Swedish University of Agricultural Sciences
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– An assessments of complex processes

Produktutvecklingsprocesser i de nordiska pappersförpackningsföretagen
– En analys av komplexa processer

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Sammanfattning

I takt med att affärsklimatet förändras måste företag kontinuerligt utveckla sina erbjudanden för att upprätthålla sin konkurrenskraft (eg. Schumpeter, 1934; Ansoff, 1979; Porter, 1985; Trott, 2012). Globalisering, snabb teknikutveckling och föränderliga kundönskemål gör att pappersförpackningsindustrin behöver förbättra sin produktutveckling (Hansen & Niskanen, 2007; Björkdahl & Börjesson, 2011). Det finns sparsamt med forskning om just pappersförpackningsföretagens produktutvecklingsprocesser (Ibid.), varför denna studie tittar på just detta för fyra av Nordens ledande företag.

Denna studie har anammat modern litteraturs perspektiv där produktutveckling anses bestå av komplexa, icke-linjära processer som även bör hanteras och styras därefter (OECD & Eurostat, 2005; Burns, 2005; Smith et al., 2008; Goffin & Mitchell, 2010; Trott, 2012). Framför allt har Goffin & Mitchells (2010) modell *Innovation Pentathlon Framework* använts som utgångspunkt för att analysera företagens innovations processes. Denna modell delar upp innovationsprocessen i tre faser; idégenerering, prioriteringar and utveckling/förverkligande. Samtidigt menar modellen att dessa faser stöttas av företagets strategi samt underliggande organisationsstrukturer och resurser i form av individers kompetens.

Personer på ledande position inom produktutveckling intervjuades i semi-strukturerade intervjuer. Materialet från intervjuerna analyserades och jämfördes sedan med *Innovation Pentathlon Framework*-modellen och annan litteratur inom ämnet.

Studien visar på att de nordiska pappersförpackningsföretagen har flexibla och dynamiska produktutvecklingsprocesser. Alla intervjuade personer ansåg dessutom att flexibilitet är av stor vikt i utvecklingsprojekten. De fyra företagen har alla olika praxis för deras produktutveckling, men likväl har de liknande komponenter, exempelvis faserna idégenerering och prioritering av idéer och projekt. Alla företag underströk behovet av utveckling inom projektledning och kompetens för att hantera den komplexitet som produktutvecklingsprocessena innebär.

Resultaten indikerar även att företagen skiljer sig i fråga om fokus för idégenerering och prioriteringar. Vissa företag är mer push-orienterade medan andra är mer pull-orienterade och detta speglar även till vilken utsträckning företagen involverar kunder i deras utvecklingsprocesser. De flesta företag skulle troligtvis ha nytta av en mer diversifierad idégenereringsprocess, att involvera delaktiga personer och kunder även i prioriteringsprocessen samt att fokusera mer på vilka värden de olika projekten kan generera.

Det finns också en diskripans i företagens attityder mot externa aktörer. Vissa företag förespråkar öppen innovation och menar att detta förhållningssätt skapar möjligheter, även om metoden kräver insikt och kunskap om hur man ska utforma avtal och balansera värden etc. Samtidigt har andra aktörer blivit mer introverta, vilket kan komma att påverka hela industrin negativt.

Vidare visar resultaten att alla företag integrerar sina affärsstrategier i produktutvecklingsprocesserna, fastän detta sker på olika sätt. Analyser tyder på att en naturligt integrerad strategi kan fungera underlättande för produktutveckling. För att undvika att projekt driver iväg kan dock kontroller behövas. Kontroller och strikta processer för att integrera strategin kan å andra sidan påverka innovationskraften och kreativiteten negativt.

Företagen måste analysera hur deras förhållningssätt påverkar deras produktutvecklingsprocesser för att kunna balansera med kompletterande åtgärder.

Slutligen konstaterar studien att det finns ett behov av mer kunskap om komplexiteten i att hantera produktutvecklingsprocesser. Studien identifierar ett antal områden som behöver förbättras och studeras närmare, exempelvis projektledning och hantering av personal, öppen innovation och involvering av kunder, flexibilitet versus effektivitet, samt flexibla kulturers förutsättningar. Vidare forskning behövs för att förstå vilka handgripliga komponenter företagens ledning bör adressera för att hantera dessa områden och förbättra sina produktutvecklingsprocesser.

Nyckelord: *produktutvecklingsprocesser, pappersförpackningar, komplexitet, flexibla och dynamiska processer, projektledning, organisationsstrukturer, samarbeten, strategi*

Abstract

It is important for firms to continually develop their offerings as the business landscape develops in order to sustain their competitiveness (e.g. Schumpeter, 1934; Ansoff, 1979; Porter, 1985; Trott, 2012). In a context of globalization, rapid technology development and changing customer needs, the paper packaging industry is urged to enhance its product development activities (Hansen & Niskanen, 2007; Björkdahl & Börjesson, 2011). However, there is little research about paper packaging firms' product development processes (ibid). Accordingly, this study assessed the product development processes of four Nordic paper packaging firms.

This study took the contemporary theoretical perspective that product development is a complex, non-linear processes, which should be managed accordingly (OECD & Eurostat, 2005; Burns, 2005; Smith et al., 2008; Goffin & Mitchell, 2010; Trott, 2012). In particular, Goffin and Mitchell's (2010) *Innovation Pentathlon Framework* was selected as a model to assess the firms' product development processes. This framework comprises an innovation process that has three phases; idea generation, prioritizations and implementation. This innovation process is supported by the firms' strategy as well as underlying human resources and organizational structures.

Executives responsible for product development were interviewed using semi-structured interviews. Interview results were then analysed and compared with the *Innovation Pentathlon Framework* and literature.

Findings were that the Nordic paper packaging producing companies have flexible and dynamic product development processes. Moreover, all executives consider that flexibility in running product development projects is vital. The four firms have different product development praxis. Nonetheless, components such as idea generation and product development phases are similar. All firms recognised that there is a need for enhanced investments in competences, people processes and team management.

A key distinguishing feature of product development praxis was that some firms have a push oriented idea generating and prioritization processes while others have pull oriented processes. Involvement of customers varies among the companies accordingly. The assessment was that most firms could benefit from having a more diverse idea generating process, involving employees and customers in the prioritization process as well as focusing more on the value proposition.

The study showed a difference in attitudes towards external actors. Some advocate that open innovation can provide firms with opportunities, although it requires competence in how to establish agreements and balance values etc. However, the findings also indicate that other actors in the industry are becoming more introverted, which may negatively affect the development of the sector and firms within it.

Findings showed that firms' business strategies were integrated in the product development process, although this was performed differently. The assessment found that a naturally integrated strategy can act as a facilitator for the products development, although too lose structures might lead to project drift. On the other hand, too controlled and strict processes might hamper the innovativeness, even though it secures the project alignment. The companies need to examine the effects of their approaches.

Finally the study highlights the need for more knowledge about the complexity of running product development processes in paper packaging firms. Several areas for improvement are identified in the study, such as people processes and management, open innovation and customer involvement, flexibility vs. efficiency and the nature of flexible cultures. Further research is needed to understand what explicit components the management needs to address to master these areas.

Keywords: *Product development processes, Paper packaging companies, Complexity, Flexible & dynamic processes, Team management, Organizational structures, Networks and alliances, Correlation to strategy*

Preface

This master thesis is the final project for my studies in forestry and economics at the University of Agricultural Sciences and I have got the privilege to write this thesis in collaboration with McKinsey & Co.

I would like to send my regards to all people I have met during my time at the university, my scholarships for travelling around the world, my internship at McKinsey and now my final thesis. You all have taught me something and those experiences have helped me with my thesis as well as many other areas.

Especially, I would like to thank Denise McCluskey, my mentor at the University of Agricultural Sciences, who has had patience with my queries, questioned my thinking and helped me to structure this thesis.

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I am also very thankful for the support and guiding from Peter Berg at McKinsey & Co as well as Lars Lönnstedt at the University of Agricultural Sciences. Thanks for letting me write this thesis.

Finally I would like to send my kindest regards and gratitude to the interviewees at the different paper packaging companies and other experts. Without your benevolence and generosity in sharing information, this thesis would not have been possible to execute. I am really thankful for all the knowledge you have shared with me and I do hope you will benefit from this thesis as well in some way or another.

Stockholm, 2013-06-13

Louise von Ehrenheim

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1 Introduction

Global demand for packaging is growing steadily and paper is the major substrate. In 2010 the global paper packaging consumption[1] had a value of approximately 245 USD billion and represented ~37 % of the global packaging market. The total market is predicted to have an annual growth rate of 3.3 % until 2016 and paper is expected to continue being a major grade (Pira International, 2011). Nonetheless, there are other packaging materials which are highly competitive; hence the paper packaging industry needs to be innovative in order to maintain its competitive advantage.

Product development and innovations has been of interest for many economists and researchers for decades. Innovations are regarded as a crucial source for sustaining competitive advantage and economic growth (e.g. Schumpeter, 1934; Barney, 1991; Drucker, 1998; Stendahl, 2009; Goffin & Mitchell 2010; Grant, 2010; Trott, 2012). In a McKinsey Global Survey 84% of the executives responding, from a full range of backgrounds and industries, stated innovation is extremely or very important to their companies' growth strategy after the recession (Capozzi et al., 2010).

Product development however is associated with substantial costs and risks. Thus, there is a need to consider the trade-off between how much a given product development is expected to contribute and the resources that will be used in each specific product development project (Tidd & Bessant, 2009; Trott, 2012). Such analysis ought to also consider what competences and resources the company possesses (Grant, 2010), what structures and functions need to be involved, and which management tools must be developed to operate such activities (Goffin & Mitchell, 2010).

The contemporary literature has the perspective that product development processes are complex non-linear management processes which not only involves the R&D department, but several functions and actors within and outside the firm (OECD & Eurostat, 2005; Goffin & Mitchell, 2010; Trott, 2012). There are many guidelines of how companies should organize their product development processes; however there is no consensus of an ideal praxis (Tidd & Bessant, 2009; Goffin & Mitchell, 2010). In the end it all comes down to the company's resources, context and dedicated people.

The overall factors that influence innovation praxis are modelled in the Innovation Pentathlon Framework (Goffin & Mitchell, 2010). This framework models innovation as a process which has three phases; idea generation, prioritizations and implementation. This innovation process is fundamentally dependent upon the organisational context, which mainly comprises the firms' strategy as well as underlying human resources and organizational structures. Accordingly, the Innovation Pentathlon Framework models the innovation processes as resting upon and interacting with strategy, human resources and organisational structures.

1.1 Literature study

This study's literature search indicates that here is a general lack of research about the product development processes in paper packaging companies. The limited work that is available reflects the consensus of the general literature, that product development is important. In particular, given current trends of globalization, rapid technology development and changing

1 Includes paper board and flexible paper packaging, but exclude mixed grades. Boards incl. folding cartons, liquid cartons, corrugated products & composite containers. Flexible paper incl. bags & sacks, wraps & pouches.

customer markets, it is advocated that there is a need for enhanced levels of innovation in the pulp and paper industry so that firms sustain their profitability and businesses (Hansen & Niskanen, 2007; Ottosson, 2008; Björkdahl & Börjesson, 2011).

There are several studies on product development which focus the forest industries in general (e.g. Rametsteiner, 2005; Ottosson, 2008) and innovation in regards to environmental issues (e.g. Kivimaa, 2007; Karltorp & Sandén, 2011). These generally call for more in depth research projects to understand processes or other enablers for innovation to improve innovativeness and product development in specific sectors and companies.

Stendahl (2009) discusses product innovation processes in the wood processing firms. His overall finding was that success in product development heavily depends on the organizational structure, systems and culture which coordinates and integrates the R&D activities rather than invested capital.

Björkdahl and Börjesson (2011) have studied Nordic pulp and paper companies in regards to organizational climates and capabilities for innovation. Their findings highlight that:

> "*a creative climate is only one of the prerequisites for innovation and that firms need to work with a number of different processes and structures in order to be successful."* (Björkdahl & Börjesson, 2011, pg. 498).

Their study furthermore emphasise the lack of knowledge about innovation processes and a critical need for attention to concrete managerial aspects to improve innovation (Björkdahl & Börjesson, 2011).

Accordingly, the literature review indicates a need for research that focuses on product development processes within paper packaging companies. How different elements affect these processes and explicit topics for the management to work with.

1.2 Purpose and research questions

The purpose of this study is to assess product development processes within the Nordic paper packaging industry to understand the nature of the processes and influencing factors as well as how these connect to business strategy and organizational structures.

The main research questions are:

1. What is the nature of the processes and how do they evolve?
2. How are the processes managed?
3. What is the design of the organizational structures and how do they influence?
4. Are companies involved in alliances and/or are external actors involved?
5. How is business strategy connected to product development?

1.3 Delimitations

This study focuses on paper packaging producing companies in the Nordic countries. Product development executives in four of the five top paper producing companies with headquarters in the Nordic countries have been interviewed and experts have been consulted. To ensure focus of the study, only processes of new product development has been assessed.

There is abundant research and material on innovations and product development and every author has his/her point of view. This study tries to be explorative and open-minded as the author is convinced product development processes are complex and non-linear processes which needs to be addressed accordingly. This perspective is highlighted by several researchers (OECD & Eurostat, 2005; Burns, 2005; Smith et al., 2008; Tidd & Bessant, 2009; Goffin & Mitchell, 2010; Trott, 2012) and illustrated in the theoretical framework

1.4 Overview

In section two a theoretical framework is presented to give the reader a background and knowledge in fundamental concepts which are important in regards to product development processes and issues addressed in this thesis.

Section three describes the methods and materials for the research process. Ethical dilemmas, critique of the method and other issues which influence the study's validity and reliability is also included.

Results are presented and analysed in section four. Statements and conclusions from the interviews are connected with relevant theories and the section tries to illustrate how the paper packaging companies actually manage their product development processes etc.

The final section, five, conclude the findings and discuss essential issues which the companies should consider in order to improve their product development processes. Topics for further research are also addressed and finally there are some concluding remarks.

2 Theoretical framework

This section aims to describe the theoretical framework of the study. There is a vast amount of publications and research projects on product development processes and innovation. Of course all could not be included in a master thesis. Moreover, little is known in the specific application area of this thesis. Accordingly, the selection is based on fundamental concepts that are important in regards to innovation and product development processes in order to give the reader an academic background to issues addressed.

2.1 Product development basics

2.1.1 Why product development is important

Product development and innovations have been topics of high interest among economists ever since Schumpeter emphasised the importance of new products as a driver for economic growth in the 1930's (e.g. Schumpeter, 1934; Barney, 1991; Drucker, 1998; Stendahl, 2009; Goffin & Mitchell 2010; Grant, 2010; Trott, 2012). In a McKinsey Global Survey 84% of the executives responding, from a full range of backgrounds and industries, stated innovation is extremely or very important to their companies' growth strategy after the recession (Capozzi et al., 2010). Today's globalized markets, rapid development of technology and increasingly demanding customers are drivers for product development (Goffin & Mitchell, 2010) as the companies' ability to adapt to changes in the business environment determines their success (e.g. Schumpeter 1934; Porter, 1985; Dawson, 2003; Burns, 2005; Smith et al., 2008; Andriopoulos & Dawson, 2009; Tidd & Bessant, 2009; Grant, 2010; Trott, 2012)

2.1.2 Definitions and types of innovation

There are many definitions of innovation, still all of them agree that it incorporates a change which is new (Schumpeter, 1934; OECD & Eurostat, 2005; Goffin & Mitchell, 2010; Trott, 2012). The word innovation origins in the Latin noun *innovates* which means to renew. The concept of newness can also be discussed. The innovation guidelines from OECD & Eurostat (2005) define innovation as a change which is "*new or significantly improved to the firm"* (OECD & Eurostat, 2005, pg. 46). This is also the approach which is used in this study. The product or service must not be new to the world, although new to the firm. In this report product development and innovations are used synonymously.

Innovations can be of several types. Trott (2012) separates between *product, process, organisational, management, production, commercial/marketing* and *service* innovation. There is not always a clear separation between the different kinds, however they do have different characteristics why it is important to recognize what type of innovation you are studying or working with (OECD & Eurostat, 2005; Goffin & Mitchell, 2010). To realize one innovation there might also be need for other types of innovations which often complicates the process. E.g. a new product might need a new process and new services as new distribution channels. The additional development processes might create further value to the firm, but also incorporates additional costs and problems which were not expected from the original idea (Goffin & Mitchell, 2010; Trott, 2012).

2.2 Innovation as a complex management process

Innovation and product development should be seen as a complex non-linear management process and not a single event. This process involves not only the R&D department, but several functions and actors within and outside the firm (OECD & Eurostat, 2005; Smith et

al., 2008; Tidd & Bessant, 2009; Goffin & Mitchell, 2010; Trott, 2012). Goffin and Mitchell (2010) states that:

> *"Managing innovation is complex and so there are no 'quick fixes', 'no universal solutions'.* [4] *The challenges of managing innovation are also compounded by the fact that many ideas that are effective in one organization cannot be easily transferred; it is not simply a case of adopting best practice, managers need to adapt ideas to the specific situation their company faces."* (Goffin & Mitchell, 2010, pg. 1).

Accordingly, an analysis of product development processes must be multifaceted and linked to a firm's unique internal and external conditions and context. There is no right or wrong answers to how to succeed with product development or how to be an innovative company, yet there are factors which the managers should take into account and factors which normally tend to increase the probability of success. As Smith et al. (2008) claims, it is important to have a holistic view and be aware of the complexity of a range of influencing factors.

2.2.1 A model of the product development process

There are several models which illustrates the product development process. Goffin and Mitchell (2010) present a rather comprehensive example when looking at the challenges of managing innovation; the *Innovation Pentathlon Framework*, Figure 1. The framework illustrates a funnel of different phases of the innovation process which is supported by the company's *innovation strategy* as well as underlying human resources, organisational structures and culture. The funnel consists of three phases; *idea generation, prioritization* and *implementation*. (Goffin & Mitchell, 2010).

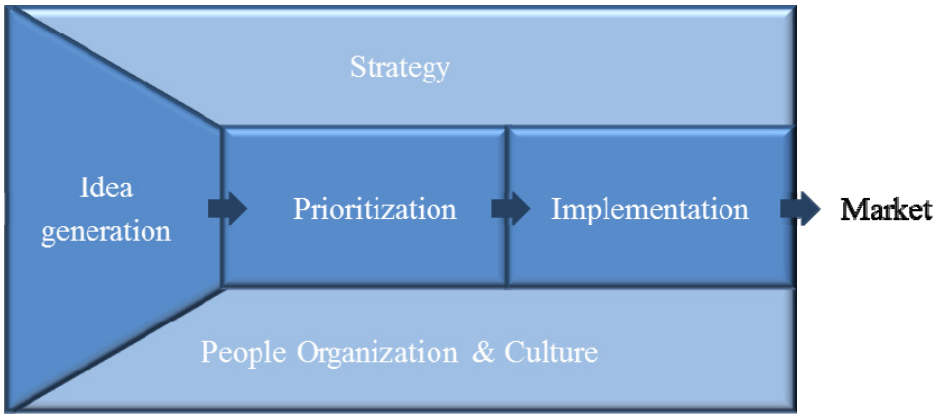

Figure 1. The Innovation Pentathlon Framework (Goffin & Mitchell, 2010).

Idea generation is highly dependent on the company's ability to generate and allow creativity throughout the organization. Ideally all functions should be involved as well as customers. It is important to encourage both individual and group creativity. At the same time, one should be aware of the fact that the number of ideas generated is not what determines the company's innovativeness. The company should focus on generating ideas which create substantial value, although there is no simple solution to how this is done (Goffin & Mitchell, 2010).

Selection, hence *prioritization*, of ideas generated are often a challenging part of the product development process. First managers must evaluate which ideas have the possibility to actually give a return on invested capital. Secondly, one needs to investigate how these ideas fit in the company's overall product portfolio and other innovation projects running in order to

balance resources and make sure the ideas are align with the corporate strategy. Third, there is a need to maintain the involved people's understanding and commitment, especially those engaged in neglected ideas, in order to keep getting reliable information, a creative environment and organisational learning (Goffin & Mitchell, 2010).

The *implementation* phase involves prototyping, testing and finally commercialization. This is when the idea actually turns into an innovation and which is traditionally seen as the actual product development process. In this phase explicit project and team management is a key issue. The person or people in charge should create clear goals and action plans, manage resources and risks as well as coordinating cross-functional actors and teams. During this process it is very important to maintain awareness of customer requirements and connections to sale. A good manager should also facilitate learning to increase the innovation competence until next project. (Goffin & Mitchell, 2010). All those elements will be further developed later in this chapter.

As a backbone for the innovative funnel there should be an *innovative strategy* which connects the product development with the business strategy. The innovative strategy aims to align the different product development phases as it enables for managers to communicate common goals for all actors and procedures involved. It is also important when ensuring the availability of the right internal resources and competences. Furthermore, the strategy determines whether any external resources or networks can be used in order to enhance the innovative process. (Goffin & Mitchell, 2010).

In the end, all innovations and product development processes are products of *people and organizational structures*. Accordingly, motivated and competent employees together with efficient organisational structures are key factors for reaching success. In order to create an innovative culture there should be a continuous learning process and evaluation, an acceptance of risk and failure, cross-functional collaborations etc. (Goffin & Mitchell, 2010).

This is only one model of many. Burns (2005) presents a totally different view, the complexity theory, which claims that innovation only can occur if the organization positions itself on the border to chaos with only a few "*order-giving rules*". He further argues that change occurs as a result of interactions and randomness (Burns, 2005), which is completely different from Goffin & Mitchell's (2010) argument about clear goals and strong management. Still, Burn's (2005) reasoning partly aligns with Goffin & Mitchell (2010), as they claim that there is no universal best practice and that development processes depends on individuals. The "*order-giving rules*" can also be resembled with what Goffin & Mitchell (2010) describes as the specific situation and context which the company must adapt to with regards to its resources and structure. Again, the fact that there are so many different theories which sometimes are completely different and sometimes do resembles, urges for a wide perspective and openness when studying product development and innovations as there is "no correct answer".

2.3 Management, culture & roles

Several studies have acknowledged that product development highly depends on the people involved (Andersson & Rollenhagen, 2003; OECD & Eurostat, 2005; Smith et al., 2008; Goffin & Mitchell, 2010; Lindgren, 2012; Trott, 2012). Individuals are the creators of new ideas (Smith et al., 2008). Individuals are managers which lead the processes (Goffin & Mitchell, 2010). Individuals are the power behind meaningful and focused change (Drucker, 1998). All those peoples' competences and capabilities determine the company's ability to success (Andersson & Rollenhagen, 2003; OECD & Eurostat, 2005; Smith et al., 2008; Goffin

& Mitchell, 2010; Lindgren, 2012; Trott, 2012). To improve each individual's capacity leadership, training and cross-functional collaborations are important (Goffin & Mitchell, 2010). "*In reality taking any good idea forward relies on all sorts of inputs from different people and perspectives*" (Tidd & Bessant, 2009, pg. 281).

2.4 Organisational structures and characteristics

Organisational structures and characteristics have impact on product development processes in many different ways (van der Panne et al., 2003; OECD & Eurostat, 2005; Smith et al. 2008; Goffin & Mitchel, 2010; Trott, 2012). Trott (2012) mentions four structures explicitly; *formalisation*; formalized procedures are threats to creativity, but also a necessity for efficiency, *complexity*; a large number of professional groups and functions increase the company's competence, but aggravate management and coordination, *centralisation*; decentralized organisations tend to be more responsive, but might lack in decision-making and coordination, *organisational size*; size impacts both resources, costs and quality which all affects what the company can achieve. Goffin and Mitchell (2010) stress *market-orientation*, *frequent reorganizations*, *autonomous teams* and *"innovation managers"* as organizational structures which promotes innovation.

Trott (2012) also summarizes twelve organizational characteristics which facilitate the innovation process. Commitment to long-term growth, willingness to invest in development projects, awareness and acceptance of risk, and strategy towards innovation, are elements which executives mainly are involved in. Receptivity to adopt new technologies, space for creativity, cross-functional cooperation and coordination, organisational heritage and innovation experience are five other elements which are results of long-term management. The organisations ability of managing projects and the market orientation, i.e. awareness of changes in competition and customer requirement, are not to be forgotten. (Trott, 2012).

These are only a few examples of numerous characteristics and structures. How the different structures and characteristics affect the product development process depend on the company's context and environment (OECD & Eurostat, 2005). There is no right or wrong answer of how a company shall be organized, however the awareness of different characteristics and their impact enables managers to focus on the right issues to create an innovative culture and success (Goffin & Mitchell, 2010).

2.5 Networks & external resources

More and more companies experience the benefits of alliances and networks in regards to product development. By joining resources, competences and technologies companies can complement each other and enhance competitive advantage in an environment which becomes increasingly complex. (Brandenburger & Nalebuff, 1996; Tidd & Bessant, 2009; Goffin & Mitchell, 2010; Remneland, 2010; Trott, 2012). Examples of alliances are innovation networks, industry clusters, R&D consortium, collaborations, joint ventures, outsourcing, supplier relations and licensing (Trott, 2012). Reasons to collaborate might be to reduce risk, costs, time to market or to promote shared learning (Tidd & Bessant, 2009). There are also proponents for *Open innovation*, were information flows liberally in and out of the company (Goffin & Mitcehll, 2010; Remneland, 2010)

Involvement of customers in the development processes can also be regarded as an alliance which is beneficial for the company. In the end, it is the revenues from customers buying products which will finance the product development process, why the new products must be anchored in customer needs and requirements (Neale & Corkindale, 1998; Business Decision,

2003; Matthing et al., 2004; Midgley, 2009; Goffin & Mitchell, 2010; Trott, 2012). Involving customers also aligns with supply chain theories which argue that additional values can be created if all actors along the supply chain are involved in the product development process (Chopra & Meindl, 2013).

On the other hand, there are studies arguing alliances are connected with substantial risks and that many do not reach their goals (Tidd & Bessant, 2009). Complementary skills and capabilities are preferable when learning is the major goal, although it is also important to balance strengths. "*The more equal the partners, the more likely an alliance will be successful"* (Tidd & Bessant, 2009, pg. 496). Furthermore, the design of the collaboration is important, hence to set clear agreements and goals, mutual expectations, flexibility to evolve, routines for problem solving and communication.

> "*Whilst the failure of an alliance is most likely to be the result of strategic divergence, the success of an alliance depends to a large extent on what can be described as operational and people-related factors.*" (Tidd & Bessant, 2009).

2.6 Strategy & product development

A firm's strategy can be seen as the formal plan of handling changes in the business environment with existing resources to create competitive advantage. (e.g. Porter, 1985; Hamel and Prahalad 1989, Barney 1991, Leavy 1996, Drucker 1998, Mintzberg et al. 1998, Ghemawat et al. 2000, Prahalad and Ramaswamy 2000, Meyer and De Wit 2004). Innovation and product development is one way to differentiate and create competitive advantage (e.g. Schumpeter 1934; Porter, 1985; Dawson, 2003; Burns, 2005; Smith et al., 2008; Andriopoulos & Dawson, 2009; Tidd & Bessant, 2009; Grant, 2010; Pätäri et al., 2011; Jobber & Fahy, 2012; Trott, 2012). However, one should not simply innovate randomly as a response to what competitors do or technological trends etc. To be successful in product development the company needs to understand the competitive landscape, their own technical competence, how a new product can complement the existing portfolio and what the company want to accomplish. To manage this, a strategic framework connected to the business strategy is needed to make relevant trade-offs and utilize resources efficiently (Tidd & Bessant, 2009).

3 Methods and materials

This section aims to describe the scope of the study, how it was performed and other information which might be important to understand the context of the research.

3.1 The research process

The research process was divided into 4 major phases:

1. Setting the *Scope, formulation of interview questions and delimitations*
2. *Population and actor selection*
3. *Data collection*
4. *Data analysis*

These phases are described below.

3.1.1 Scope, formulation of questions and delimitations

This master thesis started with a sincere interest in and curiosity about product development and the packaging industry. How to make the business case happen? Matti Stendahl's (2009) PhD study on product development among the Swedish sawmill industries inspired a similar study focused on the paper packaging industries and acted as starting-blocks. Stendahl's questionnaire were further supplemented and transformed to focus more on the processes of product development and the connection to business strategy. Experts were consulted and product development literature reviewed to further structure the questions. Finally an interview guide was formed, which can be seen in Appendix 1.

Innovations and R&D can be defined as a very wide sector and there are many types of innovations; e.g. product, process, organisational, management, marketing and service innovation (Trott, 2012). As this thesis was to focus development projects which aim to improve the business offer, hence the customer satisfaction directly, mainly new products and services were focus and cost cutting or management improving projects etc. were neglected.

From 102 articles on innovation Smith et al. (2008) identified 9 factors and 31 sub-factors driving an organisation's ability to manage innovation. The 9 driving factors were *technology, innovation process, corporate strategy, organisational structure, organisational culture, employees, resources, knowledge management, management style and leadership* (Smith et al., 2008). Smith et al. (2010) argue for the importance of a holistic view of all those factors, however to limit this master thesis the *innovation process* was focused. Attention was still paid to the other factors as they were regarded to be important in the context.

Product development consists of complex and dynamic processes which need to be managed accordingly (Hansen & Birkenshaw, 2007; Burns, 2005; Goffin & Mitchell, 2010), hence the aim of this study was to be open-minded and inquisitive about different perspectives.

In order to still structure the analysis and limit the disertation, Goffin & Mitchell's (2010) process model, the *Innovation Pentathlon Framework*, was used as framework. Accordingly, emphasis was placed on how new product or service ideas are generated, selected, developed and brought to market. How these processes are affected by organizational structures and human resources as well as the correlation to business strategy.

3.1.2 Population and actor selection

The first step when selecting the companies to interview was to set the scene. From a list of all paper packaging producing mills in the Nordic countries, the companies with headquarters in those countries were chosen. The reason for this was the presumption that product development and strategic decisions mostly occur close to top management. Furthermore one can argue the Nordic countries have a somewhat homogenous attitude of business culture and innovation.

Secondly, larger companies with a production of more than 300 000 ton packaging paper per year and a diverse product portfolio were selected. This was based on the assumption that somewhat larger companies have a higher probability of having active and continuous product development processes.

The above procedure narrowed down the list of companies from 17 to 5. The list was given to the examiner and opponent, although it is not published due to confidentiality.

The companies designated were contacted and one or two persons with insights in product development, all executives, were recommended. Only one company refused to participate in the study or any interview.

3.1.3 The data collection process - the interviews

The interviews were conducted as semi-structured, one-to-one interviews according to Denscombe's (2010) interview guide for small scale social research projects. Semi-structured interviews are structured with a clear list of issues to be addressed and questions to be answered. At the same time, the interviewer is still flexible in order to let the interviewee develop interesting topics more widely. Accordingly, answers might be open-ended, although still focused on a specific topic and influenced towards a certain direction (Denscombe, 2010). This technique was chosen as the interviews aimed to be explorative to map the different companies' praxis and processes. One-to-one interviews were appropriate as it was assumed interviewees would find it easier to find time for an interview on their own rather than making a whole group of people gather at one point.

The interviews were recorded. As Saunders et al. (2009) state, this enables the interviewer to listen attentively and participate in the interview more freely instead of spending time on writing down all the answers. This also facilitates for the interviewer to form follow-up questions in order to make the interviewee to develop interesting topics further.

Before each interview some basic questions were send to the interviewee. This was mainly done to secure an open communication and to increase the legitimacy. Those questions are found in Appendix 2.

3.1.4 The data analysis process

The notes and recordings from the interviews were transcribed, compiled and structured into statements regarding the specific companies' product development processes and the situation for the paper packing industry in general. The statements were then connected to different theories and the research questions, which can be seen in Appendix 3. Finally the material were analysed and compared with literature to form conclusions answering the research questions to fulfil the purpose.

3.2 Validity, reliability & critique

Researcher should show that information is captured with validity and assessed with reliability (Denscombe, 2007; Silverman, 2010).

To make sure the interviewees described the actual processes and not reported the corporate guidelines shortly, the interviews were rather informal and performed as conversational dialogs. One can argue the information would have been more streamlined if a more formal questionnaire was followed. However, unique statements and perspectives would not have been expressed with such method. The informal interviews better align with the study's explorative approach which regards product development as complex and dynamic processes.

One might also challenge the selection of people interviewed. The interviewees were executives recommended by different contacts. There might be others which had better insights or other opinions of how the product development processes actually are organized. It would also have been interesting to get the perspectives from someone working in the product development projects. In regards to time and scope limits this was not possible. However the executives interviewed were responsible for the product development in each company and work daily with those processes, why one can assume they have good insights.

To ensure the validity of the data analysis and reporting, recorders were used to accurately capture the interviewees' statements and the same comparative method was used to sort and interpret data from all interviews. This method might have been rigid and time consuming, however it enabled a structured handling of information. To further improve the reliability, quotes from the interviews have been included in the dissertation to let the reader see the original material without interference from the author.

3.3 Ethics and legitimacy

Product development and innovations are often sensitive corporate information. Activities at the R&D functions are often confidential information and not shared in public for competitive reasons. This was one of several reasons why product development processes were focused instead of specific products, technologies or services, as this type of information normally are not classified to the same extent. Still, the area is sensitive why one should be aware that the information which actually has been shared might be limited.

As far as possible the author has tried to decode the statements and report a generic picture of the industry to respect the confidentiality. Some information regarding the actual product development projects, organizational structures and commercialization has been excluded as this information were too sensitive or made it easy to identify specific players. To ensure the confidentiality in respect of the companies' integrity, all companies involved also had the opportunity to review the report before publishing.

4 Results and analysis

This section aims to give an overview of the Nordic paper packaging producing companies' product development processes based on the interviewees' answers and reasoning. The interviews are further connected with relevant theories on the subject to make deeper analysis of the dilemmas the product development processes encounter.

4.1 Complex processes

None of the companies interviewed have a strict action plan for their product development processes. *"It all depends on the project"* was a common answer. Mostly the product development consists of projects with dynamic processes which are unique for the project size, type and characteristics. "*The development projects are normally dynamic and cross-functional.*" (Interviewee, Annon). One interviewee stated: "*We do have action plans and guidelines for the product development, although those are seen as support rather than rules and are not strictly followed."* (Interviewee, Annon). Another person said: "*Earlier we followed stage-gate models as many other companies, but we have abandoned this approach*" (Interviewee, Annon). At the same time, all companies stated their projects "*naturally follow major stages*". Those stages include idea generation, prioritizations, development of the idea and testing, launching and commercialisation. How these stages are performed was not examined in detail. Some of the interviewees stated their company needed to improve their product development processes to be more efficient and organized. Others argued that the unstructured processes enhance creativity and flexibility which was seen as important in the dynamic environment on a globalized market.

A range of solutions to handle the projects were presented in the interviews and this can be seen as an argument for the statement: there is "*no universal solution*" or "*best practice*" for handling product development (Goffin & Mitchell, 2010, pg.1). However, all companies interviewed share the approach that product development processes need to be adapted to the actual project, hence to be flexible and dynamic. One interviewee explicitly said "*We are to develop our processes to be more agile.*" (Interviewee, Annon). This approach corresponds with Burns' (2005) complexity theory in which chaos with some *order-giving rules* is regarded as the ultimate state for innovation. The chaos is resembled by the dynamic and flexible project processes. The *order-giving rules* might be the "*natural stages*" or supportive guidelines. Strategy, corporate values and praxis are possible *order-giving rules* as well, and this is discussed later. In other words, the paper packaging companies do have a mutual way of attacking product development issues, even though this is not seen when applying the traditional theories of innovation and product development.

4.1.1 Idea generation

In regards to idea generation all interviewees claimed ideas can origin from anywhere in the organisation, nevertheless the answers to how this is performed differed. One company has an internet tool in which ideas can be registered. Another company are to implement such a tool to make sure anyone in the company could voice their ideas. "*We are to create a system in which everyone can suggest any idea for product development. Everything from technology push to market pull. This is to encourage creativity and enable spreading of ideas.*" (Interviewee, Annon). The company with the existing internet tool also argued they have an open culture which encouraged employees to speak directly to the executives why the tool is not really needed. However, the most common argument was that the ideas can come from anywhere in the organisation as the formal idea generating teams or functions are cross-functional. At least the production and the sales function are included in those teams. In many

cases ideas are also generated in the sales function from market analyses or in direct contact with customers.

In the more formal cross-functional idea generating teams the processes differ significantly, especially in regards to governance and customer orientation. One company stated they have a very strict and structured process for idea generation. Others were rather unclear and said "*it depends on the idea*". Some even claimed they need to structure their idea generation process. One company presented a decentralized and informal process and argued this is a better approach to create creativity and success. All appear to use both market analyses and direct customer relations as tools for idea generation, although some companies rely heavily on market analyses while others emphasize close relationships and collaborations with customers. There is no clear correlation between governance and customer orientation, however the company which control the product development process the most rely heavily on market analyses and the company with the least structured processes are very closely related to customers in their idea generation process.

During the idea generation a company needs to have several channels to detect signals in the environment which implies potential opportunities or need of change (Tidd & Bessant, 2009). Goffin & Mitchell (2010) further emphasise the importance of cross-functional teams, involvement of customers as well as individual and group creativity. Most of the companies interviewed seem to have these components to some extent and use several tactics to identify ideas for product development. However, some of the companies appear to be too narrow in their idea generation as they only rely on market analyses. This praxis might be a result of too controlled processes, which Bolman and Deal (2005) argues limit the organizational creativity. On the other hand, it might just be a result of organizational heritage such as push or pull approaches, which are discussed later in the next section.

4.1.2 Prioritization

The answers to how the companies prioritize among the ideas varied as well. One company strongly focuses on strategic alignment when they select among ideas. "*In the first check-up when prioritizing among ideas we make sure the idea is aligned with the business strategy and the firm's policy in regards to sustainability etc. Secondly, the idea is scrutinized in a conceptualization phase to decide whether it is interesting enough to run as a project.*" (Interviewee, Annon). Some other companies argued their strategy is so well integrated in the company's procedures this is not an issue when prioritizing. Instead they underlined the importance of focusing value creation and stated they refuse to start any project if the idea does not include a strong business case. "*All projects must have a business case which indicates the value of the final product.*" (Interviewee, Annon). One company described how the selection of projects to run is done already in the idea generating market analysis directly. Accordingly their prioritization process is mainly a question of managing present resources and analysing which project could actually fit in the existing production smoothly.

Strategic alignment, evaluation of return on capital as well as assurance of commitment and understanding among the employees are highlighted as important factors in the prioritization process by Goffin & Mitchell (2010). Strategic alignment seems to be incorporated by all of the companies, even though this is performed differently. Return on capital on the other hand, is only focused by a few. Finally, none highlighted the importance of involving employees in the process to maintain commitment, creativity and an open culture in which information is shared.

From the companies' descriptions of *the first two phases* of the product development process (from idea generation to the start-up of a specific project) one can distinguish between two approaches which strongly influence their procedures; *push and pull*. Even though the paper industry has been push-oriented traditionally, indeed the companies interviewed are of the whole range from push to pull oriented. These approaches affect their product development processes (Tidd & Bessant, 2009). Companies which are push-oriented generate their ideas in formal market and customer segment analyses. The ideas are then adapted to fit the production and there are a prioritization process based on the market analyses to balance available resources. The final product are finally pushed out on the market e.g. via marketing promotions or "*education*" of customers. The pull-oriented companies generated ideas in cooperation or close relation to customers. The ideas were then aligned with the company's strategy and prioritizations were based on the business value the project could create. Figure 2 illustrates the different praxis linked to the dominating approaches.

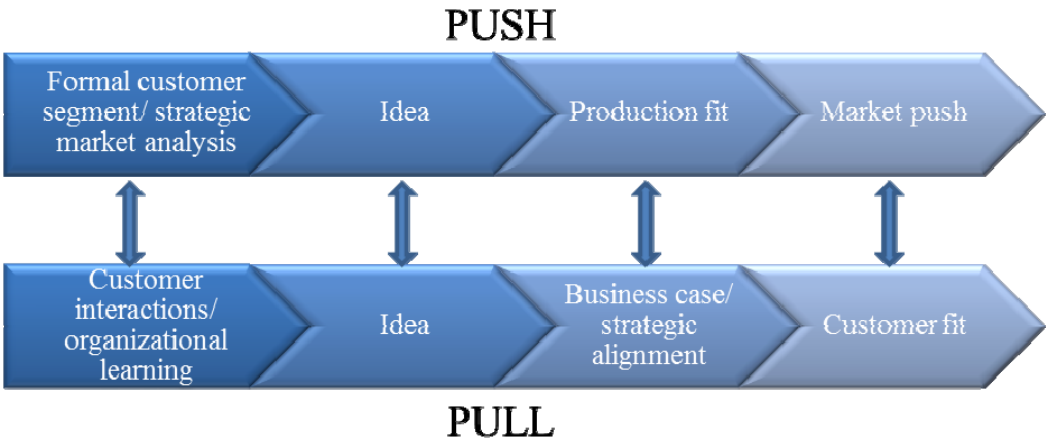

Figure 2. Different focuses in the idea generating and prioritization processes correlated to push and pull approaches.

To develop and improve the product development processes, one needs to take these approaches and the organizational context into account and make adjustments based on the total structure. At the same time, interactions and communication across functions and phases should be included. As Trott (2012) argues; innovation needs input from both technology push and market pull. Both idea generation, research and development, manufacturing, marketing and commercialisation needs to be connected and share information as well as knowledge openly to succeed with product development (Trott, 2012).

4.1.3 Implementation & evaluation

During the *implementation* phase, the actual product development project which involves prototyping, testing and finally commercialization, many of the companies have different approaches in regards to control and management. Some have almost autonomous teams and some have regular reviews. "*The projects are always monitored and reviewed during the process in order to evaluate how the projects proceed, to make sure we are on the right track and revaluate if the circumstances have changed.*" (Interviewee, Annon). "*In the beginning there is a close cooperation between the creators of the business case and the project plan, but subsequently the project is run by itself.*" (Interviewee, Annon). Another company stated they had guidelines for how the project should be run, but did not tell about any control during the process.

Trott (2012) argues that the development projects need to be well planned, managed and controlled regardless of what organizational structure is adopted. Bolman & Deal (2005) further discuss the dilemma of finding a balance between too controlled versus too licentious structures and too dependent versus too independent teams. The paper packaging companies seems to have different attitudes to what is the best praxis for their company, however many do let their projects run relatively independently when the actual project is defined. This might be a result of organizational heritage as well as just unconscious behaviours. Again, the companies needs to continuously assess their praxis to make sure the product development processes run efficiently and aligned with the company's overall goals. Simultaneously, they need to maintain creativity and individuals' dedication.

Evaluation is a key component for organizational learning and change (Senge et al., 1999; Goffin & Mitchell, 2010; Trott, 2012; Wheelan, 2013) and this was also stated by most of the interviewees. "*Each project is evaluated afterwards and the final outcome is followed at customers to see how well the new product or solution is doing. This also helps us to learn for coming projects.*" (Interviewee, Annon). Several companies were even evaluating their new products at the customers and one company had a CRM tool in which the customers regularly examined the company's performance. However, almost all of the companies interviewed are missing evaluation of the project team and team management. As the output of the product development projects strongly depends on the role of the individual as well as group dynamics (Andersson & Rollenhagen, 2003; OECD & Eurostat, 2005; Smith et al., 2008; Goffin & Mitchell, 2010; Lindgren, 2012; Trott, 2012) and the companies also recalled this fact, it is remarkable that this is totally neglected or forgotten in the evaluations.

4.2 Team management, roles & responsibilities

The success of product development highly depends on the people involved (Andersson & Rollenhagen, 2003; OECD & Eurostat, 2005; Smith et al., 2008; Tidd & Bessant, 2009; Goffin & Mitchell, 2010; Lindgren, 2012; Trott, 2012). This was also recalled by many of the interviewees. The companies stated they are recruiting their project teams within the companies based on competence and availability. Some companies said they occasionally insource external competence if there are some specific area which they do not master, however this is rather unusual. None have fixed development teams. One company stated their teams are dynamic and change during the processes depending on what is needed in the project at a specific time.

Team management, clear goals, roles and responsibilities as well as communication and mutual expectations on all levels are seen as important elements to make the teams efficient and create value according to the interviews. Those factors are highlighted as important management issues by the literature as well (Tidd & Bessant, 2009; Goffin & Mitchell, 2010; Trott, 2012; Wheelan, 2013). At the same time, this was an area in which almost every company said they did not master and needed to improve. "*We need to develop better guidelines to have clear roles and responsibilities. Especially the team management role needs to be developed and there is a need for education of potential and existing leaders.*" (Interviewee, Annon). Some stated they already had special education programs for the project managers, although they still needed to improve their routines to enhance personal skills.

To seize the individual capabilities and create the above mentioned factors, good management and leadership is needed (Trott, 2012; Wheelan, 2013). One interviewee even stated: "*Project management is as important for the outcome as the actual content or product in the project.*".

However, all companies admitted they need to improve their team management and leadership. At least they are aware of this problem, but indeed it is interesting that they all need to improve in this area. One can question if this factor is neglected or discouraged by the top management somehow? Or do they not have the capabilities to improve in this area?

Some argued that the lack of team management is due to the fact that many employees are engineers or researchers which often are very technology focused and do not have team management skills. "*Many employees are engineers who focus processes and do not have the collaborative skills needed in teamwork.*" (Interviewee, Annon). "*Many employees are coming from a research career where you are a specialist with technical focus and not used to collaborate with other units. However, to develop new products one needs to have a broader and more complex approach as well as coordinating skills. We need to be better in this area.*" (Interviewee, Annon). Several companies are sending their team managers to leadership courses etc., but they still believed they need to improve their routines to handle the project teams or enhance the teams' internal efficiency and success.

There are many factors to take into account in product development processes (Smith et al., 2008) and team management and leadership can of course always be improved (Wheelan, 2013). Probably the interviewees are aware of this fact which also influences their answers. However, team management seems to be an area with large possibilities of improvements for the paper packaging producers' development processes.

4.3 Organizational structure

All companies interviewed have product development functions connected to their packaging production, although the constellations are slightly different. Most of the functions are linked to the business areas or the production sites. In some of the companies the business areas have their own product development functions which are rather independent. Some companies have an extra central R&D function. All companies have a separate unit for new business development, hence products or businesses which do not fit into the existing business areas.

The fact that the development functions operate closely to the business areas or operating units enables the product development to have insights in both production and technical issues. At the same time they are rather spread in the case the company is somewhat larger. Decentralized organisations are often more responsive and a large number of professional groups and functions increase the company's competence, nevertheless both those structures might also aggravate decision making, control and coordination (Bolman & Deal, 2005; Trott, 2012). Accordingly, the larger paper packaging companies need a strong, clear and active management to manage all functions and make sure they do not become too autonomous.

Furthermore, there is a discrepancy in what assignments and sections the functions actually include. Some have the total control of everything which can be connected to development; e.g. new business development, product development, product enhancements and quality controls as well as all the phases of product development excluding the actual market launch and commercialisation. "*Everything from long-term innovation projects to short term quality improvements is included in the development function.*" (Interviewee, Annon). Several companies have delegated smaller quality improvements and quality controls from the development function to the business areas or production units. "*The focus of the product development function is to develop new products and solutions according to market changes at the same pace as old products are phased out. We have tried to exclude all other assignments which do not belong to such projects for this function.*" (Interviewee, Annon). In

some companies the product development function is running all the product development projects internally. In others the function is flexible and acts both as project owner, resource manager and support to other projects in the organization. In regards to sale and marketing, some have independent cross-functional idea generating teams connected to sale and some let the sale function handle everything regarding market launch and commercialisation themselves.

Almost all companies said they just had or were about to *reorganize* the organizational structure for product development. For some companies the structure is not really set yet. One interviewee emphasized that development is a continuous process of change and streamlining, and this also includes the organizational structure.

The organizational structures for product development in the paper packaging companies seem to be influenced by the companies' size, innovative culture and connection to customers. Sometimes the structure is a bit diffuse and it is rather unclear who is responsible for what. However, there is a trend where small projects are executed closer to the production and larger and more complex projects are run on a more central basis. This might be obvious or expected, nonetheless an important fact to take into account as it strongly affects the product development processes (van der Panne et al., 2003; OECD & Eurostat, 2005; Smith et al. 2008; Goffin & Mitchel, 2010; Trott, 2012). How to create a structure which is effective and decentralized even though the company is large? How to manage autonomous teams which still needs to have the same market orientation and processes which can fit other teams in the organization? How to encourage formalized procedures and still maintain creativity when the company is reorganizing frequently? Those are only a few of a large amount of questions which the companies have to deal with. As Goffin & Mitchell (2010) state, for a company to reach success in their product development processes it is important to be aware of the different characteristics and their impact. Furthermore, this needs to be connected to the company's environment and context (OECD & Eurostat, 2005). These are topics for further research.

4.4 External actors, alliances and networks

4.4.1 Involvement of customer

All the interviewees emphasised the importance of customer orientation, however there is a difference in involvement of customers in the actual process. One company only include their large and long-term customers with special requirements. "*Customers are normally not involved in the process, but we do collaborate with some large, loyal and long-term customers with special requirements.*" (Interviewee, Annon). Another company stated all their development projects are run in close collaboration with both customers and brand owners further down the value chain. "*Strong relationships to customers and brand owners are a tradition in our company.*" (Interviewee, Annon) Only smaller product enhancement projects which aim to benefit all customers are run isolated by the company itself. Two other companies stated they have the whole range of project from no customer interaction to close collaborations depending on the project type.

The involvement of customers in the product development is seen as important by many researchers, as it is regarded as the ideal method for ensuring the attractiveness of the final product (Neale & Corkindale, 1998; Business Decision, 2003; Matthing et al., 2004; Midgley, 2009; Goffin & Mitchell, 2010; Trott, 2012) and some even suggest customers shall innovate for the company (von Hippel, 2005). Some of the companies seem to believe this is not necessary.

The level of customer integration correlates with the companies' push- and pull-approaches. The companies which are more pull-oriented have several projects in which customers are involved and the more push-oriented mostly exclude the customers in the projects. The paper industry has long been accused for being push oriented and many companies have changed the last years. This might be a reason to why there is such a wide range of approaches as the companies tries to find their own strategy and differentiate to create competitive advantage. At the same time the wide range of solutions might also indicate different kinds of customers. As all companies stated they rely on long-term customer relations, those relations have probably influenced the direction of development. Some customers might not have the interest to involve in development processes. Others might be strongly dependent on those collaborative development projects. In the end it all comes down to how a specific company can create competitive advantage from the existing resources, competences, relations and context. What actually creates value should be analysed regularly.

4.4.2 Other external actors

There is also a discrepancy in how willing the companies are to involve other external actors such as universities, institutions, innovation clusters or competitors. One company strongly emphasized open innovation as the superior method for creating value, but highlighted the need of defined and fair agreements. "*We do not want to lock ourselves to one partner. We believe we can create values by alliances with a multitude of actors.* […] *To work with open innovation, one must understand how to establish constructive collaborations where all actors get a fair deal, i.e. that all benefit from the constellation and that the values created are distributed relatively to what each actor has invested.*" (Interviewee, Annon). Another company had a completely opposite approach. "*We have abandoned clusters and alliances to some extent as we are more sceptical towards such collaborations nowadays.* […] *We only participate in generic research projects which normally focus on new technical solutions. Those alliances are ended before the project gets product specific or implies any risk of reaching competitive issues.* (Interviewee, Annon). The interviewee argued the paper industry had become more introvert as the competition has tightened and were critical to whether research collaborations really could add any value. Another interviewee also affirmed this picture of the paper industry becoming more protective of their ideas, although his company did not agree on this being necessary. Other interviewees were more neutral in their approach towards alliances and innovation networks.

Open innovation and alliances are regarded as preferable by many researchers as joint efforts can create large values with limited resources (Brandenburger & Nalebuff, 1996; Tidd & Bessant, 2009; Remneland, 2010; Trott, 2010) Brandenburger and Nalebuff (1996) early discussed the benefits with *co-opetition*; which means that companies can create a win-win situation when cooperating and competing simultaneously. With this background one can ask: Why have some of the paper packaging producers become more reluctant to participate in alliances and networks?

There are other studies arguing alliances are connected with substantial risks and that many do not reach their goals (Tidd & Bessant, 2009). The more introvert companies appears to share this opinion. One interviewee in favour of open innovation discussed the importance of clear agreements in order to make all actors benefit from the results relatively to what they have invested. Maybe some of the companies reluctant towards alliances had not experienced such equality in their projects.

Complementary skills and capabilities are preferable when learning is the major goal, although it is also important to balance strengths. "*The more equal the partners, the more likely an alliance will be successful"* (Tidd & Bessant, 2009, pg. 496). Furthermore, the design of the collaboration is important, hence to set clear agreements and goals, mutual expectations, flexibility to evolve, routines for problem solving and communication.

> "*Whilst the failure of an alliance is most likely to be the result of strategic divergence, the success of an alliance depends to a large extent on what can be described as operational and people-related factors.*" (Tidd & Bessant, 2009).

Probably the more introvert companies have not managed to master those elements. The open minded companies admitted they have struggled with those issues in the past, which is used as valuable experience today. The more introvert companies have probably instead come to the conclusion the efforts are not worth it.

Whatever might be the reason, there is a change of attitude in the industry which possibly will impact the whole sector significantly. Accordingly, an analysis of what effects those trends will result in might be important.

4.5 Correlation between business strategy and product development

All companies claimed their product development is anchored in their business strategy, however there were different answers to how this is ensured. The interviewees also described a variety of approaches to portfolio management. The following paragraphs try to illustrate their praxis.

One company stated all their processes are very controlled by strategic analyses and guidelines from the top management. The product development functions and the project teams are somewhat independent when running projects, however everything has to be reported to and accepted by a top management team. There is also a special management group which is managing resources and decides how to develop the product development itself. "*There is a specific development group which is balancing resources, forming guidelines and strategic directions for the firm's product development projects. They decide what to focus, what resources should be invested and which resources and capabilities should be developed.*" (Interviewee, Annon).

Another company recalled that every project is obliged to be aligned with the business strategy and corporate policies to receive resources to start. However, they have problems with implementing the strategies in the overall product development processes. The interviewee described that the top management and shareholders strongly advocate innovation, nevertheless there is a gap between general strategic targets and the operating product development functions or operational units which are to execute the vision. "*The expectations, ambitions and resources are all present, but there is no clear action plan for what or how to do.*" (Interviewee, Annon).

A third company described how their corporate strategy is included in the business plans for each business area. The business plans are then used to form the development strategy which in the end is used for prioritizing ideas and keeping the projects on the right track. By always linking all steps from top management down to individuals executing daily assignments as well as transforming the strategy into more specified and comprehensible guidelines and action plans, they make sure the strategy is implemented on all levels. As the strategy is well

integrated the project teams can work more individually and focus on creativity instead of strategy alignment and process control. "*The business strategy is added as an additional filter for all activities.*" (Interviewee, Annon). To manage the overall product portfolio, the business areas are competing with each other to receive resources for a specific development project from the central product development function.

The last company said they have such a clear and well integrated strategy that linking development projects to it is not an issue. "*We have a very clear business strategy, hence it is easy to link it.*" (Interviewee, Annon). The interviewee further stated customer needs were the main focus in all situations. "*Due to limited resources, it is very important to have the right focus in order to serve customer needs properly.* […] *Our product portfolio is not too fragmented but designed for the applications of the customers we want to serve.*" (Interviewee, Annon).

Consequently, all companies do integrate their business strategy in the product development processes, however there is a range from a strict correlation control to a culture in which the strategy is integrated naturally. Those approaches can be correlated with the companies push and pull strategies and do influence the companies' level of innovativeness. The more push oriented companies generally have more strict controls of integrating the strategy. This control delimit the product development processes, hence the innovativeness. In the more pull oriented companies the strategy is integrated more naturally which enables a more innovative culture and enhance the creativity. As earlier stated, the companies interviewed have a range of push to pull strategies Figure 3 tries to illustrate the different approaches and their influence on the product development processes.

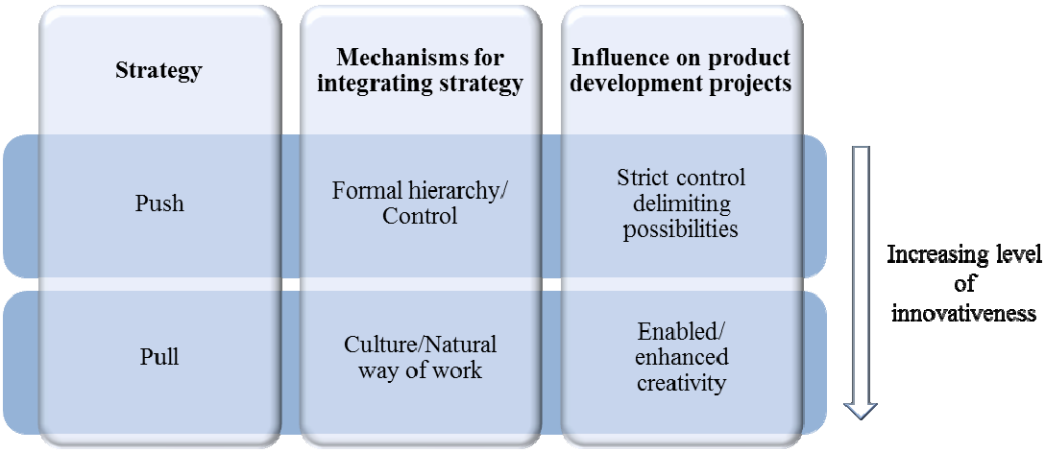

Figure 3. Mechanisms for integrating strategy and their influence on product development.

To rigid control mechanisms might obstruct the creativity as teams and employees easily lose confidence and innovativeness if their ideas are neglected and the focus primarily is to delivering something correct (Bolman & Deal, 2005). On the other hand, if the strategy is not naturally implemented in the organisation, such controls might be necessary. Trott (2012) describes that R&D teams often make independent decisions which are based on individual projects solely, without a connection to the rest of the company and the business strategy, which often results in diverse projects which do not serve the company's overall strategic direction. Tidd & Bessant (2009) further describes the dilemma with random innovation where companies' product development projects are mainly a reaction to trends and competitors' behaviours instead of thoroughly contemplated initiatives.

Most of the paper packaging producers interviewed do not seem to have these problems. They appear to have rather structured and focused development efforts as well as portfolio management in order to balance the product development projects with existing resources and the companies' context. Some simultaneously even manage to have a rather open minded approach which enhances the creativity and innovativeness. On the other hand, all the companies have clear initiative phases, although many of the companies let the actual projects run rather autonomously in the later phases which might imply a risk of project drift.

How to find the right balance between structure and creativity is an ever going question (Bolman & Deal, 2005; Tidd & Bessant, 2009; Trott, 2012). Circumstances are changing all the time, why companies need to revaluate and change continuously. At the same time, each company has a heritage which strongly influences the company's ability and delimitations. To reach success each company needs form a dynamic strategy to utilize its' resources and experience to find an individual way of creating an innovative culture; a strategy and culture which strives for mutual targets to form a homogenous and focused organization, and simultaneously encourage continuous change.

> *"Successful innovation management routines are not easy to acquire. Because they represent what a particular firm has learned over time, through a process of trial and error, they tend to be very firm-specific. […] Each firm has to find its' own way of doing these things […] simply copying them will not work."* (Tidd & Bessant, 2009, pg. 73).

5 Discussion and conclusions

5.1 Summary of findings

The Nordic paper packaging companies do have dynamic and flexible processes which are adapted to the projects type, size and characteristics. Those processes can be resembled with Burns (2005) chaos with order-giving rules such as natural stages or supportive guidelines. Flexible and responsive processes are seen as preferable in the competitive environment with global markets, shorter life cycles and more demanding customer requirements. The paper packaging producers in the Nordic countries are on the right track. How to balance structure and flexibility as well as efficiency and creativity depends on the specific company's resources and context and those are questions which the companies continuously need to assess.

The companies claim the ideas originate from anywhere in the organizations, although mostly the ideas are generated in designated cross-functional teams. The company with most structured idea generating processes rely heavily on market analyses and the most open minded company are collaborating closely with customers in their idea generation process. Generally many different channels are used to identify changing circumstances and opportunities in the environment, however some companies are rather narrow in their idea generating process. All companies could benefit from examining their structures and routines objectively to scrutinize how ideas actually can be created, spread and enlightened.

Projects passing the prioritization phase are aligned with the business strategy by all of the companies, even though this is performed differently. However, many need to enhance the assessment of the projects' potential value creation and the involvement of employees in the prioritization processes, as those factors are important for both the success of the final outcome and future idea generation

The companies can be sorted from being clearly push-oriented to being very pull-oriented. The product development processes are influenced by these approaches. Even though there is no best practise, it is important to be aware of the different characteristics and their effects to adjust the processes according to the company's context.

Many companies need to improve their control of the projects and project management to avoid the risk of project drift. At the same time, some companies could benefit from letting teams become more creative and open minded. All companies do evaluate their projects and some even have systems for enabling regular feedback from customers. However, all companies are missing team and project management in their evaluation process.

The teams for each product development project are recruited based on competence and availability. Clear goals, roles and responsibilities as well as communication and mutual expectations on all levels are seen as important elements. Still, all companies claim they struggle with those issues. Mainly these are team management questions and especially leadership education for the project managers was pointed out as needed. The ability to manage cross-functional teams and many dimensions at the same time is regarded as crucial for the team manager as product development projects often are complex. .

The organizational structure is influenced by the companies' size, innovative culture and customer orientation, which furthermore influence the product development processes. The companies' development functions are often closely connected to the operational units and

sometimes widely spread. There is a need for strong, clear and active management to manage all functions and make sure they do not become too autonomous. And again, it is important to be aware of and analyse the structure's impact to adjust the development processes in order to make it successful.

The involvement of customers in the development processes vary. Push-oriented companies hardly involve the customers at all while pull-oriented companies have very close collaborations. As all companies stated they rely on long-term customer relations, those customers probably have affected those processes. However, in the end it all comes down to how a specific company can create competitive advantage from the existing resources, competences, relations and context. All companies should continuously go through their praxis to scrutinize what creates value.

In regards to the involvement of external actors there are different approaches as well. Some strongly emphasize open innovation while some have a more restrictive and introvert approach. There is a change of attitude towards alliances and networks in the industry which possibly will impact the whole sector significantly.

Most of the companies integrate their business strategy in the product development processes. Some companies have strict control processes to align the projects with the strategy, which implies a risk of hampered creativity and innovative momentum. In other companies the strategy is naturally integrated in all processes which enhance the creativity as the teams can focus on the actual project. However, too loose structures might cause project drift, especially when there is a lack of team management.

5.2 How to improve the product development processes?

This section aims to discuss some issues which the companies should consider and scrutinize in order to improve their product development processes as well as topics for further research.

5.2.1 Implications for companies

5.2.1.1 Assess the creativity and openness in the idea generation and prioritization processes

According to the interviews ideas are generally coming from anywhere in the organizations and the companies have a relatively open cultures for idea generation. Even so, one can argue that the companies would benefit from examining how ideas actually can be created, spread and enlightened.

How to create a culture which encourages employees to be more creative? How to make people speak up? Mostly ideas are generated in cross-functional teams and the companies stated that those teams facilitate to make all functions and departments heard. However, this statement strongly depends on the people in the team. How connected are the team members to the daily operational teams? Who is actually involved, e.g. does the team include customers and suppliers?

Some companies stated they only consider ideas which are aligned with the business strategy or presented with a strong business case. These are good guidelines, but are they communicated and are all employees able to perform such analyses? Might there be any other channels or way to generate and crystallize ideas? Goffin & Mitchell (2010) point out another important factor; How to encourage people whose ideas has been neglected?

Indeed the companies do have an ambition to have an open culture where ideas can origin from anywhere, however they do need to scrutinize their structures and routines objectively to find out if they actually manage to do so.

5.2.1.2 Invest in people and team management

All companies stated they need to improve their team management and individuals leadership skills. Indeed there is an ever going process of developing people and improving the team management (Wheelan, 2013). Still, the paper packaging companies could benefit strongly from investing in people processes and group dynamics. There seems to be major deficiencies both in regards to basic evaluation schemes as well as encouragement of individuals in the phase of idea generation and prioritizations.

Examples of questions the companies should assess are: How to seize individual competences? How to maintain individuals' dedication and commitment in projects which fail as well as succeed? How to create and sustain creativity without letting groups being to autonomous? How to ensure everyone has mutual goals and expectations? How to set purposive roles and responsibilities?

The product development processes do depend on individuals (Andersson & Rollenhagen, 2003; OECD & Eurostat, 2005; Smith et al., 2008; Tidd & Bessant, 2009; Goffin & Mitchell, 2010; Lindgren, 2012; Trott, 2012), hence people investments might be one of the most important challenges the paper packaging companies needs to address to be more successful in their product development processes.

5.2.1.3 Examine the consequences of the degree of customer involvement

There is a variety in how and to what extent companies involve customers in their product development processes. By involving customers a company can save substantial costs as the products then are anchored in customer needs and behaviours which minimize the risk of launching unsuccessful products (Neale & Corkindale, 1998; Business Decision, 2003; Matthing et al., 2004; Midgley, 2009; Goffin & Mitchell, 2010; Trott, 2012). Still some companies seem reluctant to do so. Furthermore, some companies involve customers in the idea generation, however they are not part of the actual development project.

With rapidly changing market trends, shorter life-cycles and demanding customers the companies' ability to adapt to changes strongly influences their success (e.g. Schumpeter 1934; Porter, 1985; Dawson, 2003; Burns, 2005; Smith et al., 2008; Andriopoulos & Dawson, 2009; Tidd & Bessant, 2009; Grant, 2010; Pätäri et al., 2011; Jobber & Fahy, 2012; Trott, 2012). Accordingly, by involving and having close relationships to customers the companies probably have better possibilities of identifying trends and adapting their new products to what customers want.

With this background one can dispute why all companies do not choose to do so. Are customers not willing to collaborate? Does the management team not have the competence to establish such collaborations? Or are there any other reasons or risks why not to involve customers? The companies should examine the consequences of their approach to involving customers.

5.2.1.4 Investigate the opportunities of open innovation as well as an introvert approach

The approach towards alliances and collaborations with external actors such as competitors, universities, innovation clusters etc. is changing. Some claim they have become suspicious towards external actors as the competition has increased. Others have contrary become more extrovert and advocate open innovation. There are arguments both in favour and against open innovation among researchers as well (E.g. Brandenburger & Nalebuff, 1996; Tidd & Bessant, 2009; Remneland, 2010; Trott, 2010). Probably both approaches are accurate in regards to studied circumstances, nonetheless one could as well argue there are reasons to believe the solution is not simply an extrovert or introvert attitude.

Product development consists of complex processes which should be addressed accordingly. Each company should continuously evaluate their processes and be open minded to different solutions. What might be beneficial for this specific project or issue? How can value be created in this specific situation? Does the company have the competence to manage open innovation? What risks and possibilities are connected to open innovation vs. an introvert approach?

To be successful, each company needs to act and react according to existing circumstances, resources and capabilities as well as future opportunities. A solution which is preferable today might not be suitable tomorrow. However, product development as well as relations should be seen as long term investments which need consistency. Changes in attitude might impact the whole industry why the companies should analyse their approach carefully.

5.2.1.5 Trade-offs between efficiency and creativity is continuously needed

Both interviewees and experts stated that the competitive environment is getting tougher as a consequence of global markets, shorter life cycles and more demanding customer requirements. This increases the need for flexibility and the ability to be responsive and adapt to changing demands (Hansen & Niskanen, 2007; Goffin & Mithcell, 2010; Grant, 2010; Björkdahl & Börjesson, 2011). Dynamic product development processes can therefore be regarded as an advantage (Goffin & Mitchell, 2010; Grant, 2010; Burns, 2005) and almost all the paper packaging companies interviewed have incorporated this praxis.

At the same time, a complexity approach also requires good knowledge and insights in how to establish and maintain efficiency and structure which still is needed to utilize limited resources successfully. How to set the prerequisite "*order-giving rules*"? This question arise the classical dilemma were companies have to balance structure and flexibility as well as efficiency and creativity (Bolman & Deal, 2005; Trott, 2012). The ability to handle this quandary is still not really developed among the paper packaging producers. Many companies even do not seem to be aware of the dilemma or just satisfied with their situation.

Consequently, there are major opportunities in improving and balancing the paper packaging companies' product development processes. One can even argue an improvement is necessary if the companies are to maintain the flexibility and still utilize their product development resources efficiently. How this should be done and how to balance the different elements are questions for further research.

5.2.1.6 Examine the effects of mechanisms for strategic alignment and balance with necessary measures to achieve a desired level of innovativeness

The companies do integrate their business strategy in the product development processes, although the effects of how this is ensured should be examined. A naturally integrated strategy

can act as facilitator for the products development as it enables the development teams to focus more on creativity and customer needs instead of ensuring strategic alignment. On the other hand, too lose structures and autonomous teams might cause project drift. Controlled and strict processes secure strategic alignment and form a homogenous organisation with mutual goals. However, such processes might as well hamper the innovativeness as creativity is neglected.

Each company should be aware of how their praxis and mechanisms for strategic alignment influence the product development processes. This is necessary to be able to balance the effects with complementing efforts in order to achieve a required and desired level of innovativeness.

5.2.1.7 Incorporate a flexible culture which truly encourage revaluations and change

The ability to adapt to changes in the business environment is preferable due to many researchers (e.g. Schumpeter 1934; Porter, 1985; Dawson, 2003; Burns, 2005; Smith et al., 2008; Andriopoulos & Dawson, 2009; Tidd & Bessant, 2009; Grant, 2010; Pätäri et al., 2011; Jobber & Fahy, 2012; Trott, 2012). All paper packaging companies have dynamic product development processes to some extent, however many companies have inconsistencies which act as hinders.

To incorporate a flexible and dynamic approach a company must have processes, routines, structures, teams and management etc. which enable such a mind-set and praxis. Hence, the whole organization should be included in a culture which minimizes the obstacles for change on all levels. For example, if the management team advocate innovation and creativity they can not simultaneously have strict guidelines for or reward efficiency which actually hampers those efforts.

Accordingly, the paper packaging companies do need to scrutinize their organizations to develop true flexible structures with revaluations and change as part of daily operations.

5.2.2 Future research

This study has identified several areas in which the paper packaging companies can and/or need to improve. Future research is required to identify and assess details in those areas in order to give concrete recommendations for managers. Especially people processes and team management, customer involvement, open innovation as well as efficiency versus creativity should be focused in the context of the paper packaging companies.

5.3 Discussion of method and generalizability

Semi-structured interviews allowed the author to have an open-minded approach towards the companies' praxis and processes. One can argue the results would have been clearer and more structured if the interviews had followed a stricter interview format. However, as the purpose of the study was to assess the product development processes explorative and little is known about the paper packaging companies' actual praxis, it would have been difficult to design the interviews in order to capture information needed to fulfil the purpose. Furthermore, as product development often is confidential information, the author needed to adapt the interview questions and the reporting in order to maintain trustworthiness, legitimacy and validity.

This study identifies different areas for improvement or assessment. Product development processes are complex (OECD & Eurostat, 2005; Burns, 2005; Smith et al., 2008; Goffin &

Mitchell, 2010; Trott, 2012), why one should be aware of the difficulty in generalizing results and ideas. "*it is not simply a case of adopting best practice, managers need to adapt ideas to the specific situation their company faces.*" (Goffin & Mitchell, 2010, pg. 1). Indeed this study's recommendations are based on fundamental concepts which are important for all innovating organisations. However, each topic should be analysed in regards to each specific company's context.

5.4 Concluding remarks

This study implies that the top paper packaging producing companies in the Nordic countries have dynamic and flexible product development processes with some "*order-giving rules*". There are several basic components which are included in their process, althoguh all companies have different praxis, structure and approach.

Product development is a process which constantly needs to be adjusted to the companies' context, still there are several areas in which the paper packaging companies do need to improve. Especially team management and encouragement of individuals implies opportunities for improvements. Furthermore, the companies should examine the effects of their praxis and approaches towards customer involvement, open innovation, strategic alignment and a creative organisational culture.

Even though flexibility is required due to globalized markets, rapid product life cycles and increased competition, there is simultaneously a need for structure and efficiency. To balance those elements requires clear and open-minded management which have insights in business management, innovation management, project management and team management as well as the complexity of product development processes.

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Appendices

Appendix 1. Interview guide

Table 1. Interview guide with checklist of issues

Interview question	Checklist of issues/related theory
How is product development organized in your firm?	- Organizational structure - Functions & teams - Guidelines & action plans - Processes & deadlines - Norms & culture - Complexity & randomness - Strategy & business plans
Is there a specific product development group?	- Organizational structure - Cross-functional teams - Team management
Is there a clear product development strategy?	- R&D strategy - Connection to business strategy - Clear goals - Alternative innovation strategies
How is creativity and innovation encouraged or hindered?	- Strategy - Organizational structure - Management - Culture & heritage - Creativity vs. efficiency
The product development projects:	
Who/what initiates the projects? Why?	- Where in the organization do ideas emerge? - Push vs. pull - Connection to history - Connection to customer needs
Please describe the development process from idea to market launch.	- Phases - Idea selection - Deadlines & gateways - Prioritization - Interfaces - Project management - Commercialization & launch - When is sale involved?
What activities, functions and actors are involved in the process? How and why?	- Functions - Business areas - Hierarchical levels - Internal vs. external - Market research - Pilot production
What elements are crucial for the success of the projects in terms of:	
* Organisational structure	- formalisation, - complexity - centralisation - organisational size - market-orientation - frequent reorganizations - autonomous teams - commitment to long-term growth - strategy towards innovation - space for creativity

	- cross-functional cooperation & coordination, - organisational heritage
* Management, attitudes and roles	- Project management & leadership - Innovation culture - Clear goals - Clear roles & responsibilities - Competence - "innovation managers" - Creativity vs. efficiency - The role of the individual
* Networks, collaborations and external resources	- Supply Chain Management - Co-opetition & alliances - Universities & research centres - Outsourcing - Innovating customers
* Market & business offer	- Business creation - Market intelligence - Customer orientation - Connection to sale
* Results of the project and communication	- Evaluation & documentation - Organizational learning - Diffusion - Marketing - Market launch
How important is product development for your firm? Why?	- Competition - Profitability - Attract customers - Attract employees
How is product development involved in the business strategy and correlated to market goals?	- Product strategy vs. business strategy - Action plan to control the development process - Link between ideas & business strategy
How does product development complement business strategy?	- Competitive strategy - Resources & capabilities
What are the Nordic paper packaging industries strengths and weaknesses?	- Product development & innovation? - Business plans - Culture/heritage - Product - Industry competition vs. substitute

Appendix 2. Interview questions send to the interviewees

- How is product development organized in your firm? Are there norms, guidelines and action plans?
- Is there a specific product development team?
- Is there a clear product development strategy?
- How is creativity encouraged/hindered?
- Please describe two "relatively" new product development project?
  - What was the product/service?
  - Who/What initiated the project?
  - Please describe the process from idea to market launch – phases, deadlines & interfaces
  - Which activities, functions and actors were involved? How? Why?
  - How important were individual competence, responsbilities and motivation?
  - Which elements were necessary for the initiation and realization of the project? Consider for instance:
    - Organizational structure
    - Management, attitudes and roles
    - Networks and external resources
    - Market and business offer
  - How was risk and uncertainty managed?
  - What were the results of the project?
  - How were the results communicated?
  - What were keys to success? Causes of failure or problems?
- How important is product development for the firm? Why?
- How is product development correlated to market goals?
- How does product development complement the business strategy?
- What are the Nordic paper packaging industries' strengths and weaknesses compared to their competitors?

Appendix 3. Answers connected to theory and research question

Table 2. Examples of interview statements and how they were connected to theory and research questions (The examples are mixed from several interviewees in order to maintain confidentiality.)

Interview statement	Related theory	Research question
"Cross-disciplinary collaborations are important to find new solutions which are attractive to customers."	- Cross-functional teams - Networks & strategic alliances - Customer orientation	- Idea generation - Org. structures - Team management - External actors
"Problems often occur down-streams as there are no connection to customer needs/requirements"	- Cross-functional teams - Networks & strategic alliances - Customer orientation	- Idea generation - Prioritization - The process - External actors - Strategy
"All projects must have a business case which indicates the value of the final product."	- Value creation - Resource management	- Prioritizations - Strategy
"We do have action plans and guidelines for the product development, but those are seen as support rather than rules and are not strictly followed."	- Guidelines & action plans	- The process
"Mostly the teams develop new products. The sales departments then convince or *educate* the customers in how to use it or the benefits they can achieve from using it"	- Push! - Cross-functional teams	- Idea generation
"We are to create a system in which everyone can suggest any idea for product development"	- Diffusion of ideas	- Idea generation
"The actual process depends on the nature of the project."	- Dynamic & complex processes	- The process
"Naturally all projects go through the process of idea generating, selection, prioritizations, test and commercialization. But, there is no strict process plan."	- Dynamic & complex processes - Action plans & guidelines	- The process

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