeking to enhance customer value. Moreover, the supply chain aims to be integrated with links to key suppliers and customers, and the distribution channels are direct and targeted. Innovations are developed in collaboration with customers. The customer bonding is potentially high, strengthened by customisation and mutual learning with this customer focused strategy (Hax & Wilde II, 2001).

Finally, competition can be based on *System Lock-in*. This means that a firm can build walls around the customer in collaboration with complement partners in order to lock customers to the product. This can be realised either by amplifying a dominating standard or by controlling the distribution channels. This leads to a massive adoption of the product, which will work in a self-reinforcing nature meaning that it will expand the value of the product to the customer. A complementor is a firm that offers products and services that enhances the value of another firm's product portfolio. Furthermore, this strategic option requires a portfolio of products and an integrated system supply chain with complement partners and customers. Distribution is solved with massive direct channels. Moreover, the product architecture is open and innovations are developed in co-operation with complementors. The system lock-in approach has the highest potential for customer bonding (Hax & Wilde II, 2001).

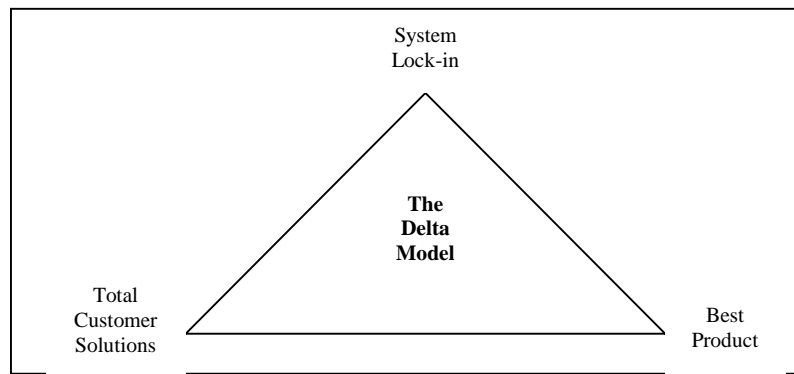


Figure 3.1 The Delta Model (Hax & Wilde II, 2001, p. 381)

Hax and Wilde II (2001) suggest three different business processes that will aid the firm in the accomplishment of its targets. The processes are:

- Operational Effectiveness
- Customer Targeting
- Innovation

These processes will be quite different when it supports the three different strategic options described in the triangle. With a best product strategy operational effectiveness seeks to establish an internally efficient cost infrastructure. Customer targeting aims to maximise coverage through low cost multiple distribution channels, and innovation seeks to develop a product portfolio based on a common platform and expectations to be first on the market (Hax & Wilde II, 2001).

With a total customer solutions strategy, the main objective of operational effectiveness is the maximisation of customer value, and to improve the horizontal linkages between the constituents of total solutions. Customer targeting aims to develop bonds with individual customers by improving the marketing customisation. Innovation is also focused on customising products in collaboration with the customer, which increases customer lock-in (Hax & Wilde II, 2001).

In the system lock-in strategy, the role of operational effectiveness is to integrate complementors in order to improve the performance of the entire system. Customer targeting aims to create a network of various complementors that will jointly facilitate customer lock-in. The innovation process seeks to develop a dominating industry standard that evolves rapidly and has a backward compatibility, in order to achieve system lock-in and competitor lock-out (Hax & Wilde II, 2001).

3.2.3 Advantages from innovation

When a new innovation is introduced to the market the firm introducing it will experience low competition and thus high profits. To explain why some

companies can gain above average high profits, relative their competitors, Roberts (1999) implies that a company's innovative ability is important. The author means that the aggregated innovations presented by a firm over a period of time, rather than specific individual innovations, can explain abnormal rates of profit. The reason for this is, according to the author, the times of monopoly-like market situations that follow the introduction of an innovation that gains market acceptance. Even though product innovations affect rates of profit innovations can appear both due to an innovative capability within the firm or simply out of chance (Roberts, 1999).

The advantages a company gain when introducing a new product is called pioneering advantages. The authors imply that these advantages spring from the opportunity the company has to develop economies of scale, economies of scope and distribution systems. Additionally, the company creates an image in the eyes of the customers of being an industry leader. The sustainability of these pioneering advantages depends on the ability of competitors to imitate the important features of the product innovation (Song, Di Benedetto & Zhao, 1999).

3.2.4 Incremental innovations

Banbury and Mitchell (1995) suggest that there is an important connection between an incumbent's ability to introduce incremental product innovations and its performance. The stress concerning product innovation and its effect on business performance has been on major innovations. However, the authors mean that it is equally important to refine and enhance existing products in order to add value to the company's customers, especially in a stable and mature industry. Competing incumbents in a mature industry often offer their customers products that consist of the same core features. Thus, the incumbents differentiate their products through incremental changes (Banbury & Mitchell, 1995)

During the evolution of an industry there are times of ferment, when a dominant product design is determined, and times of incremental product change, when the product is enhanced and refined. Non-incremental changes or innovations are adjustments to the core concepts of the product. The dominant design is synonymous with a technological paradigm. Incumbents are often perceived as players who do not actively endorse change and innovations but the authors mean that the incumbents play an important role in the innovative process of a stable industry. The research of Banbury and Mitchell (1995) deals with important incremental product innovations in stable markets. Further, they mean that incumbents often are leaders of innovation and adjust to new competitor's innovative product changes if they affect the incumbent's existing target customers. The incumbents need to either introduce their incremental product change first or imitate it quickly if a competitor introduces it. Thus incumbents can achieve a stable or improved market position. However, not all incremental product innovations are successful. The success depends on the degree of acceptance the innovation receives in the eyes of the customers (Banbury & Mitchell, 1998). Innovation within companies acting in a stable market often aims to satisfy the needs of the current customers (Robinson & Chiang, 2002).

Time of market introduction, concerning incremental innovations, also emerges as an important factor to success in a stable market. Because of the developed and established marketing and production systems that the incumbent has built up during years of existence, the difficulty is not to market the product but to gain first mover advantages. The first mover advantages often consist of building barriers surrounding the customers due to switching costs (Banbury & Mitchell, 1995).

Despite the importance of introducing the incremental product changes that appear on the market, either within the own company or those developed by competitors, no incumbent develops or adapts every incremental innovation. There are three reasons for this. Firstly, the incumbent may not have the competences to introduce the innovation. Secondly, patents and property rights could protect the innovation introduced by competitors. Thirdly, the incumbent may have waited too long before introducing the innovation, often because of uncertainty concerning the market's willingness to accept the innovation. The incumbent sometimes wants to wait and see if the innovation becomes accepted but then it might be too late because the opportunity may have vanished or the competitor may have managed to build barriers around the customer base. Knowing when to adopt an incremental innovation is rather delicate since waiting for the vital success factor of market acceptance can result in a missed opportunity. If there are high investment costs connected to the introduction of the innovation companies often linger until they receive market acceptance (Banbury & Mitchell, 1995).

3.2.5 Innovation and customer involvement

The strategy of a company concerns how to fulfil the customers' present needs and how to predict the future of the market. Conner (1999) suggests a balance between the customer-led and the market-led orientations, rather than a strict choice concentrating on one of them. The author's argument for this is that a company: "*must live and act in the short-term and in the long-term*" (Connor, 1999, p. 1158). On which part of the strategy the company focuses, the market-led or the customer-led, determines the time horizon of the innovation process. Companies that focus on the future spend resources and invest enabling them to develop in groundbreaking unique product ideas. Thus, having a shorter time horizon often produces small incremental innovations to an existing product. The author also stresses the need for customer involvement in the innovation process in order to generate useful ideas and ultimately, products (Connor, 1999).

3.3 Resources and innovation

3.3.1 Basic strategic resources

A basic view in strategic management, besides the IO, is the resource-based view of the firm that is an approach that implies that resources and capabilities of a firm are the central determinants of composing an appropriate strategy. Thus, to have an internal focus that acknowledges the importance of well set goals and values,

well deployed and built up resources and capabilities as well as strong structure and systems. Organisational capabilities consist of three types of resources. Firstly, the resources can be human, such as know-how, communication skills and motivation. Secondly, the resources can be intangible, such as technology, reputation and culture and lastly they can be tangible, such as financial and physical resources (Grant, 2002).

Barney (1991) argues that two assumptions are made when using a resource-based view in order to analyse competitive advantage. The author means that competing companies differ in the aspect of resources and that these differences are constant over time. These assumptions are, according to Barney (1991), the exact opposite of the assumptions made when using environmental models to analyse competitive advantage. The resource-based view suggests four critical attributes for firm resources in order to have the potential of sustainable competitive advantage. Barney (1991) argues, that the resource must be valuable, meaning that it utilises opportunities and neutralises threats in a firm's environment. This implies that the environmental models identify which resources that live up to this demand. Furthermore, the resource has to be rare, which denotes that the resource must not be common among the firm's competitors. In other words a company with valuable and rare resources possess a first-mover advantage compared to its rivals. This will, according to the author, lead to competitive advantages. However, in order to lead to a sustainable competitive advantage the resource must be impossible for competitors to imitate, and there cannot be similar substitutes for this resource (Barney, 1991). Hax and Wilde II (2001) mean that the problem with the resource based view is that it is unclear which resources and capabilities that are meant.

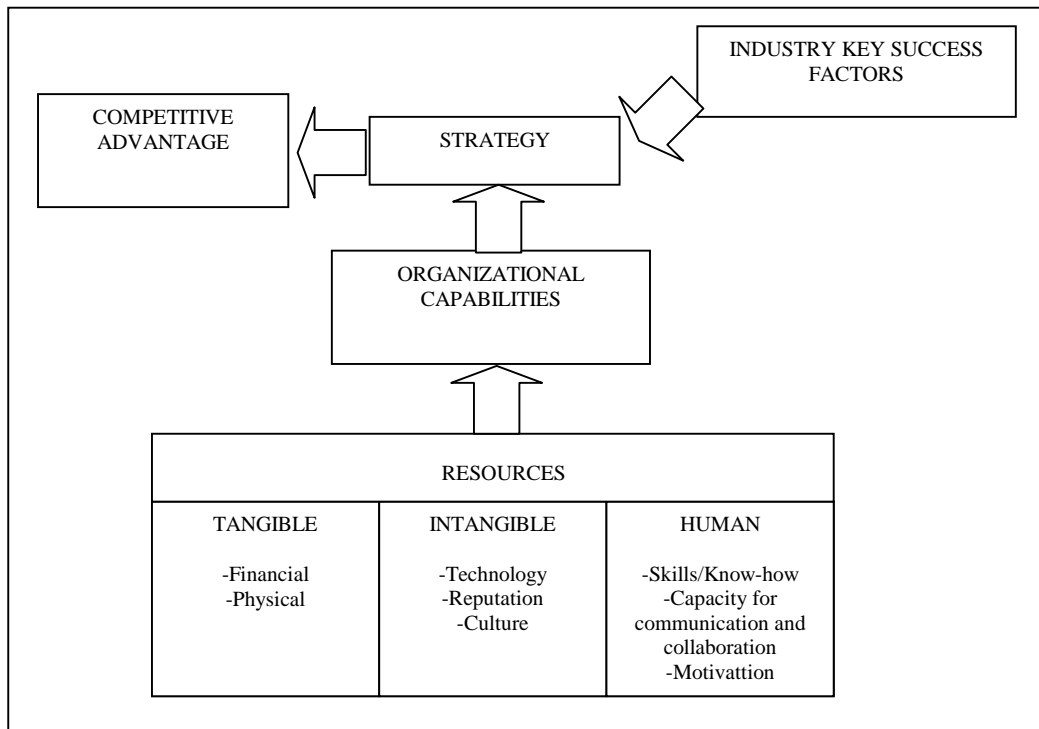


Figure 3.2 Linking model (Grant, 2002 p. 139)

The resource-based view is a more internal view than the Industrial Organisation that fully focuses on the external characteristics of the firm. To link these two views and show them both as sources of competitive advantage Grant (2002) presents the model (figure 3.2) illustrated above.

3.3.2 Innovation and competences

Knott (2003) has developed a model dealing with innovation dynamics. The model suggests that companies compete for knowledge shares and makes the assumption that knowledge shares are synonymous with market shares because of the relationship between sales and R&D expenditures. The fear of losing market shares is often the incentive for innovation. The heterogeneity of knowledge within an industry leads to the scenario where industry followers absorb knowledge from industry leaders and thereby gain market shares. To respond to this threat industry leaders often turn to innovation and new knowledge. The author comes to the conclusion that strategies are important in order to achieve heterogeneity within the industry's knowledge stocks that in turn leads to innovation (Knott, 2003).

Danneels (2002) claims that technological and customer competences are the most important competences for product development. However, it is not only these competences per se that are important but also the relationship among them. In the process of product innovation two important sets of knowledge are essential. Firstly, a company must have the technological skills to develop and produce a product physically, and secondly they must have a comprehensive knowledge about their target customers (Daneels, 2002).

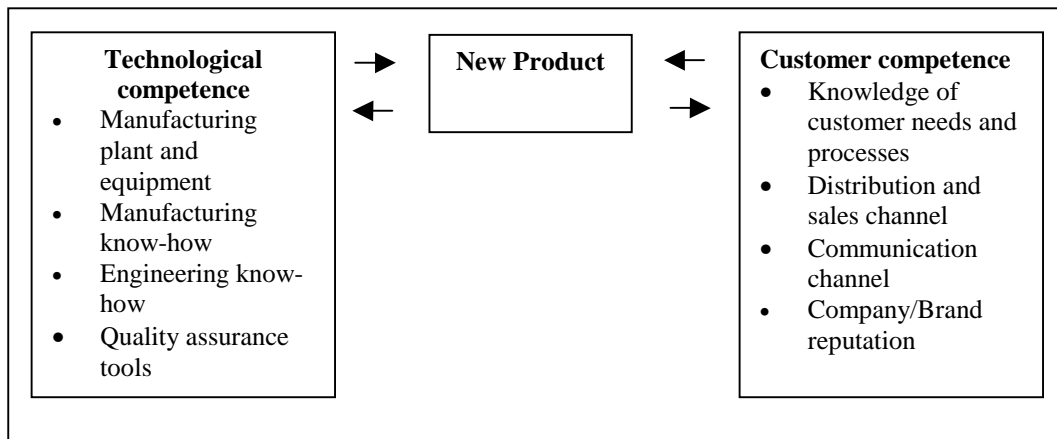


Figure 3.3 Product innovation as linking of technology and customer competences (Danneels, 2002, p. 1103)

It is essential to the product-developing phase to link customer and technology competences in order to fully reach the potential of the innovation. The end-result of this process is the finished product. Danneels (2002) also mean that product innovation is a way to leverage the competences of the company. A product is not the result of one core competence and a core competence is not the result of one product. Thus, the essence of product innovation is to separate existing competences from current products and then link those existing competences to

new products. The next step is to create new competences from basis of the old and thereby develop the portfolio of competences over time. Product innovation is therefore a way to enhance and broaden the competences of a firm. The development of competences is, however, strongly effected by path dependencies since the choices of which competences to develop are linked to past choices and developments (Daneels, 2002).

Competences are firm specific resources meant to be used to achieve the objective of the company. An enlargement of the competence base is therefore a way to increase a company's ability to perform the way they want and intend. However, building competences per se will not automatically result in rent earning advantages. There are many examples of revolutionary competences that have not been able to create rents. Instead, the competences should be seen as potential sources of advantage (McGrath, Tsai, McMillian & Venkataraman, 1999).

To use new competences in order to create competitive advantage the firm must be able to transform its competence into products and services that create customer value. This is achieved by creating distinctiveness by either operating more efficiently which will lead to cost leadership or by differentiation. When a company has achieved this step competitive advantage will be experienced (McGrath et al, 1999).

3.4 Theoretical summary

To facilitate the understanding of what factors influence a firm's innovative abilities, the theoretical chapter began with a presentation of Edquist's (1997) theories dealing with innovation systems. These theories are designed to describe, understand and explain the processes of innovation by considering all the important factors that shape and influence innovations. Since we are focusing on innovations specific to the transport packaging industry, our chosen focal point has been sectoral innovation systems (SIS). Breschi and Malerba (1997) suggest that the innovative environment within a specific sector can be analysed by looking at the innovative opportunity conditions as well as the appropriability conditions that characterise a studied sector. When Breschi and Malerba (1997) characterise a traditional industry sector according to these variables they state that it is often characterised by a low level of opportunity and appropriability conditions. The low innovative opportunities result in innovative activities that are focused on cost efficiency and the improvement of already established products. The low appropriability conditions lead to rapid imitation and the erosion of competitive advantages. The authors therefore consider the primary competition to take place on low price and on post-sale assistance.

It is important for the reader to bare in mind the three basic strategic directions for creating customer bonds in order to understand how companies try to position themselves and how innovations mean to strengthen these directions. Hax & Wilde II (2001) argue that there are three strategic directions of a company: Best product, Total customer solution and System Lock-in. The best product direction aims to increase customer bonds through providing the customer with a low-price

product or a differentiated product. The total customer solution direction seeks to deepen the customer relationship through profound understanding, and innovations are developed in co-operation with the customer. The system lock-in direction intends to build walls around the customer by creating a standard with which complement products are compatible. This lock-in effect can be attained by creating a dominant standard, by relationships with complement suppliers and by control of the distribution channels. Innovations are produced in co-operation with complement suppliers (Hax & Wilde II, 2001).

Innovations can be the source of high performance and it is therefore important that the reader is aware of theories linking innovations with performance. Roberts (1999) examines first-mover-advantages in order to explain a company's above average performance over time. The essence of this discussion is that a company through its ability to introduce innovations early can gain high margins due to the related monopoly like market situation (Roberts, 1999). Mature industries often experience a low degree of major innovations but products are often subject to incremental innovations that enhance the product over time (Banbury & Mitchell, 1995). Banbury & Mitchell (1995) mean that these incremental innovations constantly increase customer value, which in turn leads to improved performance of the company.

Connor's (1999) theories are used in order to explain the importance of customer involvement in the innovation process. These theories imply that customer involvement improves the chance of developing usable ideas and products.

Barney (1991) argues that resources are a source of competitive advantage and that resources are heterogeneous within an industry. It is important that the resources are hard or even impossible to imitate in order for them to be the source of competitive advantage. It is also important for the reader to remember that resources can be tangible, intangible or human (Barney, 1991). Resources and competences are important in the innovation process, especially customer and technological competences. A company must have the technological competences to develop a product and they must also hold a customer competence in order to understand the needs of the customer and thereby sell the product (Daneels, 2002). McGrath et al (1999) stress the value of a large base of competences that can be transformed into products and services that increase customer value.

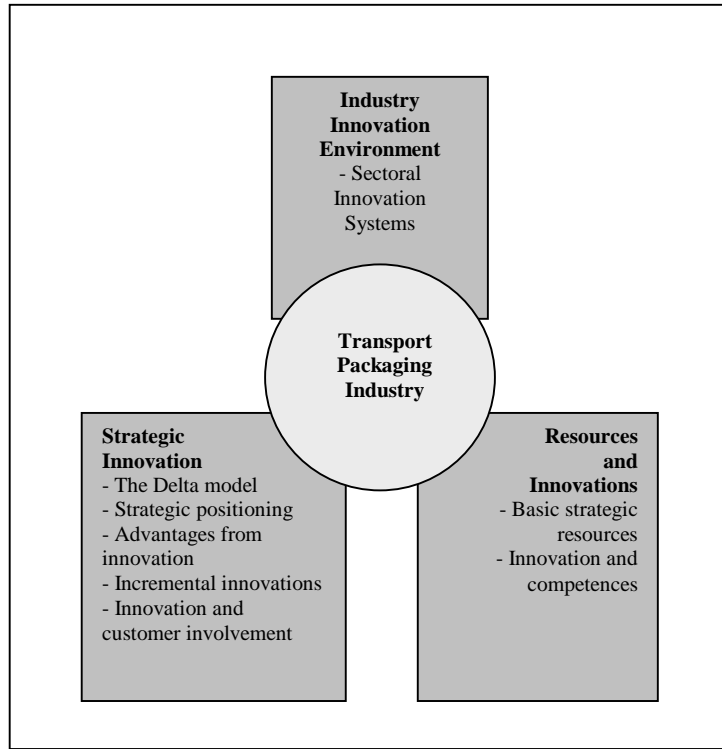


Figure 3.4 Theoretical summary

4 The empirical study

In this chapter, the empirical study of the thesis is reported. The first section gives a brief overview of the evolution of innovations within the corrugated line of business. Technical developments in material, print and barriers are presented. Thereafter the four case studies are reported, aiming to present the activities of the firms as well as their approach and day-to-day work with innovation and innovative capabilities. The presentation of the case studies starts off with Kappa Förenade Well, followed by SCA Packaging, LINPAC and finally Wellplast AB. The chapter is completed by a section dealing with the customer perspective of innovations within the studied industry.

4.1 The evolution of innovations within the corrugated line of business

The following sections present a brief a overview of developments within the part of the transport packaging industry that deals with the corrugated material. The evolution of innovations is illustrated in Appendix 1.

4.1.1 Material

Corrugated board, which is the construction material of corrugated boxes, was invented and firstly constructed in the 1870s. The material combines strength and stiffness with flexibility and cushioning and has therefore become the most commonly used transport packaging material. The elements of which corrugated board consists are liner and fluting. Liner is the flat surface and fluting the wave-like part between two liners. Corrugated board can be constructed with one, two or three layers of fluting (Packforsk Information material: Packat i Pocket).

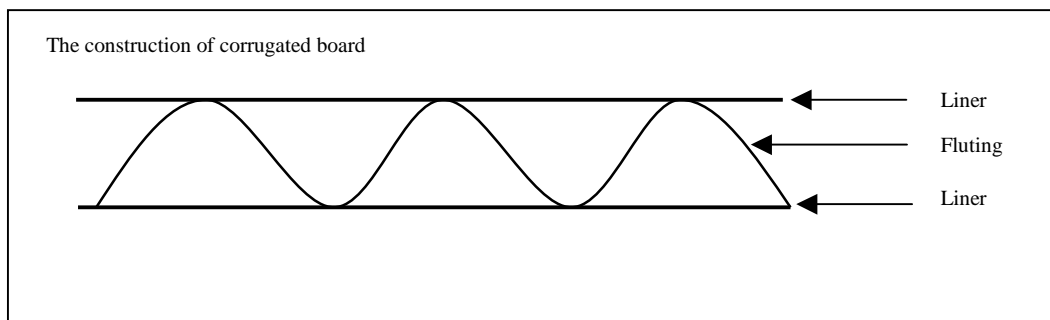


Figure 4.1 Corrugated board

Until the end of the fifties transport packages were mainly constructed in a simple way where cuts are made in the corrugated board in order to fold it into a box. This type of box is commonly known as the American Box. The construction method of the American Box is efficient when it comes to raw material since the spill over of corrugated board is diminutive. The American Box currently stands for about 45% of all corrugated packages produced (Holmlund, Interview).

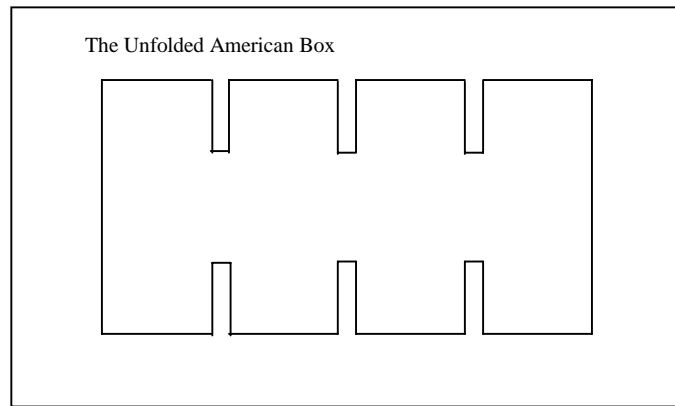


Figure 4.2 The American Box

In the late fifties the industry started to punch out the shape of the corrugated board in the converting process. This method gave a liberty to shape the material in any desired way. An enhancement of the method came along a couple of years later when the multiple-spot glue made it possible to deliver the box in a flat state so that the customers could erect it when they desired (Holmlund, Interview).

The Swedish corrugated industry has a long history of processing virgin fibre. The use of virgin fibre is not only due to the fact that Sweden has a rich supply of forest products, but also to the fact that the corrugated factories often have been a part of large forest corporations. The harsh environmental debate in the mid-eighties that dealt with the use of resources implied that it was better to use recycled fibre. The customers' environmental requirements forced the industry into the use of recycled fibre instead of virgin fibre in the late eighties. From being a nation that only used virgin fibre Sweden underwent a rapid change during the nineties and at the moment the industry uses approximately 55% recycled fibre in the production of corrugated board. Recycled fibre is cheaper but it is, however, also less moist resistant and harder to print on (Holmlund, Interview).

4.1.2 Print

The evolution of printing started with flexo-printing in the thirties. This method is a type of post-print, which means that the desired print is printed directly on the corrugated board using a rubber cliché covered in paint. At first this method was used for address indications on packages and the print could only be one colour. The next step in the post-print evolution occurred in the early eighties and it was the use of a screen print instead of a rubber cliché, which made it possible to print multiple colours and photographic images. Flexo/post printing is the cheapest method of printing (Holmlund, Interview).

The next printing innovation was pre-print, which means that the liner is printed before the corrugated board is made. This method enhances the quality of the print because it is printed on a flat surface, which makes it superior in quality to the post-print method. Pre-print is linked with a high initial cost, which necessitates

large volumes. The pre-print method has been widely used in Sweden since the early eighties (Holmlund, Interview).

The third commonly used printing method is offset printing. This printing method is based on the fact that ink and water do not mix. The image is transferred to plates that are moistened firstly by water and secondly, by ink. The water sticks to the area where there is no image and the oil-based colour or ink sticks to the image. The ready-to-print image is then applied to a rubber blanket used in the final stage to print on the corrugated board. Offset printing is the most qualitative printing method and it requires a rather low initial cost but a following high unit cost, which makes it perfect for low volumes. Offset printing was introduced to the market in the late 1960s (Interview; Holmlund).

Printing has also evolved through the development in paper quality. At the beginning the print was applied to the rough regular liner but then it was discovered that an added surface made it smoother. The added surface enhanced the printing quality but it also worsened the liner's colour absorption, which forced the development of machines with the required features. The new machines also applied a surface of lacquer that became a success on the retail market. This type of machine was developed and introduced on the market in the mid-eighties (Interview; Holmlund).

4.1.3 Barriers for corrugated board

The development of barriers for corrugated board has been ongoing since the seventies but it intensified in the early nineties. In the late 1980s companies started treating the fluting with different types of wax impregnation in order to make it more moisture resistant. Experiments had also been conducted in the seventies with applying an acrylic surface to the corrugated board. Grease-resistant corrugated board was developed in the mid-eighties, plastic layer inside the corrugated board (P-laminate) in the early nineties and experiments with plastic surfaces begun in the early nineties. Products with these characteristics have become niche products with limited sales. 98% of the corrugated board produced can be recycled and the remaining 2% can be derived from plastic barriers, which cannot be recycled. The paper mills refuse to take these products back so the producers cannot mark it with a "recyclable" label, which makes customers reluctant to use them because it creates difficulties when it comes to handling. The waxed corrugated boxes can, however, easily be recycled within the current Swedish recycling system and are mainly used for packaging solutions aimed for transporting potatoes (Interview; Holmlund).

4.2 The evolution of innovations within the plastic line of business

The following sections present a brief overview of developments within the part of the transport packaging industry that deals with the plastic material. The evolution of innovations is illustrated in Appendix 1.

4.2.1 The 1960s

During the 1960s, both consumers and producers started to switch preferences from wood and paper board to the plastic material. The main reason was that it was better suited regarding hygiene aspects and it was also a new more modern material that attracted attention. There already existed a recycling system for wooden boxes such as beer crates, although it was very few industries that actually used the system. According to Rabe the only business within the provisions industry actively using the recycling system during this decade was the breweries. During this time it was also common that transport packaging was made of metal and plywood. The plastic boxes produced at this time were only possible to stack on top of each other and not into each other. This resulted in a lot of air being transported in the recycling transports (Interview; Rabe).

4.2.2 The 1970s

The first cone-shaped boxes were introduced to the market, which enabled the boxes to be stacked into each other when empty. The major driving force of this innovation was the will to reduce the amount of space the empty boxes occupy during the recycling transportation. The western world also experienced two oil crises during the 1970s that triggered many projects within the area of energy savings (Interview; Rabe).

4.2.3 The 1980s

During the 80s companies such as IFCO introduced foldable boxes, which were based on the new concepts of large open recycling systems. Earlier many recycling systems were tied to a certain distributor who only delivered their own boxes. During this decade the logistics were opened up and the so-called pooling system was introduced as a new market where the profitability lay in minimising the recycling flows (Interview; Rabe).

During the later part of the 1980s the first “swingwire-box” saw the light of day. The driving force behind this innovation was the English supermarket chain Tesco that lay massive investments in the development aimed at minimising the costs of their own flows. This new box was very simple to use and it saved a substantial amount a space. In England, the recycling transportations were usually quite short and it therefore never became an option to use the foldable IFCO box (Interview; Rabe).

4.2.4 The 1990s and the 2000s

Further developments have been made in the already existing systems. The “swing-wire” construction provided the basis for the development of the Maxi-Nest box that is used by SRS (Svenska Retursystem) and has become a major success in recent years. Further improvements were also made to the foldable IFCO box that is best suited for long transportation distances. Today, eight or nine empty foldable IFCO boxes take up the same amount of space as one erected box.

What drives the development today is the box's durability, how easy it is to wash and new ways of folding (Interview; Rabe).

4.3 Case 1: Kappa Förenade Well

4.3.1 Background and activities

Kappa Packaging is a Dutch company with headquarters in Eindhoven. The history of the company started when Bührmann-Tetterode and KNP (Koninklijke Nederlandse Papierfabrieken), merged in 1993. The packaging departments of these companies became independent in 1997 through a management buy-out and the new-formed company took the name Kappa (**K**Arton **P**roduktie & **P**Apier) (www.kappa-packaging.com). The company is one of three large players dominating the European transport packaging industry and has 120 operations running in 20 countries employing 17 000 people (Kappa Packaging Information material: Kappa Pocket).

The Swedish part of operations is Förenade Well that was founded in 1965 as a result of the merger of several small businesses. The company was acquired from AssiDomän in 2001 and changed its name to Kappa Förenade Well. The acquisition doubled the size of Kappa Packaging. Kappa Förenade Well's headquarter as well as a corrugated board factory is situated in Eslöv. The factory in Eslöv mainly produces two millimetre corrugated board and also specialises in qualitative printing. Kappa FW also has factories in Brännögård and Gävle. In Brännögård they specialise in making large volumes and long-stretched series and in Gävle they focus on large packages made by heavy material. The company supplies corrugated packaging solutions and machine systems for erecting boxes on a business-to-business market (Interview; Holmlund).

4.3.2 Performance packaging

Kappa Packaging has developed a concept called Performance Packaging in order to optimise the packaging chain. The concept is divided into four elements: innovation, effectiveness, integration and visualisation.

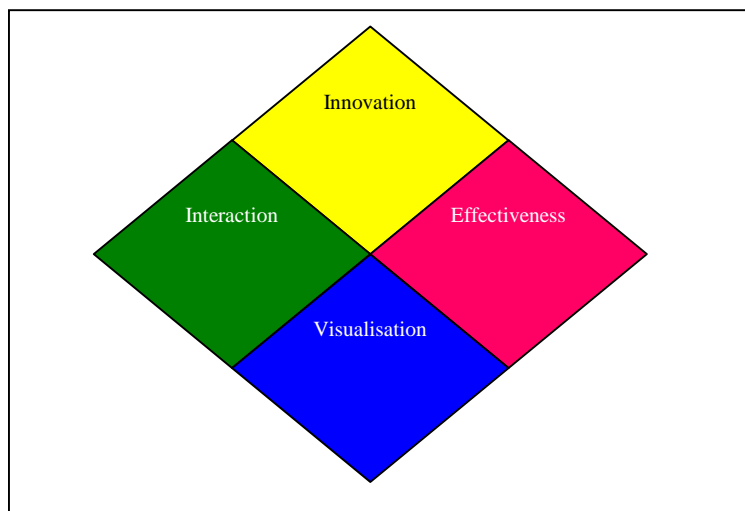


Figure 4.3 The Diamond (Kappa News p.3)

The innovation element deals with the importance of creating new solutions for packaging and service. Holmlund (Interview) means that novel thinking is crucial for future development. Low cost strategy was the focus of the corrugated packaging industry until the late nineties and it was mainly driven by the intense environmental debate that deepened in the eighties. Further Holmlund (Interview) says: *“We started questioning what it was that we were doing and began to look at the whole logistic chain instead”*. The reason for this change in attitude was that if you look at a packaging solution separated from the logistic chain and try to minimise the costs you may get unwanted effects elsewhere in the chain. If instead, you evaluate the total transport cost seeing the packaging solution in the context of the logistic chain you see the whole picture and can truly minimise the costs of transportation (Interview; Holmlund).

IT has become an important tool in the innovative process, conducted by constructors in co-operation with customers, aiming to provide the customers with an innovative packaging solution in an efficient way. The IT solutions consist of three main software programs: WellTools that is a material and construction optimising tool; WellGuiden that is a database of packaging solutions developed during the past 60 years; WellDesign that is a tool handed out for free to customers so that they can construct and design their own packaging solution (www.kappa-forenadewell.com).

The size of Kappa Packaging provides for a profound knowledge base in order to constantly improve production effectiveness. Thus, there are substantial economies of scale when it comes to technological development. By constantly improving the effectiveness of Kappa Packaging the company aims to also improve the effectiveness of their customers (Kappa FW Information material: Performance Packaging.).

The increasing importance of store visualisation of the package has led to dramatic improvements in the area of paper printability and print quality. Kappa Packaging claims to be the leading player in Europe when it comes to printing on corrugated board. Kappa FW has a separate department called Grafisk Produktion that deals with the graphical profile and print method choices of the companies' customers (Interview; Holmlund).

Integration of the suppliers' production and the customer has become increasingly important while product differentiation is difficult. The integration concerns the logistic and supply chain needs of the customer and the production of the supplier in order to effectively make packaging a part of the transportation flow (Interview; Holmlund).

4.3.3 Product development

Almost every packaging solution that Kappa FW sells is custom-made to fit the specific needs of the individual customer. This means that every product sold is, in a sense, unique. Kappa FW has one development centre tied to every sales region. Along with this, Kappa Packaging also has a corporate-wide R&D

department in Holland that deals with projects on a more long-term basis. This has for instance developed a packaging solution with a protecting gas that expands the durability of fruit, vegetables and fish (Interview; Holmlund). Holmlund (Interview) claims that this is a typical project that is run from the main R&D department in Holland because of its size and long-term perspective.

According to Holmlund (Interview) Kappa FW conducts R&D activity on three levels. The first level of product development is when customers want to buy standard boxes custom-made in regard to length, height and breadth. This is the simplest form of product development within the company and it is often the sales personnel that seal the deal with the customer directly without clearance from the company (Interview; Holmlund).

The second level of product development occurs when the requirements of the customers are a little more complex and difficult to handle, resulting in the need for non-standard solutions. The sales personnel then contact a so-called development centre where competences from different functions and departments are gathered in order to solve the customer's packaging problem (Interview; Holmlund). Holmlund (Interview) stresses the motive of these development centres by saying that: *"instead of passing around the project through the organisation like a stick in a relay race we assemble a team that handles the whole project"*.

The third level consists of a product development group that picks out some interesting projects that can bring development one step further. In this stage high investments are acceptable as in the case of packaging solutions developed for fruits and vegetables, the fish industry (CoolPack) and the meat industry. These investments are often based on the need for developing a new machine and producing a prototype. When projects on this level surface Kappa FW tries to make a commercial evaluation of the project in order to see if there is a potential market for the product. Holmlund (Interview) says that if a customer like Swedish Meats makes an inquiry to Kappa FW about a new packaging solution that demands high investments the company is likely to accept. This is simply explained by the fact that Swedish Meats is a large company that probably is in need of large volumes in the future that most definitely will cover the development costs of Kappa FW. However, if the inquiry comes from the fragmented agricultural industry, where volumes linked to one customer are low, the willingness from Kappa FW to invest might be lower. The decision whether to invest or not is always made from case to case (Interview; Holmlund).

Innovations are dealt with in different ways within Kappa FW but Holmlund (Interview) claims that renewal and innovation is an important profile of the company that enables the enhancement of the customers' competitive ability. He also stresses the importance of an innovative and non-conservative management that encourages innovation and renewal (Interview; Holmlund).

4.3.4 The driving forces of innovation

Customers' needs are often the most significant driving force of innovation within Kappa FW. About 99% of the innovations spring from the needs of customers and often it is existing customers. Holmlund (Interview) has a principle of not engaging in any projects if there is not a customer involved who can judge if the project is relevant or not. He further means that it is easy to come up with magnificent packaging solutions but they are often difficult or even impossible to sell. It is important that costs and revenues are in balance in order to make a product commercially durable. *"The only safe way to achieve success in product development is to have a customer tied to the project"* (Interview; Holmlund).

4.3.5 Differentiation

The success of Kappa FW relies on the development and expansion of their customers. Holmlund (Interview) declares that it is difficult to grow organically in a mature industry and it is therefore important to grow in symbiosis with the customers. In the past, focus has been laid on low cost strategies aimed to decrease the raw material input and minimise the thickness of corrugated board but that strategy has reached its peak and companies have started to refocus. The new focus is on the functionality of the packaging solution seen from a broad logistical perspective (Interview; Holmlund).

Holmlund (Interview) claims: *"Almost every producer of corrugated board and transport packaging solutions has the same raw material to work with and the same producing machines that are often bought from the same supplier. The companies also have the same financial muscles being part of large corporations and the employees basically have similar education."*

Holmlund (Interview) says that if any of Kappa FW's competitors come up with a revolutionary packaging solution they will definitely soon be aware because every company in the industry knows what the competitors are up to. In the past, focus was laid on patents but this focus is almost gone since it is rather easy to go around the patents by developing a slightly modified solution instead. The change in attitude towards patents was driven by the European Union and when Sweden joined in the mid 1990s the rules of competition changed for the main players on the Swedish market (Interview; Holmlund).

On the European continent corrugated board factories are often regarded as uncompetitive outside a radius of 100-150 km because corrugated board is very volume demanding when it comes to transportation. The activities of Kappa FW are, as mentioned above, specialised in different areas and every factory delivers nationwide. According to Holmlund (Interview) this gives Kappa FW an advantage when it comes to investing in high qualitative machine systems because the firm does not have to invest in these machine systems in every factory. This reduces the costs of the total investments and makes it possible to invest in the specialised units on a more frequent basis (Interview; Holmlund).

Holmlund (Interview) says that Kappa FW is more proficient and has more experience within some areas when it comes to packaging solutions. The company produces a so-called “Bag-in-box” solution where a plastic bag is put inside the corrugated box. This product is mainly used for milk etc. bought by big-household customers like schools and military facilities. Kappa FW is the only supplier of this packaging solution in Sweden. Kappa FW also provides another unique solution, more linked to production, the so-called fan-fold technique. The technique is based on the ability to not cut off the corrugated board at the end of the machine but rather to fold it enabling over-sized packaging solutions. It is thereby possible to produce packages for products like flagpoles etc. Kappa FW is also the only company in Sweden that produces its own machines for erecting packages when their competitors buy their machines from a supplier. Holmlund (Interview) is certain that these competences serve as a specific strength and advantage for Kappa FW in regard to their customers.

Holmlund (Interview) claims that innovation is most definitely a mean of differentiation. *“However, it is not enough to proclaim it, it has to be done as well”* (Interview; Holmlund). In order to be fully innovative, people and resources that can generate innovations must be assembled. By providing packaging and printing consultancy to its customers, Kappa FW regards itself to be on the leading edge when it comes to innovation. The company’s graphical centre is located in Brännögård where customers can get suggestions from graphical designers and print experts regarding print and production applications. *“The activity of the graphical centre is also something that makes Kappa FW unique on the Swedish market”* (Interview; Holmlund).

4.3.6 E-business

The possibility to integrate Kappa FW’s routines with the customers’ routines is immense and e-business solutions are constantly developing. However, there has not been any rapid growth in this area but it is on its way driven by the advancements in electronic communication in general (Interview; Holmlund).

Two years ago Kappa Packaging introduced an e-business solution called Kappa Connect that is a platform that aims to simplify the administrative work of their customers through order processing, reduced administrative costs etc. (Interview; Holmlund). The platform gives the customers a choice of the level of integration. The level of integration can span from simple online ordering to procurement control, warehousing and Vendor Managed Inventory. The sales argument of these integrated e-business solutions is that: *“You will have more resources available to focus on your core competences that secure your competitive advantage”* (Kappa Packaging Information material: E-business with Kappa Packaging, p. 2).

However, advertisement regarding the Electronic Data Interchange (EDI) system, which connects the customer’s business system with Kappa FW’s business system, has been conducted since 1991. The customer uses EDI to place an order when their stocks of packaging need to be increased. Another way of integration

is if the supplying company is granted access to the customers' stock balance so that the supplier can plan the production and delivery in a way that ensures that the customer always has packaging in its stocks. This type of integration has, however, not been a huge success yet and this can be illustrated by the fact that Kappa FW has only one customer integrated at this level (Interview; Holmlund).

4.3.7 The development of SWIF 2000

The destination of 70% of the deliveries made by Kappa FW is some sort of retailer. The retail system for food in Sweden is built up around wholesale dealers to whom producers sell their goods. The wholesale dealer then sells the goods in a more manageable manner to the food store. The goods delivered to the wholesaler from the individual producer are often packaged in identical boxes and therefore easily piled on pallets. However, a problem to pile the goods on pallets arises when the wholesaler assembles the deliverance to the food store from different producers. To get rid of this problem the wholesalers suggested that the producers of packaging solutions came up with a compatible standard that would be easy to pile. Kappa FW then developed a modular packaging system consisting of different sizes of packages compatible when it comes to piling on pallets. This system, called SWIF 2000, was then distributed through the interest organisation Svenska Wellpapp Föreningen, who offered it to all the producers in Sweden. Holmlund (Interview) claims that it is impossible to develop a standard without sharing it with your competitors (Interview; Holmlund).

SWIF 2000 was developed in cooperation with ICA but after a while Kappa FW discovered a problem, since the company's own customers, the producers, did not want this system. They wanted the same old custom made packaging solutions that they had always used because those were the products suitable for their needs. The result was that the producers ignored the SWIF 2000 system and it is hardly used at all today (Interview; Holmlund).

4.4 Case 2: SCA Packaging

4.4.1 Background and activities

SCA Packaging (SCAP) is a division within the SCA Group that was founded in 1929 through a number of mergers and acquisitions of Swedish forestry companies. SCA stands for Svenska Cellulosa Aktiebolaget and the company has a global approach concentrating on packaging, absorbing hygiene products, graphic paper and forest or recycled products. All of SCA's businesses are somehow related to fibre (www.scapackaging.com). SCA has a turnover of approximately 8 billion Euro and the concern employ about 44 000 people in 40 different countries (SCA Annual report, 2003).

In 1990 SCAP was created as a business group with headquarters in Zaventem, Belgium (www.scapackaging.com). Since the foundation of SCAP, the group has used an expansive acquisitions strategy that has been successful. Today the company is the leading supplier of customer specific packaging solutions in

Europe. Furthermore, the firm is Europe's largest producer of corrugated board that consists of fresh wood fibres, from the group's own resources of forest and returnable fibres (SCAP Information material: The seven laws of packaging). The products are produced at more than 280 facilities in about 30 countries and the division currently employs roughly 20 000 people (www..scapackaging.com). SCA is active in all parts of the value chain, from the gathering of recovered fibre to the end product and the company recycles more than 80 % of the fibres it uses. The objective of SCA is to grow 10-15 % a year. Approximately 60 % of sales are still made out of conventional transport packages. The rest of the sales are advanced packaging solutions for fast moving consumer goods, consumer electronics and so on (SCA Annual Report, 2003).

4.4.2 Product development

“SCAP does not work with standard products, but creates unique solutions for each specific customer. The company always works towards tailored customer specific packaging solutions. Each customer has its own demands and SCAP creates every product in line with each customer's specific demand. The customer may interpret it as a unique solution whereas SCAP sees it as a new combination of something that has been done several times before. Consequently, an innovation does not necessarily mean something completely new, but rather to find new combinations of previously applied solutions.” (Interview; Renman).

Renman (Interview) says that almost all products adhere to the FEFCO-codes of standard constructions that can assume different length, height and breadth relationships. To these basic constructions various additional constructions are usually added. The additional constructions, along with the choice of material, are used to create a unique solution for a specific customer.

“In this sense, SCAP is always innovative when creating a new product solution although it is just a slight modification of something previously done” (Interview; Renman).

However, Renman (Interview) says that if one defines innovation as the emergence of completely new and groundbreaking products SCAP is not innovative. There is no incentive for major innovations because it already exists a tailored packaging solution suitable for each situation. As a result, there has not been many major innovations resulting in completely new products, but the industry has been shaped by continuous incremental improvements of the product (Interview; Renman).

Traerup (Interview) claims that most innovations within SCAP aim to add value to the product by designing the most cost efficient total packaging solution. This does not mean the lowest selling price, but includes packaging handling costs, breakage, ergonomics, impact during transportation and so on (Interview; Traerup).

4.4.3 Graphic technique

There has been an immense development in the graphic technique during recent years. Renman (Interview) says:

“There is basically no limit to what can be done in this area today. Traditionally the secondary package was brown with a simple graphic print but today SCAP is able to print photographic four colour prints directly in its own factories. Historically there were technical limitations and the transport package was not seen as a surface that could be used for a selling announcement or a strong profiling”.

In other words, the boundaries between primary and secondary packaging have become blurred since transport packages to an increasing extent are shown and marketed directly in the stores and thereby fulfil the function of primary packages (SCA Annual Report, 2003). This is something that has changed quite dramatically and it is important for SCAP to make a correct estimation of how advanced print the customer wants. Differently stated, it is not always obvious to choose a print with the highest quality (Interview; Renman).

4.4.4 Material preferences

There is a constant on-going experimentation concerning new methods of applying new barriers to corrugated board. As opposed to the majority of the product development SCAP drives this development on its own in order to improve the corrugated material and thereby open up new market segments. In areas where the characteristics of the corrugated material does not satisfy the customers' needs, the customers have instead been forced to find other materials or packaging solutions that better fulfil their requirements. By developing new barriers that improve the characteristics of the corrugated material SCAP tries to reach out to new unexplored segments of the market where corrugated has earlier not been an alternative (Interview: Ericsson).

The customers often have found an existing packaging solution satisfying their needs and demands. This means that customers already solve their packaging concerns in some way, for example a customer can package a certain product in plastic bags. It is SCAP's mission to do their best in order to integrate new functions into the corrugated material itself (Interview; Eriksson).

An example of a recent development within this area is the VCI-coating, which is a coating that is added in order to neutralise oxidation of products packed in the corrugated box (Interview; Eriksson). Some metallic products oxidise as soon as they come in contact with air. Lubricant and protective paper has up to now been the solution, but it is an expensive, smeary and time consuming solution (SCAP Information material: Förpackningslösningar med skydd & styrka). The VCI-coating spares the customer from this kind of troublesome handling, since it regularly emits a gas that prevents the product within the box to rust (Interview; Dölling). Despite its advantages it is, according to Renman (Interview), difficult for this kind of products to break through on the market. SCAP has worked with

the VCI-coating for roughly 2-3 years and not until now has a suitable customer base been identified. Although it is a commercial product today, sales-volumes are still rather low and it is targeted at specialised product segments (Interview; Renman). However, the coating means that customers are spared from a great deal of troublesome handling, which certainly will attract new customers according to Dölling (Interview).

The largest area within barriers is moisture, since the fibre itself is very sensitive to dampness. Corrugated board loses its strength dramatically when it comes in contact with high levels of moisture or cyclic climate when transported over the equator. This kind of problem can be solved with different barrier solutions (Interview; Eriksson). A concrete example is the DryPack-solution, which has been developed especially for the fish industry. When transporting fresh fish it must be kept cool, which is usually accomplished by filling the transport package with ice. The conventional solution for transportation of fresh fish is leaking boxes made of EPS (Expanded Poly Styrene), also called cellplast. When the ice melts the water simply flows out of the package, which is rather unsanitary and as a result the fish boxes have to be transported separately (Interview; Dölling).

SCAP identified this problem and started a project aimed at developing a box made of corrugated board that could be used for transporting fresh fish. Corrugated board has many advantages compared to EPS, but the problem is the fact that corrugated board is moisture sensitive. The project group consisted of people with competences in packaging, graphic printing, hygiene and fish cultivation. The project was developed during approximately 3 years and the DryPack solution was introduced in Gothenburg in the early nineties. DryPack is made of corrugated board covered with a coating that makes the package completely waterproof. The box is equipped with an absorbent that efficiently absorbs every drop of water. This means that DryPack can be transported along with everything else in a cooled transport. Furthermore, DryPack is constructed with double layers of fluting resulting in an improved isolating ability (Interview; Dölling). Another advantage of DryPack compared to EPS-boxes is the fact that it is recyclable. In the recycling process the coating is separated from the corrugated board mechanically (Interview; Eriksson).

The result of the DryPack project is a unique and recyclable corrugated box that is completely watertight and almost as isolating as EPS (Interview; Eriksson). DryPack is an innovation that has opened up a new market for SCAP. Ragnhild Dölling argues that it is extremely important to be able to offer customers functional solutions to their problems. In the DryPack case SCAP identified a problem that would open up new market space if a solution could be found (Interview; Dölling). However, in spite of its advantages DryPack has not broken through on the market yet. DryPack has acquired parts of the Swedish and Norwegian markets, but the problem is that it needs an absorbent that involves a high cost. Eriksson (Interview) believes that EPS-boxes will preserve their market share as long as it is legal to let the wastewater out of the trucks. There is an ongoing discussion treating this question and perhaps DryPack will receive help from legislation in the future. It is possible that DryPack will benefit from the

environmental debate concerning demands for a larger amount recyclable material (Interview; Eriksson).

4.4.5 E-business

Renman (Interview) argues that e-business has not experienced a breakthrough on the market yet. However, SCAP has a couple of customers where EDI-solutions are used although these are perceived as very complicated and demanding to work with. SCAP also has the e-business tool SMART that includes VMI (Vendor Managed Inventory). VMI means that SCAP manages its customers' inventories according to a certain schedule. When working with e-business solutions, the supplier and the customer must open up their systems. Renman (Interview) claims that the intention behind these systems is good, but customers often consider their flexibility to be negatively affected making it difficult to change supplier (Renamn, 2004).

4.4.6 Manufacturing process

The machines used in the manufacturing process are constantly being developed, which has an effect on the cost of production. As a result of the development fewer employees are required to handle the machines and the speed of production is gradually increasing. This leads to a continuous decrease in costs, but it does not lead to any sustainable competitive advantages, since this development is almost identical for all competitors on the market (Interview; Renman).

4.4.7 Driving forces of innovation

Innovations are mostly driven by demands from certain customers. This means that customers identify their own specific problems and then asks SCAP to solve them (Interview; Eriksson). However, there is of course an innovative power within the firm. Research contributes with new innovations to some extent, but these are often long-term projects that take rather long time to develop. Examples of such projects are the above discussed VCI-coating and the DryPack solution (Interview; Österberg).

Renman (Interview: SCAP) claims that the reason why customers drive most innovations is that there is no point for SCAP to develop the most brilliant packaging solutions if customers do not want to buy it. It is also a question of attitude, meaning that innovations will be hampered if customers are resistant to change their existing routines. Many of the major customers have united, in order to force prices down through aggressively shaping a pressure of purchase. This is another factor influencing the innovative ability of SCAP negatively, since the products are seen as standards. These companies are not interested in how SCAP can improve the product but their focus is solely connected to the price level. It is, consequently, customers that decide if it is important for SCAP to be innovative. If there are limitations in the system the innovative ability will be affected negatively. SCAP has to be in co-operation with customers in order to make an

innovation successful (Interview; Renman). According to Traerup (Interview) it is incredibly important to have the ability to listen to customer needs.

In order to improve the innovative ability of the employees SCAP develops new working methods. An example of this is the European Innovation Centre, meaning that SCAP tries to create an environment where employees are innovative in co-operation with customers. The Swedish equivalent of the Innovation Centre is called Design Centre. The work is focused on attitudes and information to employees present on the market (Interview; Renman).

4.4.8 Differentiation

According to Renman (Interview) differentiation is all about being better than your competitors in different aspects. This involves product development, presence on the market, having a complete product portfolio and packaging service with complement products. The packaging service is a merchant business where SCAP is serving the market with smaller series and more standardised corrugated products. This kind of packaging services can be a strong complement to a customised offer. For example SCAP can offer its customers packing tools (Interview; Renman).

The tools available for competition, besides price, are reliable deliveries and short time of delivery. In order to achieve this it is important to create a flexible organisation. It is also important for SCAP, as the market leader, to be perceived as innovative by the customers, since imitation is not enough to keep this position (Interview; Eriksson). Wernersson (Interview) claims that imitation does not give customers any added value and it will lead to problems when customers want further development of the products. Furthermore, imitation will lead to decreasing prices, which has a negative influence on the profitability (Interview; Wernersson).

In order to be perceived as innovative it is important with good communication and transference of knowledge. Since SCAP is a giant company it has a great deal of competences in different locations, which makes this even more important. An example of how this is solved is a database called MIDAS, where employees can search on various criteria in order to find possible solutions to a packaging problem. MIDAS has been active for about 4 years and it has functioned well, especially for designers but also for salesmen (Interview; Eriksson).

4.5 Case 3: LINPAC Materials Handling Scandinavia AB

4.5.1 Background and activities

LINPAC Materials Handling focuses on Returnable Transit Packaging (RTP) solutions in plastic and is a division of the LINPAC Group (LINPAC materials handling solutions). LINPAC is a 50-year-old company that was privately owned

up to a year ago when the founder died and the company was sold to a large UK based Investment Corporation. LINPAC, or Lincolnshire Packaging as it was originally called, started out as a small company producing wooden boxes for the beverage industry. LINPAC is today among the world's largest companies active within packaging and materials handling. It is a truly global company and has 15 000 employees worldwide. The business is divided into three main parts according to material usage. The Container division primarily consists of corrugated board and corresponds to one third of the company's total turnover. The second part of the company is called Plastics and is the only division that does not deal with transport packaging. This division focuses on smaller plastic packages such as meat packages, which dominate the Swedish market within this area. The third part is known as Mouldings and it is under this division that LINPAC Materials Handling is found. This part of LINPAC is engaged in moulding plastic packaging solutions mainly for the food and the automotive industry. There are also a couple of smaller business units that are supposed to complement the three major divisions that make out the basis of the company. Among others there is one division solely focusing on RFID (Radio Frequency Identification) and one business unit that is called LogTec, which is a so-called pooling-company (Interview; Rabe).

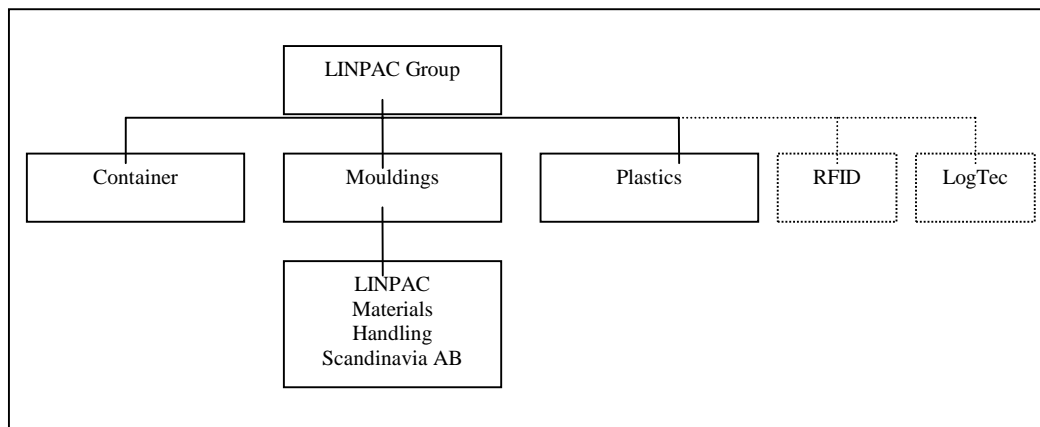


Figure 4.4 The LINPAC Group (Interview; Rabe)

4.5.2 The RTP-system

According to Rabe (Interview), the one thing that has had the greatest impact on the way LINPAC does business is the appearance of an organisation called IFCO (International Food Container Organisation). IFCO, which today is owned by LINPAC's German competitor Schöller, introduced a completely new system on how to make money on reusable plastic boxes. This system is based on the idea of *pooling*. IFCO that produced reusable plastic boxes offered their customers the possibility of replacing their old corrugated boxes with plastic boxes instead, to the same price as corrugated. However, instead of selling the plastic boxes to the customer, Rabe (Interview) explains, IFCO started to hire them out. IFCO began producing large amounts of reusable boxes that they delivered to various food producers. They in turn packed their products in the boxes, which were sent to the retailer who paid 3 SEK per box (the equivalent price of a corrugated box). The

next step is to send the plastic box to a washing company that then sends it back to the producer for reuse.

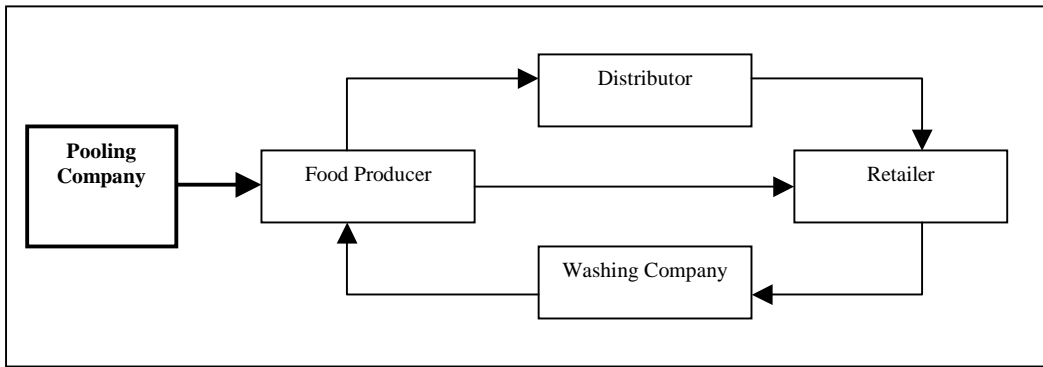


Figure 4.5 The pooling system

IFCO created a system where they owned all the boxes themselves and no selling ever took place. However, this open system requires that all actors involved are able to co-operate and it also puts great demands on the logistics involved. As Rabe (Interview) pointed out, since there are such enormous volumes involved it is possible to make remarkable amounts of money if you are able to squeeze in a margin of only a couple of percents somewhere in the chain. On the other hand, IFCO is an evident example that also the opposite is true. IFCO had estimated that their boxes would manage about 50 trips before they broke. After a while it became obvious that this was not the case when the boxes started to fall apart only after 3-4 trips, and the company lost enormous amounts of money (Interview; Rabe).

After IFCO, the first pooling-company on the market, appeared many others have imitated their idea and created similar systems. Today the pooling companies are incredibly important players influencing LINPAC's business since these are their major customers. Pooling companies, especially in Europe and North America, are in control over the entire distribution aimed at the fresh food industry (Interview; Rabe).

"It is consequently incredibly important for LINPAC to create long-term relationships with the different pooling companies that will facilitate the selling of their products" (Interview; Rabe).

4.5.3 The food industry

The world's largest industry, all categories, is retail in all forms. The largest sector within the retail industry is provision. In Sweden there are two Trade Organisations that operate within the food industry, DLF (Dagligvaruleverantörens Förbund) and DULOG (Dagligvaruhandels utvecklings- och logistikgrupp). DLF includes companies such as Scan and Arla, and many other similar companies that produce food that is delivered to the retailer. DULOG is the Trade Organisation for the retailers, which include ICA, Coop, Bergendahl, AxFood and Fria Handlare. This is what the Swedish food industry looked like a year ago. Today many new players have entered the market,

such as Lidl, Aldi and Netto, but they are still not part of DULOG (Interview; Rabe).

In 1992, DLF and DULOG jointly came to a decision stating that the food industry in Sweden should start using reusable packaging solutions instead of disposable packages such as corrugated. Up to this point corrugated boxes had dominated the industry completely despite its apparent drawbacks regarding its moisture-enduring abilities. In 1996, they decided that the new reusable packaging system should be based on a plastic pallet and a number of compatible plastic boxes. When this decision was made DLF and DULOG together founded a pooling company called Svenska Retursystem (SRS). SRS is a non-profit organisation that is owned by both the food producers and the food retailers. It was first in year 2000 that SRS introduced the new reusable system that is based on a LINPAC box called Maxi-Nest. This Maxi-Nest based RTP system totally dominates the Swedish food industry today, and the number of retailers and producers using this system will only keep on growing (Interview; Rabe).

The Maxi-Nest box originates from a co-operation with Tesco in the 1980s. At that time a company that was not part of LINPAC together with Tesco introduced a cone-formed box that makes it possible to stack the boxes into each other when they are empty. This was a large breakthrough when they first started to appear 20 years ago. This was a large product development and a fantastic innovation at that time, Rabe (Interview) explains. At first LINPAC tried to copy this solution, but since they never managed to come up with a solution quite as good, they decided to buy the company instead. Since this innovation became a part of the LINPAC Group, the innovation has been subject to continuous improvement during the years. First and foremost, they strived to be able to stack as many boxes as possible into each other by minimizing the incremental height increase from each box. At the same time as they were forced to keep the cone-like shape they were also focused on improving the filling factor by having as straight walls as possible (Interview; Rabe). The Maxi-Nest box, which is the most widely used transport package within the Swedish food retailers today, is the fifth generation of this box. It has sold in over 35 million copies and the product has also become an accepted international standard (LINPAC Information material: LINPAC Materials handling solutions).

Rabe (Interview) explains their success with the Maxi-Nest box by pointing at the fact that they managed to be involved in the entire process from day one.

“LINPAC began trying to influence the Trade Organisations in early 1995 that plastic boxes were the future of this business. The actual order, on the other hand, came first five years later” (Interview; Rabe).

Rabe (Interview) is therefore also careful to stress how extremely time consuming the process was. However, as LINPAC came in at this early stage and sold their packaging solution successfully they consequently managed to set an industry standard. *“When you manage to set such a standard you have also managed to secure business for the next 20 years or so”* (Interview; Rabe).

It shall also be noted that the situation experienced in Sweden is rather unique. In no other country has the entire food industry joint forces and jointly own the system and the pooling company. In other countries, such as Germany and England, each specific retailer has its own system and hires their own pooling company. In Sweden, where there is only one system, this will completely dominate the entire industry and in a couple of years you will not see a single corrugated box at the retailer (Interview; Rabe).

“If you manage to set a standard within an industry it is easy to release complementary products that customers have to buy. This is only possible when the originator has full control of the product. LINPAC has a large amount of patents on the Maxi-Nest box and has exclusive design rights for this product.” (Interview; Rabe).

The Maxi-Nest solution is a recognised standard within European retail, which therefore gives LINPAC a strong hold of the market. Rabe (Interview) further informs that there are active imitations competing in the market, but since these are not compatible with the Maxi-Nest system, it becomes almost impossible for the retailer to change supplier (Interview; Rabe).

4.5.4 The automotive industry

The world's second largest industry, after retail, is the automotive industry. Within this line of business the customers have slightly different criteria, than the food customer, when choosing a transport packaging solution. Within this industry, packages must first and foremost endure enormous weights but it is also paramount that they remain safe and easy to handle. These are the criteria that drive the development within this segment of products. Within the automotive industry there are also committees and Trade Organisations that influence the development and supervise everything that is going on. Within the automotive industry it is extremely important that the packages are adjusted to all sorts of different standards regarding assembly lines, storage and handling etc (Interview; Rabe).

Almost all auto industries have their component production plant around the corner from the assembly lines. Consequently the material flows are not as long as they are within the food industry where e.g. food is transported all across Europe. As a result, it is not as important to create boxes that cover a minimal amount of space when they are empty, since the flows are so short (Interview; Rabe).

About ten years ago LINPAC in cooperation with their main Swedish competitor Arca developed a large reusable plastic container that was aimed specifically at the automotive industry (Interview; Rabe). This packaging solution was named Folding Large Container and was designed to work in the most demanding manufacturing environments (LINPAC Information material: LINPAC Materials handling solutions).

“The development of the FLC was an explicit request from Ford that had come to the decision that all their European plants should become totally free from disposable material. The traditional packaging container within the automotive industry was earlier made out of wood or steel” (Interview; Rabe).

The ergonomically designed FLC is less heavy, cleaner and safer to use than the earlier one-trip packaging solutions. The replacement of the one-trip packages with the FLC has also resulted in large overall cost and waste reductions through the supply chain (LINPAC Materials handling solutions).

The FLC is today a universally accepted standard that LINPAC does not have a single patent on. Today, not only Arca but also a numerous amount of competitors are able to manufacture identical containers that are all compatible with the same systems and assembly lines. This has naturally pushed down the prices dramatically. When LINPAC and Arca first introduced the FLC they were the only ones that offered this product and they could at that time charge about 3000 SEK per box. This is to be compared with about 1000 SEK, which it is sold for today. It is even possible to buy an imitation of the FLC from a Chinese supplier that only charges 600 SEK for the box. It shall be noted that the material cost for an FLC equivalent box is about 500 SEK (Interview; Rabe).

The automotive industry is known to be the best in the world when it comes to pushing down costs through the entire supply chain. The auto companies are also considered to be extremely unfaithful to their suppliers and always buy the cheapest products they can find, regardless of who the supplier is. This in turn puts great pressure on the packaging suppliers and will not result in any groundbreaking innovations, since there is no room for development costs in the low product prices. However, it does encourage companies to be innovative in their production and in their processes. Since they are forced to sell the products at such a low price they have to find new ways to cut their production costs (Interview; Rabe).

4.5.5 E-business

About 4 years ago, the automotive industry was the first industry to introduce Internet auctions when they were about to place an order. Large auto companies, such as Ford, arrange E-auctions when they are about buy a large quantity of new boxes. Any packaging company that feel they are able to deliver the requested goods are welcome to place a bid. The player who manages to bid the lowest price gets the deal. Rabe (Interview) explains:

“The competition is extremely fierce on these kinds of auctions and it is an effective way for the auto companies to push down prices. This has become a common procedure especially in Germany and England, but has not yet been introduced on the Swedish market.” (Interview; Rabe).

According to Rabe (Interview) new E-business solutions have not excelled at the pace they thought it would a couple of years ago. The Internet auctions within the

auto industry are the only form of E-business that LINPAC is involved in today (Interview; Rabe).

4.5.6 Customer's role in the innovative process

Rabe (Interview) is of the opinion that there is most definitely a correlation between a company's innovative abilities and its success. He also claims that an equally crucial aspect is to have a customer that supports the innovation and is involved from the beginning. Rabe (Interview) illustrates this by referring to a situation that occurred in Germany only a couple of years ago. All breweries in Germany have their own beer crates that are part of a closed reusable system. In co-operation with a German brewery LINPAC developed a technique called In-Mould Labelling that enables the breweries to have logotypes printed on the crates with exceptional quality.

“This innovation in combination with a couple of faithful customers has resulted in LINPAC's total domination as beer crate supplier in Germany, in only a couple of years. In this case, it is evident that this distinct innovation has increased LINPAC's turnover in Germany with 20-30%.” (Interview; Rabe).

This innovation was possible in Germany since they have a closed system when returning the beer bottles and the fact that each brewery owns their own crates. This will never be possible in Sweden with the open system that SRS has introduced (Interview; Rabe).

It is a customer's explicit request of a new packaging solution that justifies the enormous amounts of money that is spent in LINPAC's development process of a new product. LINPAC hardly ever begins developing a product because they believe that this is a great product and customers ought to appreciate its functionality. However, as a supplier LINPAC creates close relationships with their customers, which makes them fully aware of their problems and potential areas that can be improved. In this way LINPAC can create and present new solutions, which they can offer the customer one year of exclusive rights to. If the customer after this presentation is interested and ready to place an order, that is when the development process gets started. It is extremely important for the packaging suppliers to find the customers that push the development forward and inspire them to find new solutions (Interview; Rabe). Rabe (Interview) claims: *“It is the customers that drive innovation, and that is the way they want it to be”*.

Rabe (Interview) is careful to explain that completely new products are extremely difficult to introduce within this industry. The sales process, which is always project based, alone is estimated to take at least a year or maybe two. It took LINPAC about 3-4 years to acquire SRS as customers and it is first now, 5 years later, that the business is really getting started and the volumes are increasing (Interview; Rabe).

The reusable plastic boxes that LINPAC produces are a result of three things: the material, the machines and the production tool. Rabe (Interview) explains that all their competitors have access to the exact same material and machinery. The

design of the product, i.e. the production tool, is the only thing that they are able to control themselves. Even still, 80 % of LINPAC's entire production process is equal to its competitors. Therefore Rabe (Interview) considers the company's competitive advantages not to come from the product itself but what the relationship looks like with the customers. When developing this relationship the company's innovative ability as well as the ability to be proactive towards the customers determines the success rate (Interview; Rabe).

Rabe (Interview) also considers it to be extremely important to be perceived as innovative by the customers.

“The customer naturally wants to buy its products from the largest company that has the best reputation. From that perspective it is definitely important to be perceived as innovative” (Interview, Rabe).

However, when it comes to how open the customers are towards new innovations, Rabe (Interview) has noticed clear differences. For instance, a customer situated in a completely new market such as South Africa, tends to be much more willing to buy and try out new products. When LINPAC is dealing with established companies situated in Europe, on the other hand, those companies have a much more conservative view on innovations and always question the functionality of something that has not yet been proven successful. These customers are often quite afraid of trying out new innovations since there are heavy investments involved. Therefore the established customer usually chooses a product that has a proven good record. However, Rabe (Interview) also believed that the largest suppliers usually have one or a couple of faithful customers that they know are always willing to try the latest innovation. These customers, who are willing to take a new step, are incredibly important in order to get the first few names down on paper. But in general new markets and new players are usually much more open towards new innovations and new products than their mature and established counterpart (Interview; Rabe).

4.5.7 Differentiation

According to Rabe (Interview) it is extremely important to successfully manage to differentiate oneself from one's competitors. If you cannot manage to do this you will quickly become old and dull within this business. Rabe (Interview) says:

“Since the products are so similar it is impossible to survive if another company constantly beats you to the market with new products or has a more complete product offering”

The innovative ability within this industry has been used both to create cost advantages and differentiation. The company that manages to create a cost advantage will have the ability to earn more money or to lower the price to the customer. Rabe (Interview) is of the opinion that it was more common historically to use innovations as a mean of differentiation. Since LINPAC started out as a production driven company, they have earlier not questioned the production

process at all. Instead they were focused on trying to come up with new innovative products, where in the end the majority were impossible to sell (Interview; Rabe).

Today, the innovative ability is more focused on creating cost efficiencies and to develop a more complete product offering. Nowadays LINPAC carefully examines how customers use their products and how it is possible to improve customer value. One way is to expand the product range by introducing complementary products that are compatible with the ones that the customer are already using. Such an example is illustrated by the specially developed trolleys that suit LINPAC boxes and are used to further enhance customer value as well as create yet another product offering (Interview; Rabe).

Rabe claims that it is important to create partnership deals, to sell additional services or to add complementary products to your product range in order to attract the customer within the transport packaging industry. It is naturally not easy to compete with companies that have the same abilities and products, and it is therefore crucial to be innovative. The customer has an extreme bargaining power and it is difficult for LINPAC to be different than their competitors. LINPAC therefore tries to tie the customer closer. For instance, LINPAC has now introduced a service called RTP consulting. This consulting service that is aimed at their largest customers such as Unilever and Nestlé, offers to conduct a thorough analysis of a company's materials flow. For this service, LINPAC charges nothing. Nevertheless, the idea is through this analysis to be able to offer the company a customised packaging solution, which will result in increased sales (Interview; Rabe). This is a new area within the industry and Rabe (Interview) is very positive towards this idea and believes that there is a lot of money that can be made from it.

Another service LINPAC offers its customers in order to differentiate the product, is repair of the reusable boxes. LINPAC runs a number of different repair plants spread across Europe where all repairs take place, and it is free of charge. LINPAC does not make any money out of those plants, but offers it as a service for the customers (Interview; Rabe).

4.5.8 Patents

Rabe (Interview) considers patents to be an important factor contributing to LINPAC's success. Not only do they protect the company's unique solution from being imitated by competitors but it also has a commercial value that provides them with a selling argument when persuading customers to choose their products. However, Rabe (Interview) is careful to explain that the company owning the patents must be large and have a lot of resources backing them up, otherwise it is impossible to protect the patents.

“It is always possible to find ways around the patents or even to just ignore them altogether. In that case the companies with the largest resources willing to endure the longest and most costly legal processes will be the winners. In such a case, the

size of the company is paramount. If you are as large as LINPAC no one will put up fight since they know that it will hurt them considerably” (Interview, Rabe).

LINPAC has an entire department that is constantly monitoring its competitor’s patents making sure no one intrudes on their protected solutions. However, it is extremely difficult for a small plastics supplier to make sure that no one steals patented solutions(Interview; Rabe).

“Small players will sooner or later get run over by the large competitors with more resources to go through a legal process. It is, however, important with patents and we pay loads of money each year to keep them” (Interview, Rabe).

4.5.9 Recopac – a different innovation

Recopac is the name of a packaging innovation that has not yet made it to the market. Recopac is short for Reusable Collapsible Packaging and its construction is similar to the classic corrugated box. The major difference is that the Recopac is made of plastic, which makes it possible to reuse about 400 times (Interview; Rabe). However, just as a corrugated box the Recopac can be folded out completely, enabling the possibility of stacking 700 flat Recopac boxes on one pallet. This is to be compared with the Maxi-Nest that stacks about 150 per pallet, and the corrugated box that stacks about 450 per pallet (Fröjd, Gyllin & Linderstam, 2002). The Recopac is a completely new solution within the RTP area and has the potential to lower transportation costs dramatically for the customer (Interview; Rabe).

The Recopac project is quite different from the majority of the development projects that have been undertaken by LINPAC. Firstly, the Recopac solution was not originally invented within LINPAC, but by a company that LINPAC acquired a couple of years ago. Secondly, the Recopac was developed without the involvement of a customer. Rabe (Interview), who is project manager for Recopac, emphasizes how difficult it is to reach a breakthrough with a new product of this type. Regardless of how fantastic the Recopac solution is and what advantages in form of washing and transportation costs that the customer would gain, it is extremely difficult to persuade a customer to be the first one out. Many customers have been interested in the product but they have not been willing to take the final step and place an order. It is extremely uncommon that companies in the packaging business carry out projects in this way, that is, without having a customer involved from the beginning (Interview; Rabe).

4.6 Case 4: Wellplast AB

Wellplast AB is a small company with its factory and headquarters in Munka-Ljungby, Sweden. The company employs seven people at the moment. The innovation behind Wellplast AB springs from an idea of the former Chalmers student Anders Jönzon, who participated in a competition aimed at finding a moist resistant, transport packaging solution that would be approved for food and cheap enough to compete with corrugated board. There was no satisfying result of the

competition but it sparked the idea (Interview; Volckerts). As the idea turned into a real product Anders Jönzon, Jacob Volckerts and Jörgen Ingvarsson won the prestigious Innovation Cup award in the year 2000 (Dietel, 2003).

4.6.1 The product

The main application for Wellplast®, which basically is corrugated board built up by 51% chalk and 49% polypropylene plastic instead of a fibre material, is moist and damp conditions that normally weaken the characteristics of regular corrugated board (Wellplast AB Information material: The perfect solution for protecting your product). The constructional role model for Wellplast® has been corrugated board, which Volckerts (Interview) thinks has outstanding features. Further, he says that 90% of all products at one stage are transported in a corrugated box. The construction of Wellplast® has refined the features of corrugated board to some extent by not having sinus-shaped fluting but rather triangular shaped fluting which in theory gives Wellplast® ten times the stiffness (Interview; Volckerts).

Wellplast AB has tried to make the material as similar as corrugated board as possible since they want to be able to use the same machines as the large Swedish corrugated board converters. This enables Wellplast AB to outsource the conversion. The most important feature in this quest has been to create a material that can be folded in the same way as corrugated board. It is the chalk in the plastic that makes this folding feature possible (dept fold). When it comes to printing possibilities there is still some work to be done in order to make it as good as corrugated board (Interview; Volckerts).

When a package made of Wellplast® is consumed it is sent to REPA (the recycling organisation for packaging material) and it is either recycled along with other polypropylene products or it can simply be incinerated. Recently, the European Union decided that energy extraction could be considered as recycling (Interview; Volckerts). Wellplast® has the same incineration value as oil but the residual materials are only water, carbon dioxide and lime (Wellplast AB Information material: Environmental declaration).

4.6.2 The Customers' view of the Wellplast® material

The most important factors that influence the customers when they consider a new material are, according to Volckerts (Interview), the features, the price and the environmental impact of a product. The most important feature of Wellplast® is the moist resistance since it is unaffected by damp conditions. The most apparent applications for this packaging material are when the transported product itself is moist and damp, such as fruit, vegetables or fish. Business opportunities could also be found in geographical regions with high humidity or in conditions with changing temperatures that create condensation. It is also important to have an environmental friendly product. However, this is a basic requirement from the customers and they are not willing to pay an extra for it (Interview; Volckerts).

Price is the most important factor when attracting customers. Wellplast® is however twice as expensive as the simplest forms of corrugated board. Volckerts (Interview) means that it is very competitive when compared to corrugated board that is treated to cope under damp conditions.

The cleanliness of Wellplast® is also an advantage because it does not emit dust or loose fibres. This makes the product useful in the food industry, where regular boxes need to be erected in a separate room with no contact to the food itself (Interview; Volckerts). Wellplast® is also approved for direct contact with food (Bengtsson, 2003). Cleanliness could also be valuable in the electronic and medical industry. The strength of Wellplast® can be compared with a double-layer normal corrugated board (Interview; Volckerts).

4.6.3 Market situation

Wellplast AB's main competitors are not only the corrugated board producers but also polystyrene producers, especially on the fish market. In regard to price is Wellplast® however cheaper than polystyrene. Another advantage for Wellplast® and corrugated board is that the boxes can be transported and delivered flattened, which decreases costs significantly compared to polystyrene (Interview; Volckerts).

At first Wellplast AB thought that their markets mainly were fruit, vegetables, fish and meat but it has turned out slightly different. Presently, when the product has been on the market for a year, the steel industry and the automotive industry have turned out to be two large customers. A large market impact has been achieved on the market for dill-boxes where Wellplast® has managed to attract almost the whole market. Volckerts (Interview) stresses that though this might seem like an insignificant market volumes are surprisingly high. Further, he says that almost every niche in the transport packaging market is linked with high volumes.

The packaging solution for the fish industry has however not been an instant success. The company believes that they have an excellent solution but the breakthrough has not been seen yet. The Swedish market is dominated by treated corrugated board, more precisely DryPac from SCAP but polystyrene is dominant on the important markets like Norway and Iceland. Wellplast AB has focused their efforts at the Icelandic and Norwegian markets because of their size. Wellplast AB has some customers in the medical industry and they want to enter the telecom industry. However, there are difficulties aligned with focusing on many markets simultaneously according to Volckerts (Interview), mainly because of their size. Wellplast AB also sells its products via Boxon the largest packaging wholesaler in Sweden (Interview; Volckerts).

4.6.4 The production process

The production facility in Munka-Ljungby is capable of handling the production for the Nordic market (Dietel, 2004). Wellplast AB buys the sheets of polypropylene and chalk plastic mixture from a supplier and then weld them

together to produce Wellplast® which is built up with liner and fluting in the same way as corrugated board. The end product at the factory in Munka-Ljungby is sheets of Wellplast®, which is sent to the customer, either directly or via a converter (Interview; Volckerts).

Great effort has also been put into the creation of an efficient and effective production process. One part of the production process has been significantly important in this process and Wellplast AB has been granted patents for this part of the production process. Wellplast AB has spent a lot of money on patents but the main goal is not to just sell the product but also the technology to corrugated board producers. The benefits of putting this technology within the organisation of these producers are mainly logistical and scale related. According to Volckerts (Interview) Wellplast AB has experienced a positive reception from the corrugated industry and many companies have become converting suppliers.

Life-cycle analyses have been made, which show that the resources required when producing Wellplast® are lesser than when producing paper. This is mainly due to the fact that it contains a lot of chalk. The problem, however, is to make the public aware of this. The conception that paper is good and plastic bad is well rooted in the minds of the public. Volckerts (Interview) claims that it is hard for the plastic industry to put forward the benefits of plastic since the paper industry has a long tradition of lobbying, even at government level.

4.6.5 The further development of Wellplast AB

Further development of the Wellplast® material is driven by customer demands. Inquiries have been brought forward to mix certain elements in to the polypropylene and chalk mixture in order to, for instance, get antistatic and UV-stabilising features. The development is constantly ongoing since the organisational culture, ever since day one, has been of an innovative kind. Research activities are sometimes so intense that the company needs to pull the brakes since it is an extremely costly activity (Interview; Volckerts).

4.7 Innovation from a customer perspective

In order to understand how customers of transport packaging perceive innovation and innovative ability, two large customers have been examined. Their views and opinions on the matter are expressed in the following two sections.

4.7.1 Kraft Foods

Kraft Foods is one of the leading Nordic food companies and employs about 2 800 people and has an annual turn over of approximately 6 billion SEK. Their major brands include Marabou, Freia, Daim, Japp, Twist, Kraft, Philadelphia, Gevalia, O'boy, Estrella and Maarud (www.kraftfoods.com)

Regarding secondary packaging solutions Kraft Foods is a sole user of the corrugated board material and Bergquist (Interview) estimates their annual

expenses on corrugated to reach 100 million SEK for the Nordic market. The corrugated material exists within every single one of Kraft Food's products, in one way or the other (Interview; Bergquist).

Every third year Kraft Food arranges a centrally organised European purchase occasion where all the large transport packaging producers, such as SCAP, Kappa Packaging, Smurfit and StoraEnso, actively participate. These large producers of corrugated are all European or involved in some sort of European cooperation or alliance. The European nature of the transport packaging companies makes it possible for Kraft Foods to coordinate all its European purchases. During this purchasing occasion it is decided which packaging suppliers Kraft Foods will engage in cooperation with stretching over the next three-year-period. Before they engage in this cooperative relationship they negotiate and make decisions regarding price, productivity and the desirable product range (Interview; Bergquist).

Bergquist (Interview) is, however, careful to mention that a lot of changes during this three-year-period and depending on these changes it is naturally possible to contact other suppliers and develop new relationships. This mainly tends to occur when there has been a change regarding the product range, for instance when Kraft Foods is about to release a new product or if the design has radically changed. At first when Bergquist is involved in the process of choosing which producer to hire main factors influencing the decision are product quality, price, delivery security and the producer's innovative ability (Interview; Bergquist).

Bergquist is involved in the relationship with the supplier throughout the contracted three-year-period even though she is not part of the actual packaging development process. Kraft Foods has a separate department that only deals with packaging development. This department is responsible for creating specifications of packages that the company desire the packaging supplier to further develop and produce. This process is usually characterised by a close relationship between Kraft Foods' development as well as buying department and the corrugated producer (Interview; Bergquist).

Bergquist (Interview) explains that the packaging development process may proceed in quite different ways. Sometimes Kraft Foods may contact a wide range of suppliers asking them to come up with solutions for a specific problem, of which Kraft Food then chooses the best alternative. Sometimes, when the internal packaging development department have made up their minds for a specific solution that they want to have produced, they place this specification on an Internet auction where they let the producers place bids. The producer offers the lowest bid gets the deal. Kraft Food first introduced E-auctions a year ago, so this approach is rather fresh. However, according to Bergquist (Interview) it is a well working system, even if some suppliers have expressed some complaints. It happens that Kraft Food takes a packaging specification that a certain supplier has laid a lot of time and resources to develop, and offers this to a wide range of competing producers (Interview; Bergquist). Bergquist (Interview) says:

“The specification originator has therefore been known to complain, since they consider themselves as having access to more information than is revealed from the specification, which in their eyes would make them best suited for the deal. However, packaging suppliers are aware that this is a give and take situation, where the only way to keep a position in the game is to cooperate”

When it comes to other E-business solutions Kraft Food has a working EDI (Electronic Data Interchange) system with a couple of suppliers. Kraft Food internally calls this system QR (Quick Replenishment) and implies that they send their stock level as well as their estimated demand to the supplier each week. It is then agreed that the supplier is allowed to produce and deliver packages covering the next three months demand (Interview; Bergquist).

Regarding the development within the transport packaging industry Bergquist (Interview) believes that the printing area is the area that has excelled the most during the last three years. There are greater possibilities to accomplish a high quality good-looking print for a reasonable price today, than it was three years ago. There has also been developed a much wider range of possible printing techniques that makes it easier for the customer to choose a print that suits their needs. Earlier there was a large difference between the simplest and most advanced technologies, but no alternatives in between. But nowadays, there are a wide variety of techniques and methods to choose from (Interview; Bergquist).

4.7.2 IKEA

About 70% of IKEA’s products are packaged in corrugated board packages. The remaining part is made out of packages in plastic. IKEA strives for using as much corrugated as possible. However, in Asia, for instance, IKEA uses a newly developed kind of plastic pallet. The plastic pallet that is called “LastList” was innovated within IKEA and has become a major success especially in Asia since this material is better suited for the Asian climate. The plastic “LastList” solution is also sold to external players on the market (Interview; Dickner).

Allan Dickner is head of IKEA’s concept-packaging department, which is situated in Älmhult, Sweden. The first task of this department is to develop packaging solution concepts for IKEA’s entire product range worldwide. Every single IKEA product is designed and developed in Älmhult and is always designed in-house (Interview; Dickner). Dickner (Interview) explains that the packaging solution is viewed as a part of the final product itself. In other words, the product and the belonging package are seen as one entity. At the same time as the product design team decides what the final product will look like, the packaging design team creates a packaging solution unique for this product. These two teams are linked through a tight cooperative relationship and the development always goes hand in hand with each other (Interview; Dickner).

“IKEA never hires a packaging producer in order to help with the actual packaging design. For instance, in Sweden IKEA never asks any of the other large corrugated producers to help them come up with a packaging solution. If we turn

to one of them for help, we always have the packaging specification done, and only want them to produce it.” (Interview, Dickner).

As Dickner (Interview) explains, IKEA is quite different in that respect. The packing design is developed internally and IKEA is then able to give the packaging producers a distinct specification of the packaging solution, and they only expect the packaging company to produce it. IKEA specifies exactly what material, what design and what type of printing shall be included in the package (Interview; Dickner).

The reason for IKEA to design everything in-house is that the company wants all its different stores to look the same and have similar packaging solutions for every product. The brown corrugated box has become a part of IKEA’s identity and it is therefore important that IKEA makes sure that the customer experiences the typical IKEA atmosphere when visiting the stores. For instance, since the classic brown corrugated box has become sort of a trademark for the firm, IKEA are not at all interested in the advancements that have been made within the printing area (Interview; Dickner).

Dickner (Interview) considers IKEA to be quite different from all other corrugated customers. Normally the product producer does not also develop the packaging solution, but within IKEA there are 20-25 people that only deal with developing new packaging solutions for the company’s products. They are also different in that respect that they are not interested in all additional services that the corrugated producers offer. Since IKEA has all the competences required for the packaging development, the sole factor determining which corrugated producer gets the deal is the price. The large Swedish producers of corrugated have not had the ability to compete with international competitors regarding price issues. IKEA therefore buys the large quantities in Poland, and import it to Sweden. According to Dickner (Interview) IKEA is not interested in interacting with sales people, or design departments, they only want to hire the producer that can produce according to the company’s specification and its large quantity - for the best price. However, this is a direct consequence of IKEA having all the required experts internally (Interview; Dickner).

One innovation that has increased the experienced value for IKEA as a customer is the development of wear protective packages. Dickner (Interview) explains that there have been several different solutions to this problem through the years. He has seen a development from having a different paper material as inner liner, to treating the surfaces in different ways. Regardless of the specific solution, the important issue is that it excludes a step in the packaging process since the protective paper is not needed (Interview; Dickner).

Another thing IKEA works a lot with is to use the corrugated material for different applications in an intelligent way. For instance, instead of using EPS as a cushioning material, IKEA has experimented a great deal with using corrugated board for this purpose as well (Interview; Dickner).

5 Analysis

In this chapter the information, gathered in the empirical study, is analysed through the theoretical framework. The first section consists of an analysis of the industry innovation environment, which is followed by analyses of the possibilities of creating competitive advantage through innovations. A section analysing customer focused innovations finishes off the chapter.

5.1 The industry innovation environment

By analysing the studied companies according to the two variables described by Breschi and Malerba (1997), we aim to create a comprehension of the prevailing innovative environment within the transport packaging industry sector. This will provide a basis when explaining and analysing how innovations are used when creating competitive advantage within this industry.

5.1.1 Opportunity conditions

As described by Breschi and Malerba (1997) the innovative opportunity conditions of a firm can be explained by where in the industry life cycle the company is situated. Rabe (Interview) stresses the fact that LINPAC is part of an extremely mature industry where innovations aimed at attracting customers are mostly focused on finding new value-added services. However, he also points out that there is still a lot to be done in order to create a more cost efficient production process. Rabe (Interview) is also of the opinion that innovations were more commonly used as a mean of product differentiation historically, when the company first appeared on the market 50 years ago. Breschi and Malerba's (1997) theory explains this by pointing at the fact that there are often a wide variety of technological solutions in the early stages of the life cycle, which lead to a higher level of innovative opportunities. However, as a dominant design appears technical innovations will be more focused on improving production efficiency and the performance of already existing products. This corresponds very well to Rabe's (Interview) view of the industry.

Holmlund (Interview) is also convinced that the transport packaging industry is situated in the mature stage of the life cycle. However, Holmlund (Interview) describes a slightly different scenario regarding the corrugated line of business. As opposed to the plastic segment of the packaging industry, Holmlund (Interview) declares that the cost minimising strategy has already had its peak within Kappa FW. Now they have started to focus on the functionality of the packaging solution seen from a logistical perspective. Still, Holmlund's (Interview) view of the industry also supports the fact that the transport packaging industry is a mature industry and the opportunity level of innovation should consequently be characterised as low. The differences between LINPAC and Kappa FW's situation can be explained by the fact that the corrugated business has already experienced the phase that focuses on low cost.

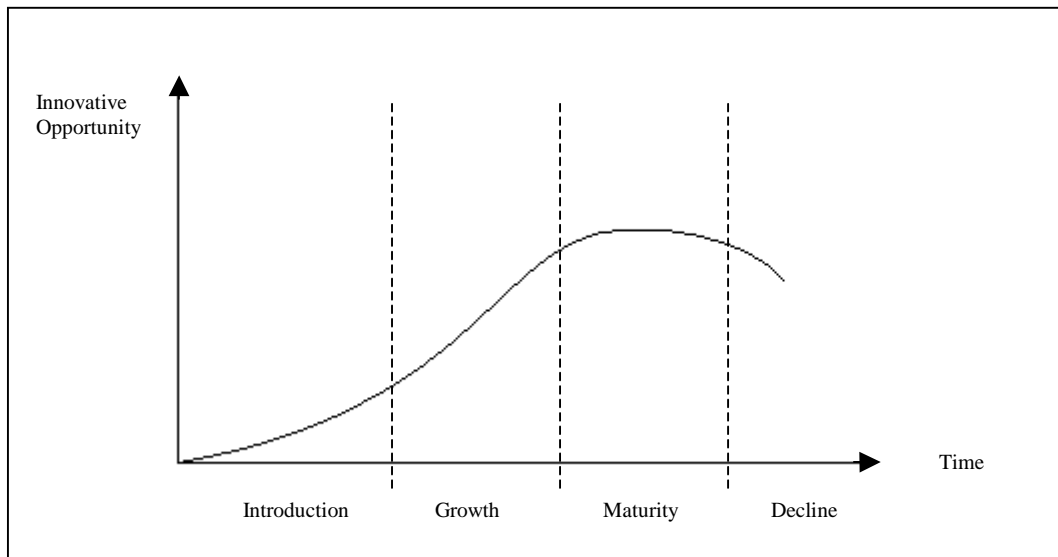


Figure 5.1 Life cycle

Wellplast AB received full recognition only four years ago when they won the prestigious Innovation Cup award (Interview; Volckerts). Although Wellplast AB is a part of the same market as the large incumbents and is competing for the same customers, the young nature of Wellplast AB as a company makes it remarkably different from its competitors. At the same time as Wellplast AB is competing within an extremely stable industry situated in the mature phase, Wellplast AB as a company is in the early introductory phase of the company life cycle. As opposed to the large corrugated producing competitors, Wellplast AB's entire business idea is based on a new innovation. The innovation of the Wellplast® material could possibly be seen as a disruptive technology since it might satisfy the customers' needs in a different way. The different technology fulfils the customers' requirements regarding, for instance, moisture resistance in a simpler way since this can be achieved without specific, often costly, treatments of the corrugated material. Volckerts (Interview) characterise the Wellplast AB organisational culture as being marked by an extreme innovative spirit. They constantly use their innovative ability in order to find new areas where their product might gain foothold. In that sense one may argue that Wellplast AB is experiencing a high level of innovative opportunity although they are competing within a mature industry.

The level of pervasiveness can also measure the opportunity conditions experienced by a firm. Breschi and Malerba (1997) define a high level of pervasiveness as an ability to apply new knowledge to a wide range of products and markets. Eriksson (Interview) considers it being particularly important to transfer and communicate new knowledge across different locations within SCAP. This becomes especially valuable since SCAP is a giant company with knowledge and competences spread widely across the globe. The successful MIDAS database, existing within SCAP, is an example of how a company has accomplished this transfer of knowledge. Employees around the world can search the MIDAS database in order to find possible solutions to a packaging problem. Also Kappa FW has a similar system that is called WellGuiden (Interview;

Holmlund). This implies that new knowledge is applicable to more than one product or market, and the level of pervasiveness should consequently be high.

Breschi and Malerba (1997) also discuss how different sources of innovative opportunity conditions affect the experienced opportunity level. Innovative opportunities may arise from such differing sources as new breakthroughs at Universities, internal advancements in R&D or from external interaction with customers. When evaluating this dimension all case studies showed similar results. All interview respondents emphasised the importance of including the customer in the innovative process. Furthermore, all respondents considered the customers being a stronger driving force behind successful innovations than breakthroughs at Universities or high investments in R&D. They also thought that the transport packaging companies are extremely dependent on finding customers that are willing to push the development forward by requesting demanding solutions.

5.1.2 Schumpeterian dynamics according to opportunity conditions

Even though the above discussion does not solely point towards either a high or a low level of opportunity, the majority of the dimensions indicate that the innovative opportunities are rather low within the transport packaging industry. According to Schumpeterian dynamics, a sector characterised by a low level of opportunities will not attract a large number of innovators to enter the market. This leads to a low degree of competition, which in turn will limit the incumbent's incentive to innovate. This will consequently result in a highly concentrated industrial sector where the major innovators will experience a secure market position (Breschi & Malerba, 1997).

These characteristics, as described by the Schumpeterian dynamics, support the general view of the transport packaging industry that has been presented in this thesis. That is, an industry dominated by few large players who experience a quite stable market environment with low opportunities for groundbreaking innovations.

5.1.3 Appropriability conditions

A firm's appropriability conditions describe how difficult it is to protect innovations from being imitated by competitors (Breschi & Malerba, 1997). According to Holmlund (Interview) patents or other ways of protecting one's innovations is not given a lot of focus within the industry or within Kappa FW today. The driving force behind this development is, as described by Holmlund (Interview), the membership of the European Union, which changed the rules of market competition.

Rabe (Interview) on the other hand, is of a different opinion. He considers patents being an important factor contributing to LINPAC's success and emphasises the large amount of money spent on patents each year. Apart from protecting a specific innovation, Rabe (Interview) also considers patents having a commercial

value as these can be used as a selling argument. However, Rabe (Interview) is careful to explain that patents only fulfil their purpose if you are a large company with sufficient resources to undertake a legal process. Otherwise the large companies will run over the smaller ones, since there are ways of side-stepping the patents or to simply ignoring them all together.

Rabe (Interview) mentions the Maxi-Nest and the FLC, which both are LINPAC products, as two examples of the differing importance of patents. Regarding the Maxi-Nest solution, which totally dominates the Swedish and the English food market, a serious amount of money is invested each year to keep the large number of patents that LINPAC has on this solution. In the case of the Maxi-Nest patents have played a crucial role in its success. This can be explained by the fact that LINPAC is the only company that produces this particular solution. When it comes to the FLC, on the other hand, LINPAC is not the holder of a single patent. There was simply no use in trying to protect this solution since the product was developed through cooperation with Arca, which meant that one of their main competitors had access to exactly the same product from day one.

Volckerts (Interview) stresses how important patents and licensing abilities are for Wellplast AB's future success on the market. Wellplast AB has been granted patents for their unique production process, which they also spend loads of money protecting each year. Since Wellplast AB's entire business idea is based on them being the only producer of the Wellplast®-material, they are consequently extremely dependent on the ability to protect it from imitators. However, Volckerts (Interview) also explains that part of the company's business idea is to sell the technology to producers of corrugated board and they are therefore heavily dependent on licensing abilities as well.

5.1.4 Schumpeterian dynamics according to appropriability conditions

The importance of patents and other possibilities of protecting one's innovation seem to differ between our observed case studies. However, it also appears to differ within the same company depending on the characteristics of the specific project. It is, consequently, difficult to come to a unanimous conclusion regarding the appropriability level of the entire industry. According to Schumpeterian dynamics, a high level of appropriability will lead to increased growth for the innovators, higher innovative concentration and few innovators (Breschi & Malerba, 1997). These are characteristics that are well in line with what the transport packaging industry looks like today. This could therefore be an indication suggesting that the level of appropriability should be considered high. It is, however, important to remember that the level of appropriability may differ from project to project and depending on the firm size and its available resources.

5.1.5 Characteristics of SIS within the transport packaging industry

Presumed that the transport packaging industry environment is characterised by a low level of opportunity conditions and a high level of appropriability conditions, neither the condition named Schumpeter Mark I nor Schumpeter Mark II, seems

to be applicable. However, the environment as described by the latter, has many similarities with the studied industry sector. That is, a high level of concentration, a low number of innovators and an extremely stable environment for the few market leaders. Schumpeter originally considered this condition to be characterised by a high level of innovative opportunity, which our studies do not support (Breschi & Malerba, 1997). From this discussion the conclusion can be drawn that the possibilities for groundbreaking innovations are not great, since the innovative opportunity conditions are considered to be low. However, the high level of appropriability conditions aids the incumbents in protecting their innovations, which leads to a stable environment for the large players who are able to create innovations once in a while.

A slightly different condition, which corresponds even better than Schumpeter Mark II, is discussed by Breschi and Malerba (1997). They characterise a traditional industry sector according to the opportunity and appropriability variables. The authors describe a traditional industry sector of having a low level of opportunity and appropriability conditions. They also say that the relevant knowledge base required for innovations is characterised as simple and is represented by equipment and materials. This corresponds very well with Rabe's (Interview), Holmlund (Interview) and Renman's (Interview) views on the topic. Rabe (Interview), for instance, explains that all of LINPAC's competitors have access to the exact same materials and machinery. He says that 80% of LINPAC's entire production process is equal to its competitors.

Holmlund (Interview) also emphasises the fact that as soon as any of the active players comes up with a new innovation all the competitors will be aware immediately, and that they are able to imitate it if so is wanted. Breschi and Malerba (1997) explain this by pointing at the fact that traditional industries usually have a low level of appropriability, which leads to rapid imitation and the erosion of competitive advantage. Instead of competing with the actual product, Breschi and Malerba (1997) state that competition rather takes place on low price as well as post-sale assistance. Rabe (Interview) expresses an identical opinion when he stresses the importance of offering value added services such as the repairing of broken boxes.

5.2 Innovation as a mean of competitive advantage

5.2.1 Differentiation

According to The Delta Model there are three different approaches in order to create customer bonds. The first approach focuses on best product economics. The second one is based on a total customer solutions focus. The final approach is a development of total customer solutions including complementors in order to achieve a system lock-in (Hax & Wilde II, 2001).

When analysing Kappa FW and SCAP it is rather clear that both companies emphasise the importance of a customer focus in order to achieve differentiation. Holmlund (Interview) argues that cost leadership has been used in the past, but

this strategy has reached its critical point and there is no room for cost strategies today. Renman (Interview) explains the situation by declaring that every company in the industry uses basically the same machines and there is always an on-going development of these machines, which leads to a continuous decrease in costs. However, he further clarifies that this development does not lead to competitive advantages, since the situation is about the same for every firm in the industry. Furthermore, Holmlund (Interview) argues that the opportunities for differentiation do not lie in revolutionary packaging solutions, due to the market transparency. In other words, the best product approach is not a suitable strategy for SCAP and Kappa FW. These companies have instead emphasised a strategic focus on the customers with customised products and an integrated supply chain.

According to both Renman (Interview) and Holmlund (Interview) almost all innovations are developed in co-operation with a customer. Stated differently, innovations are mainly driven by customers, who identify a problem and ask the companies to solve it. Holmlund (Interview) means that it is difficult to grow organically in a mature business and it is therefore important to grow in symbiosis with the customer. Furthermore, Renman (Interview) means that the customer focus leads to customer lock-in through increased switching costs. This implies that it is a long-term process for a customer to change supplier, since the working methods are adapted to the current supplier. A change from one supplier to another can, according to Renman (Interview), take two years to accomplish before everything works smoothly again. This discussion indicates that the differentiation strategies of both Kappa FW and SCAP mainly are in line with the Total Customer Solutions approach. Consequently, the differentiation lies in customer specific offerings that are based on customer specific needs.

However, SCAP also has strategic elements that indicate System Lock-in, since the company offers its customers complementary products that are compatible with other products of SCAP. An example of such a complement product is a packaging tool that SCAP offers its customers, in order to facilitate the packing.

When studying LINPAC it is evident that this company also has a great deal of focus on customers. Rabe (Interview) emphasises that it is extremely important to be able to differentiate oneself from the competitors. He, furthermore, explains that differentiation through completely new innovative products has been proven not to be the appropriate strategic approach, since these products generally are difficult to sell. Due to the similarities between LINPAC's and their competitors' product range it is important to create differentiated value-added services that can be used to attract customers. An example of this is the RTP consulting service, which means that LINPAC analyses the major customers' material flow for free. By doing this LINPAC has the objective to get to know its customers' needs better and develop long-term relationships with the customers. This discussion implies that LINPAC uses a strategy that is in line with Total Customer Solutions. Rabe (Interview) also states that it is important for the company to create long-term relationships with pooling companies that are in control of the entire distribution chain of the fresh food industry. In Sweden, where the pooling company, SRS, is jointly owned by the retailers and the food producers it can be

argued that LINPAC has managed to create a Customer Lock-in. All involved parties have invested a substantial amount of money in this RTP standard which is based on the patent protected Maxi-Nest box. Rabe (Interview) claims that the customers are likely to remain within this system standard for the next 20 years since the customers' switching costs are significant. As the Maxi-Nest box is not compatible with other packaging solutions it is not possible for the customers to put price pressure on LINPAC by involving other suppliers. Rabe (Interview) also declares that offering complementary products that are compatible with the other products is one commonly used way to expand the boundaries of the product.

The situation is different for Wellplast AB, than that of the other three companies, since the firm emphasises a greater focus on differentiation through the characteristics of the product. Wellplast® is according to Volckerts (Interview) a further development of the characteristics of the traditional transport packaging material, corrugated board. The product has an almost identical construction as corrugated board, but is made of a waterproof plastic material instead. The company is too small to be able to match the major companies when it comes to additional services and long-term relationships. As a result, Wellplast AB emphasises a differentiation strategy solely based on the characteristics of the product, indicating the Best Product approach.

5.2.2 Innovative resources as a source of competitive advantage

Competences can be a source of competitive advantage and it is therefore important to focus on the development and deployment of resources and competences. The companies in the corrugated industry seem to have similar resources when it comes to production, education and material. The resources of a company are, according to Barney (1991), only a source of competitive advantage if they differ from those of their competitors.

Holmlund (Interview) stresses the similarities of the corrugated producers by claiming that they have the same raw material, the same production machines bought from the same suppliers and that they even have the same financial resources since they are part of large international corporations. Renman (Interview) is of the same opinion since he proclaims that the technological development when it comes to machines has been immense but no company has been able to gain any competitive advantages from it. The same scenario seems to be apparent in the reusable plastic box sector of the transport packaging industry. Rabe (Interview) indicates that 80% of LINPAC's production process is identical to the ones of their competitors. It therefore seems evident that the resources and competences involved in the production process are not distinguishing factors among the companies in regard to competitive advantage.

However, an efficient production process appears to be a requirement to be able to compete in this market. Wellplast AB has spent a lot of money on developing and protecting their production process, which they later aim to sell or licence. Resources have also been deployed in order to make the material compatible with

the pushing and cutting process of their suppliers, e.g. the large corrugated producers (Interview; Volckerts).

Rabe (Interview) is of the opinion that competitive advantage within the transport packaging industry springs from customer relationships. The high degree of customer involvement in the developing process gives the companies the possibility to constantly improve their customer competences that Daneels (2002) discusses. The companies seem to have similar competences when it comes to the technological arena although they might differ when it comes to customer competences.

In the customisation process it is essential to have a high innovative ability and the competences to give the customers a value adding solution. IT has given the companies a new mean of making their innovative process more efficient and giving their customers a high value solution simultaneously. The size of the large companies creates high potential for learning curve effects (Interview; Holmlund; Interview; Eriksson). By the introduction of IT solutions such as MIDAS (SCAP) and Wellguiden (Kappa FW) that hold a database of previously invented packaging solutions the companies increase their performance. These IT solutions prevent the companies from developing a specific packaging solution twice and they also give them a large number of inventions from which they can compose new solutions. Since the company's innovative competencies are gathered in these IT solutions it is reasonable to believe that the customers will experience a higher value. The ability to gather these competences in an IT resource might in the future be a source of competitive advantage.

In order to be innovative companies need to develop enabling competences (McGrath et al, 1999). SCAP has developed a forum for innovation called the European Innovation Centre where employees and customers meet for co-operation in an innovative environment. The forum has received a Swedish spin-off called Design Centre (Interview; Renman). Here the employees and the customer can meet so that the employees may attain the knowledge and competence required to understand the customer's needs. This knowledge will be valuable in future product development activities.

McGrath et al (1999) argues that it is important to gather a team of competences that can boost customer value. Thus, it is necessary to assemble a team that holds the required competences needed to deliver a high customer value. Kappa FW tries to assemble competences from the entire organisation when they conduct product development of the second and third level (see Section 4.2.3). The competences are brought together in so-called development centres, which are tied to a specific sales region (Interview; Holmlund). Holmlund (Interview) implies that it is necessary to assemble innovative resources in order to produce innovations. The development centres transform the profound company-specific knowledge and competence in order to create value for the customer in the customisation process (Interview; Holmlund). A company's different competences can be seen as a toolbox that enables the companies to create a customised product. In this case innovations are used to improve the competences

that make out this toolbox. The innovations concern print, barriers, design, material and E-solutions. How these competences have developed can be seen in the section dealing with the evolution of innovations within the transport packaging industry (4.1). The transformation of competences is an important factor for the rent potential of an innovation (McGrath et al, 1999).

Consultancy is a way for the packaging producers to use their competences to deepen the customer relationships. Packaging consultancy services are used to create long-term relationships and trust between the package producer and the customer. Kappa FW has consultancy work focused on printing solutions that will maximise customer value (Interview; Holmlund). LINPAC has developed a service aimed at their largest customers where LINPAC analyses the complete material flows of the customer (Interview; Rabe). The, free of charge, analysis can then be used as a sales argument showing for instance cost savings or efficiency improvements that can be made.

5.2.3 First-mover-advantages from innovation

In the market for reusable plastic boxes it is important to develop a product that will be seen as an industry standard in order to increase the margin of the business. Banbury and Mitchell (1995) refer to this as the development of a dominant product design that later will be enhanced and refined. The FLC for the automotive industry developed by LINPAC and Arca can be seen as a clear example of where the producer's margin was substantially higher at the time of market introduction. This is illustrated by the unit price that dropped from a price of 3 000 SEK at market introduction to 1 000 SEK, which it is sold for today. The price drop can be explained by the fact that the design has been available for every company to imitate which has increased the competition (Interview; Rabe).

When a company manages to set a standard or simply is the first to introduce a new solution this can increase its margin. The advantages of setting a standard can be described as similar to experiencing a long-term pioneering advantage described by Roberts (1999), since it creates a monopoly-like market situation. Rabe (Interview) also mentions the importance of being the leading company within an industry when it comes to innovative ability since no customer wants to hire an average supplier. This implies that it is important to be first to market and continuously introduce innovations that aggregated generate above average profits through high margins.

5.2.4 The importance of incremental innovations

The corrugated market is characterised by a product that has not undergone any major changes during the years. It is the same basic product today as it was 20 years ago. However, small changes are continuously introduced to the market and how these changes influence the market situation is not evident. Further Renman (Interview) claims that the industry has been shaped by small product enhancements and not major innovations. Since the majority of the corrugated producers' products are customised to fit the needs of their customers, innovation

is always a part of the daily work in terms of new solutions that make the business of the customers more efficient.

Banbury and Mitchell (1995) argue that incremental innovations that increase customer value are of great importance, especially in mature industries where the products are based on the same core features. Kappa FW finds it important to constantly improve their own effectiveness in order to increase the effectiveness of their customers and thereby amplify customer value. Effectiveness is one of the four elements of Kappa Packaging's Performance Packaging concept (Kappa FW Information material: Performance Packaging). Incremental innovations are a prerequisite of the customising process even at the most basic level of product development where length, height and breadth adjustments fulfil the basic customer value requirement. It is, however, even more important at the levels of developing more complex solutions in order to meet the needs of the customers. Renman (Interview) describes the customising process as presenting the customer with a solution that they may perceive as unique but it is often a combination of previously used solutions.

Although no revolutionary innovations concerning the basic product have taken place, major changes have occurred during the last ten years regarding features and supporting services. Print has been the one thing that all interview respondents have regarded as the most fast developing feature where dramatic quality improvements have been made (Interview; Renman, Holmlund, Bergquist). This technological improvement has made the boundaries between secondary and primary packaging more blurred and has enabled the customers to use secondary packaging as marketing tools instead of just transportation protection.

The Maxi-Nest solution by LINPAC has, according to Rabe (Interview), been subject for a number of incremental innovations during the years. The development has been focused on minimising the stack height in order to fill the trucks with a greater amount of boxes during transportation and thus, make the customers more cost efficient. These small incremental innovations presented have increased customer value by focusing on making the solution better suited and optimised for the customers' needs.

5.3 Customer focused innovations

5.3.1 Customer driven innovation

"The only safe way to achieve success in product development is to have a customer tied to the project" (Interview; Holmlund).

Hardly any transport packaging innovations are developed without the involvement of customers. Holmlund (Interview) goes as far as saying that 99% of the innovations within Kappa FW are developed in cooperation with customers. Since every customer wants a product that holds specific features that fully satisfies their needs it is difficult for a supplier to invent a product out of thin air.

Eriksson (Interview) at SCAP agrees with the importance of customer involvement in product development and Renman (Interview) means that there is no need for SCAP to develop new products if the customers are not interested in buying them. Rabe (Interview) stresses the need of developing relationships with customers who drive the development forward.

Bergquist (Interview) explains that Kraft Foods has an own department that only deals with packaging development. This department often comes up with conceptual packaging solutions that Kraft Foods wants the corrugated producers to further develop. It is therefore important with a close collaboration between the supplier and the customer in order to produce a satisfying result.

IKEA, on the other hand, is a customer that buys enormous amounts of corrugated each year and they are of a completely different opinion. IKEA is not at all dependent on the packaging supplier to come up with solutions, new designs or new innovations. This is simply because IKEA has all the necessary competences internally that makes it possible for them to design and innovate their own packages. The only thing that IKEA desires from the producers is that they are able to produce large quantities reliably and to a low price (Interview; Dickner). Since the large corrugated producers that we have been in contact with are focused on delivering a customised product solution where they help the customer to develop the package, IKEA has chosen not to engage in a relationship with these suppliers. However, this is a direct consequence of IKEA having the required competences within their own company (Interview; Dickner). This is a rather unique situation, but could possibly come to make out a future threat for the corrugated producers if this type of customers becomes more common.

Renman (Interview) implies that customers are not always interested in how SCAP can improve their product since the product has become a standard. Thus, price is the main focus of these customers who are more interested in how SCAP can lower their costs. The fact that large corrugated customers have begun to introduce Internet auctions as a mean to decide which supplier to contract is evidence showing the low cost customer emphasise (Interview; Bergquist). This is a scenario that in a way slows the development. This means that the customers determine the need for innovations by their willingness to pay for it. Rabe (Interview) expresses the same opinion when mentioning the E-auctions that the automotive industry was first to introduce. Internet auctions are an effective way of pushing down prices, encouraging the packaging companies to be innovative in their production processes (Interview; Rabe). Bergquist (Interview) mentions that although Kraft Foods consider E-auctions to function well, the corrugated suppliers have been known to complain. It happens that Kraft Foods offers a specification, which a certain supplier has laid a great deal of time and resources into, to a wide range of competing suppliers. If a competitor is able to offer a lower price he is contracted instead of the specification originator (Interview; Bergquist). This kind of scenario results in great cost pressures being laid upon the packaging producers and lowers the incentive for the companies to be innovative.

In the reusable plastic box market Rabe (Interview) argues that customer involvement in product development is equally important. He claims that the total dominance of the German beer crate market was mainly achieved through the In-Mould- Labelling technique that was developed within the frames of a co-operation with a couple of German breweries. The innovation evidently paid off since it has increased LINPAC's turnover in Germany with 20-30% (Interview; Rabe). This is an obvious example of where it has been extremely important and successful to be innovative.

To illustrate the difficulties of not having a customer involved in the development phase, Rabe (Interview) mentions Recopac. LINPAC has desperately tried to find customers for this, according to Rabe (Interview), genius packaging solution that creates immense cost saving opportunities when it comes to transportation since it is flat in its unfolded condition. However, the success has not been seen and Rabe (Interview) suggests that it is because customers are reluctant to take a chance and be the first customer. Customers want to buy a product that has been tested and has been shown successful in order to eliminate uncertainty. This dilemma is derived from the lack of customer involvement in the development phase since a customer who had adopted Recopac at an early stage most likely would have attracted new customers.

In the product development phase there has to be a relationship between the supplier and the customer so that the supplier apprehends the customers' needs and the specific environment of which the packaging solution will be a part. When the supplier has developed a profound knowledge of the customers' requirements the supplier can use their experience and innovative ability to produce a product that they know will have a market and commercial value. In addition, we have noticed that it is very uncommon that packaging suppliers get involved in projects not based and driven by customer wants and needs. These observations are supported by Connor (1999), who claims that customers have to be involved in product development in order to create useable products.

5.3.2 What facilitated the change in the food industry?

The recent transport packaging development towards reusable plastic boxes in the Swedish food industry is an interesting example of the importance of knowing who the decision makers are. The transport packages are sold directly to the producing farmers but it is really the retailers who determine which packages to use. Kappa FW developed an industry-wide standard, called SWIF 2000, in order to meet the requirements of the wholesalers who found it difficult to pile packages with different designs on pallets. The development of SWIF 2000 was a smart solution but it was not the wholesalers who made the decisions. The retailers were the ones dictating the conditions and they wanted to implement a system of reusable plastic boxes. LINPAC on the other hand started to negotiate with the Trade Organisations, DULOG and DLF, as early as 1995 and after five years the first order came through. DULOG's and DLF's decision to base their reusable plastic box system on the Maxi-Nest solution creates a substantial market for LINPAC, especially since it is not compatible with other plastic box producer's

products. These examples show the importance of identifying the decision makers and try to influence them to choose a specific solution. The food industry is an enormous market and the fact that this industry has chosen a plastic reusable system instead of a corrugated solution could possibly have a substantial impact on the future turnover of the corrugated producers. The plastic boxes can perhaps be seen as a disruptive technology since the plastic reusable solution satisfies customers' needs in a different way and has thereby taken the place of corrugated boxes on important markets like the food market.

6 Conclusions

In this chapter the conclusions of the thesis are presented. We also reflect on future possible threats to the need of innovative abilities within transport packaging companies. The chapter finally describes possible areas of future research.

6.1 Answering the questions

6.1.1 The transport packaging industry's innovation environment

The innovation environment that characterises the transport packaging industry has many similarities with that of general traditional industry sectors. The case studies all indicate that the transport packaging industry is in a mature phase of its life cycle and consequently presents a low level of innovation opportunity conditions.

The large corrugated producers are united in their view that it is extremely difficult to protect innovations from imitators within this industry and that not a great deal of attention is given to this issue. Although the same protective difficulties exist within the plastic segment of the industry it appears to be more important with patented innovations that are able to set a system standard within this segment. However, the appropriability conditions are even still characterised as low.

6.1.2 Driving forces of innovation

All transport packaging solutions are custom-made and developed through a close customer relationship. The transport packaging companies seem to have no incentive to produce innovative solutions without having a customer tied to the project. The case studies indicate that the dominating driving forces behind a clear majority of the innovations are the customers and their needs.

6.1.3 Innovation as a mean to achieve competitive advantage

All the examined companies use a differentiation strategy in order to create competitive advantage since their similarities regarding the abilities to produce the basic product eliminates the option of a low-cost strategy. The large companies differentiate themselves through a Total Customer Solution approach where close long-term relationships with the customer enable unique solutions that are innovated specifically for the individual customer. Competitive advantage is created by customer lock-in, achieved through close and long-term product development and customisation relationships with the customer who, as a result, experiences increasing switching costs in the course of the integrated relationship. Additionally, innovative services are produced in order to raise customer value and consequently the margin of the business. These value-adding services can

possibly be the source of competitive advantage if the underlying competences are difficult or impossible to imitate.

6.1.4 The role of innovations within the transport packaging industry

Packaging solutions have not changed dramatically over their lifetime, however, they have been subject of constantly ongoing improvements. The product offering consists of specific features that continuously have been enhanced through incremental innovations. It therefore seems evident that innovations rather take place as incremental improvements of existing products rather than groundbreaking new products that revolutionise the industry.

There are indications implying that it is important to be the leading company when it comes to innovative ability since it is a mean of attracting customers. The customers evidently desire a co-operation with a supplier that has a high problem solving ability offering a security as they are able to develop products in line with the customer's demands.

Innovations are also focused on improving the business performance of customers since transport packaging companies grow in symbiosis with their customers. The success of the transport packaging companies is a consequence of the success of their customers.

6.2 Possible threats to the importance of innovation

The case studies as well as the customer perspectives indicate that the transport packaging customer is extremely price sensitive. This has forced the companies to focus on how to improve their cost efficiency through improvements in the production process and by minimising the amount of material usage. Historically, this has been the number one source of competitive advantage. This development has, however, reached its peak and it is today difficult for the packaging producers to find ways to further lower their costs and still be profitable. Instead, the packaging companies have been forced to find new ways of creating competitive advantage and new sources of income. By adding services (both pre and post sales) that increase the product offering to attract customers it simultaneously provides the companies with an additional service that they can charge for. This seems to work, but only to a certain extent. As long as the customers are in need of the services and actually perceive them as adding value everyone shows a happy face.

However, customers such as IKEA provide clear evidence that this is not always the case. Since IKEA has access to all the required competences internally they are not willing to pay extra for additional services that they are not in need for or at all interested in. Since large packaging companies' entire business idea is based on the fact that customers want and need customised products, it can be seen as a serious threat if customers like IKEA become more widespread. A future scenario, within this industry, could be imagined to feature the rise of 3PL (Third Part Logistic) companies that offer the end customer a solution where the 3PL

companies manage the entire value chain from design to delivery. The effect upon transport packaging producers would be that their new customer, the 3PL companies, have access to all required knowledge internally and therefore are solely interested of the actual production of the package. The packaging supplier who survives this scenario is the one that would be able to create a profitable organisation that is only focused on the actual production of the transport packages. This would imply that innovations or companies' innovative ability would no longer be a potential source to create competitive advantage.

6.3 Further research

When examining innovations within the transport packaging industry we have come across a couple of interesting topics for future research:

- Is innovation profitable? This could be determined through quantitative study aimed at finding a correlation between the innovative ability of a transport packaging company and its performance.
- How can the transport packaging companies avoid a future development where their competences enabling value-adding services become a commodity?

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Appendix 1

