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Strategies in Declining Industries

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Abstract

An increasing pace in globalization and technological innovation has changed industry landscapes in different sectors. In fact, a growing number of industries are characterized by rapid decline. While there has been much research conducted about life-cycles and its respective stages, knowledge of industries operating in the decline stage has received less attention.

The aim of this research is to discover which types of decline exists, which strategies are available and appropriate to cope with decline, through an investigating of the Norwegian Pulp and Paper Industry. In order to answer these questions, an examination of the theoretical approaches within Strategy is conducted, more specifically the perspectives of Industrial Organization within Strategy and Population Ecology. Applying these two perspectives in the context of the Norwegian Pulp and Paper Industry allows the identification of the most suitable perspective.

The research is primarily qualitative in nature, through a case study approach. Information is gathered by conducting twelve in-depth interviews with informants from all major companies representing the Norwegian Pulp and Paper Industry.

Our findings suggest that the intuitive perception that the Norwegian Pulp and Paper Industry as a whole faces declining demand is incorrect. More than half of the industry is in fact enjoying growth, and the remaining companies clustered at the mature and decline phase. It appears that companies operating in growing segments appear to be more proactive and fits better to the strategies representing Industrial Organization within Strategy. In contrast, companies operating in mature and declining segments seem to be more reactive, and strategic adjustments on the basis of Population Ecology seem more appropriate.

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1.0 Introduction

An increasing pace in globalization and technological innovation has changed industry landscapes in different sectors. In fact, a growing number of industries are characterized by rapid decline. An exemplary industry is the pulp and paper industry, which partly faces a challenge driven by the increasing technological innovation and digitalization in the media sector. Following a declining demand, businesses shut down and employees lost their jobs (Foss, 2017). While there has been much research conducted about life-cycles and its respective stages, knowledge of industries operating in the decline stage has received less attention. A thesis exploring strategies to cope with decline is consequently of high interest. The paper seeks to investigate the Norwegian Pulp and Paper Industry through a case study. This industry has been one of the most important sources both in terms of export and employment, with a labor force of over 2.500. Furthermore, structural changes have led to a constant reduction in employment. In fact, over the past 20 years, almost half of the companies in this industry have decided to shut down their units. As a result of the financial crisis and decreasing demand for paper based products, a decline in production of especially magazine and newsprint paper followed during recent times (Røtnes, 2012). The aim of the thesis is consequently to discover which types of decline exists, which strategies are available and appropriate in different situations.

In order to answer these questions, the thesis makes use of the theoretical approaches within Strategy, more specifically the perspectives of Industrial Organization within Strategy and Population Ecology. Taggart (1995) argues that population ecology can be seen as an alternative paradigm to the life-cycle and an alternative view of the dynamics of decline. Eventually, the analysis and comparison of the two models allows us to determine the perspective and finally strategies that are most applicable for the Norwegian Pulp and Paper Industry. A more in-depth description between Industrial Organization within Strategy and Population Ecology will be discussed in the theoretical framework.

2.0 Research Questions

Primarily, our research question *"Which different types of decline exist?"* is important to be answered to receive an overview of this stage of the industry life

cycle. Different types of decline are caused by various internal and external factors of an industry and subsequently require different coping strategies. Answering this research question will determine the influence of these factors and the consequent form of decline. This leads to present the following question: *"Which strategies can companies apply to cope with decline?"*. The result will contain a pool of different strategic approaches for companies to cope with decline, through the perspectives of Industrial Organization and Population Ecology. As the thesis focuses on the Norwegian Pulp and Paper Industry, the results from the empirical research will provide theoretical and managerial implications and suggestions for different players within the industry.

3.0 Norwegian Pulp and Paper Industry

3.1 Overview

Norwegian manufactures of paper, pulp, wood chemistry products and fiberboard constitute the Norwegian Pulp and Paper Industry. This industry mainly consists of eleven Norwegian companies representing the NPPA, employing approximately 2,500 people.[1] The companies are mainly located in the southern, eastern and central Norway (Norwegian industry, 2016), all listed in Table 1 with their respective key information. Companies manufacture products based on renewable raw materials such as timber or sustainable sources of energy such as hydropower, resulting in a broad product range, generally separated into three different product categories:

1. Paper, pulp and specialty pulp, produced from the wood fibers
2. Lignin-based chemicals and vanillin
3. Bioethanol

The pulp and paper industry is an important buyer of Norwegian wood and wood dust using approximately half of all Norwegian industrial wood available for sale. Currently, around 95% of the products are exported in total. Various companies export their entire output, their target markets being mainly European countries, above all Germany and the UK. Before 2011, Norway was a net importer of wood. Today Norway is considered a net exporter (Foss, 2017). Figure 1 and Figure 2 below show that the industry has been declining heavily both in

[1] Marit Foss, the Operating Manager of the Norwegian Pulp & Paper Association (NPPA), offered her knowledge and experience through an extensive interview to provide this paper with fundamental insights into the industry.

production, sales and exports over the period from 1993 - 2015. Total pulp production dropped from 1.603.000 tonnes to 900.000 tonnes from 2011 to 2015, whereas export of pulp declined by over 40% during the same time period. Owing

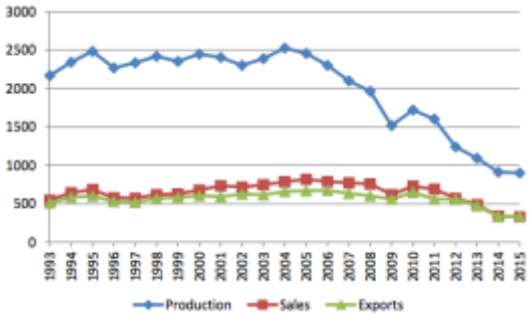

Figure 1: Pulp Production, Sales and Export, in 1,000 tonnes (NPPA Key Figures, 2015).

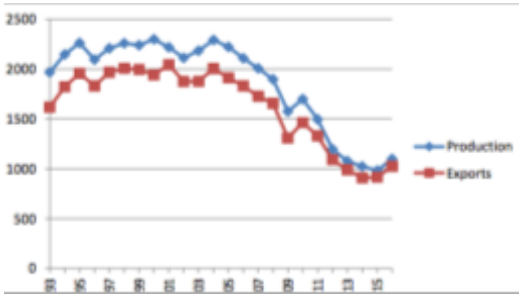

Figure 2: Paper and Board, Exports and Production, in 1,000 tonnes (NPPA Key Figures, 2015)

to the ongoing digitalization, the market volume shrunk alongside the demand for printed papers and companies consequently had to either shift their product portfolio or close mills.

Figure 3 illustrates that the number of paper- and board mills has reduced from 21 in 1997 to eleven in 2017, and represent an overall reduction in production capacity of 430.000 tonnes of pulp, 619.000 tonnes of cellulose and 981.000 tonnes of paper annually, as seen in Table 2 of the appendix.

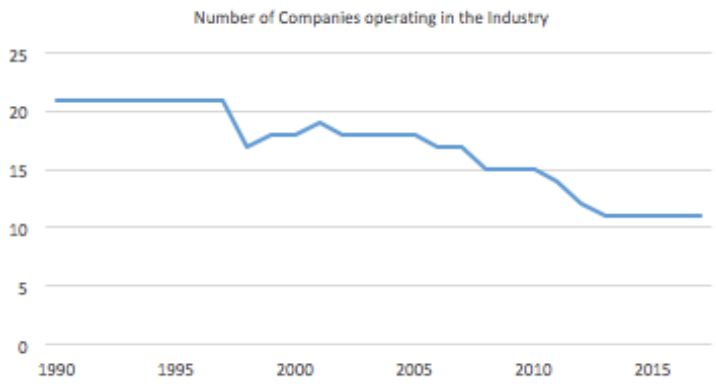

Figure 1: Number of paper- and board producers operating in Norway from 1990-2017 (Table 2, 2017).

Regarding the cost structure associated with pulp and paper production, the wood as a raw material, transportation costs and energy costs account for the largest shares, for 30%, 20% and 20% respectively (Foss, 2017). A locational advantage of Norwegian companies compared to Asian competitors is its proximity to the European market and the long coast line, which allows the usage of ships for transportation means. Further, companies and mills are closer to the raw material, namely the forests, compared to Chinese competitors. Another advantage compared to Asian competitors is that Norwegian firms use their resources more efficiently through a high degree of automation, which also results in a consistently high quality of the product. To further differentiate themselves from low-cost country competitors, Norwegian companies highlight their products' quality through PFC and FFC certifications.

All products are sustainably and legally harvested, an aspect which many customers value (Foss, 2017).

Previous decline periods resulting in decreasing demand for products of the pulp and paper industry happened as a consequence of high oil prices in the 70s, the banking crisis in the 80s and the financial crisis beginning in 2007. Many Norwegian companies closed mills temporarily during these periods of reduced demand. As a response to disruptive innovation and partly volatile market behaviors, Norwegian firms began to diversify more. Many firms use side streams of their production processes so that the majority of the processed timber is processed and profits maximized. The company Norske Skog, for example, uses their sludge, which is considered a side stream product, to create biogas. They further plan to generate 25% of their revenues from other sources than their core product graphic papers such as biogas and micro cellulose (Foss, 2017).

3.2 Segmentation of the Industry

According to the European Commission, forest-based industries can be grouped into the woodworking-, the pulp and paper, and the printing industry. In total, forest-based industries account for seven percent of the entire manufacturing GDP in the EU and have a turnover of 485 billion Euros created by 3.5 million employees in over 400.000 companies (European Commission, 2017).

Firstly, the *woodworking* industry includes the production of sawn wood, wood-based panels, wooden construction materials and products such as furniture. The latter account for 70% of its turnover, which in total was 122 billion Euros, employing 1.093 million employees. The woodworking industry currently faces a variety of challenges. Sustainability and legality play an important role since all wood in the EU must come from verifiably legal sources. Wood is generally not always available at affordable prices. Industries such as the bio-energy industry might receive governmental subsidies, which allow companies to purchase at higher prices. The raise of the bio-energy industry will increase the demand for wood and therefore increase its prices even further. This issue could theoretically be compensated for by a higher labor productivity, however, the workforce is aging and young people are reluctant to the woodworking industry (European Commission, 2017).

Secondly, the *pulp and paper* industry is considered energy and raw material intensive, characterized by high capital cost but also high efficiency and

innovation rate. Its turnover is 180 billion Euros and a labor force of over 640.000. It continuously reduces its environmental footprint and becomes less CO2 intensive. The industry faces challenges as a consequence of digitalization. Simultaneously, there are also growth segments in this industry, as the demand for packaging and hygiene papers is still increasing (European Commission, 2017). On a European scale, but also specifically in Norway, according to Marit Foss (2017), the packaging and Hygiene Papers' demand is increasing. Further, European companies have a high export share, thus face trade barriers. Rising gas and energy prices increase the production costs while EU environmental policies must be followed. An opportunity is the impact of technology on the resource efficiency in order to reach the goal of 80% CO2 reduction and 50% value growth by 2050.

Based on, and strongly related to the pulp and paper industry, the *printing* industry employs 770.000 people and produces a turnover of 88 billion Euros. Productivity is improved through process automation and advanced technologies. A major challenge it faces is the drastic shift of reading habits towards web-based media and e-solutions. On the one hand this reduces the demand for paper and printing, on the other hand it reduces revenues from print advertisement (European Commission, 2017). The decline as a consequence to the digitalization was unpredictable due to its disruptive nature. Growth can be noted only in the packaging segment. Competition from low-cost countries, mainly Asia, is further lowering prices while production costs, including energy, raw material and labor, increase in the EU. Strict environmental requirements challenge companies additionally. On the contrary, new services and products, such as database management, intelligent labels and 3D printing offer opportunities. Increasing sustainability concerns from companies and consumers improve the perception and reputation of EU companies compared to low-cost foreign competitors (Foss, 2017).

3.3. The Final Output

Moving to a more detailed description of products made by Norwegian companies, Borregaard, the second largest member in terms of revenues, and one of the oldest pulp and paper companies in Norway, serves as a great example of how versatile wood is to produce a multitude of end products other than the obvious ones mentioned above. In general, the company produces lignin products,

specialty cellulose, vanillin and bioethanol in order to supply various industries. To start with, these terms will be explained briefly: Lignin is an organic substance binding cells, fibers and vessels and is considered a major abundant renewable carbon source. Cellulose fibers is extracted from plants and wood and is an important structural component of cell walls. It is mainly used as a stabilizer or thickener in various industries (Intechopen). Vanillin is extracted from the pulp of wood, synthetically processed and commonly servers as a replacement for vanilla extract to reduce production costs (Global Healing Center). Finally, bioethanol is a sort of ethanol gained from glucose and therefore from plants and a means of providing energy, for example as a fuel for transport (Oilgae).

Agriculture, animal feed and dust control are further industry segments the company serves. This specific product portfolio includes a wide range of lignin based agrochemical products, soil amendments, granulation aids and fertilizer binders for the agriculture industry and nutrition additives, binders and lubricants for the animal feed industry. Regarding dust control components, lignin based products suppress the dust creation in natural and industrial environments.

In terms of purely industrial customers, sub categories such as batteries, industrial binders, industrial cleaners and water treatment, coatings and adhesives are addressed. Borregaard is in fact the world's leading manufacturer of organic, lignin based additives for lead acid batteries. Lignin based components are also used for binding methods of palletting and briquetting. Another use of lignin based products is industrial cleaning and water treatments where they are used to counter the fouling of cooling water and disperse dirt particles. Cellulose, on the other hand, is used in the coating and paint industry as a performance enhancer. Outdoor as well as indoor paints and industrial coating is the target of these components. Regarding adhesives and sealant systems, cellulose based components increase the formulation efficiency.

Further, personal care, home care, flavor and fragrances, food, pharma and textiles depend on different wood components produced by Borregaard. Cellulose based enhancers perform as additives in the cosmetics, skin and hair care sector. These enhancers are also used in the home care sector for liquid laundry and household products such as sponges. Regarding the flavor and fragrance industry, vanillin as a wood based ingredient is used in perfumes and dairy products. Cellulose, as another wood based product is additionally used in the food segment, for example for sausage casings. Again, vanillin and cellulose are important components of

products in the pharmaceutical industry, besides others in the x-ray contrast media. Borregaard further offers cellulose dispersants used for the dyeing of textiles.

Finally, highly specific customer segments, such as oil fields and bioethanol are addressed. Lignin based components are used in cementing retarders, important products for effective drilling and extended pump times. Finally, Borregaard is one of the leading suppliers of second generation bioethanol for technical and pharmaceutical use.

Borregaard gives an example of the product opportunities that exist. However, this broad product portfolio is not representative for the entire industry. Most players offer a much narrower portfolio. For example, companies typically focus on either packaging paper, different types of pulp, household paper, magazine and book paper or fiberboards.

4.0 Theoretical Approaches

This section presents the literature, which will serve as a basis for the theoretical framework. Initially, three matrices are used to map decline, BCG, GE, life-cycle matrix (Taggart, 1995). This served as the basis for more in-depth models from two different perspectives: Industrial Organization within Strategy represented by Harrigan & Porter and Population Ecology represented by Zammuto & Cameron. Both perspectives will be presented with a focus on the above-mentioned models, complemented by further related models.

Industrial Organization within Strategy provides an alternative perspective to Population Ecology, focusing on other dynamics of decline. The former perspective focuses more on the business unit level and is considered more proactive. The latter is more concerned with the totality of an industry and described as more reactive. The two perspectives could possibly compete or complement each other when used to analyze empirical data.

4.1 Earlier Portfolio Planning Models

In Taggart's (1995) article about strategy formulation in declining industries, three conceptual constructs were identified to have a significant impact on the development of competitive strategy analysis and selection; the Boston Consulting Group (BCG) growth/share matrix, the General Electric (GE) industry

attractiveness/ business strengths matrix and the life cycle matrix. In light of decline, the BCG matrix identifies “dogs” as cash traps, where the combination of low growth markets and weak competitive positioning result in low, or even negative, financial returns. As a result, the strategy prescription is to either harvest or divest. The GE matrix looks at industry attractiveness and business strengths. If the industry is considered unattractive and the strengths of an organization are not compensating for it, returns will be negative. Strategy prescriptions include pruning the product line, minimizing investments, specializing and seeking niches, positioning to divest, and divesting. Thus the BCG prescription of harvest or divest is supplemented by recognizing the possibility of niche strategies. Both constructs build on life cycle theory, which will be presented in detail throughout the next section.

The industry life cycle was first introduced by Vernon and Wells in 1966. The overall hypothesis includes that an industry passes through a number of stages: introduction, growth, maturity, and decline. These stages are defined by inflection points in the rate of growth of industry sales. Industry growth follows an S-shaped curve because of the process of innovation and diffusion of a new product (Porter, 1980). However, Klepper (1997) distinguishes between only three stages in the industry life cycle. The initial, also called exploratory or embryonic stage, is categorized by low market volume, high uncertainty, primitive product design and intense product innovation. The second stage or growth stage is reached when output growth is high, product innovation declines and specialized machinery is substituted for labor. The last stage, the mature or decline stage, corresponds to a mature market in which output growth slows down, entries decline further, market shares stabilize, innovations are less significant and management, marketing, as well as manufacturing techniques become more refined. In the last two stages the products of the industry have already become standardized and buyers have gained more power as there are more suppliers to choose from (Johnson et al. 2008). The most common environmental reasons resulting in declining demand are technological advances, introduction of superior substitute products, shrinking customer groups, buyers in trouble, changes in buyers' lifestyles, needs and tastes, rising costs of inputs or complementary products (Harrigan and Porter, 1983). This is also the shared opinion of Grant (2010) who elaborates that the key features of declining industries are excess capacity, lack of technological change,

declining number of competitors, high average age of both physical and human resources and aggressive price competition.

4.2 Industrial Organization Perspectives in Strategy

This view is concerned with the development of a more comprehensive knowledge of industry behavior and firms' actions when operating or facing a declining environment. Companies can no longer enjoy market growth without stealing other competitors' share. As a market enters a decline phase the rules of the game change, allowing less room for failure.

4.2.1 Harrigan's Model

The models within strategic portfolio planning described in section 4.1 (GE & BCG) and their respective prescriptions (Harvest or Divest) have been criticized by Harrigan (1980) for identifying too superficial appropriate strategies. As a result, Harrigan developed "Harrigan's model" in collaboration with Michael Porter, which combined emergent life-cycle research with a structural analysis of industries and provided strategic options for managing decline to a greater extent than portfolio planning models did. The model's main conclusion is that firms in declining industries can still have higher than average returns. This will be presented in detail in the next section.

4.2.1.1 Environmental Decline

Harrigan's Model identifies causes for decline, distinguishes between different types of decline and provides different strategies for each type. Before discussing the strategic options developed by Harrigan, a deeper understanding of industry characteristics affecting the industry needs to be ensured. Harrigan & Porter (1983) analyzed the environmental attractiveness of an industry. In order to do so, they list structural factors and determine if they cause an either hospitable or inhospitable environment. The main categories include conditions of demand, exit barriers and rivalry determinants, as illustrated in Table 3 in the appendix.

Harrigan & Porter (1983) mention several reasons why industries enter a decline phase. Technological advances lead to lower costs and a higher quality, the customer group might shrink due to demographic changes, taste and style might vary or costs of inputs rise. This can be supplemented with the work of

Hamermesh and Silk (1979) who add limited supply of natural resources to that list, and Taggart who (1995) emphasizes regulations and deregulations. Finally, Liebermann (1990), adds the impact of products classified environmentally dangerous. Another major contribution to Industrial Organization within Strategy is McGahan's (2004a) study of industry change trajectories. The author identifies two threats of obsolescence: a threat to an industry's core activities and a threat to and industry´s core assets. The first one refers to actions that initially attracted buyers whereas suppliers become less important. The latter includes resources, knowledge and brands, which loses value. Figure 4 helps to determine which change trajectory a company is facing.

		Core Activities	
		Threatened	**Unthreatened**
Core Assets	**Threatened**	*Radical Change*	*Creative Change*
	Unthreatened	*Intermediating Change*	*Progressive Change*

Figure 4. Trajectories of industry change. (McGahan, 2004)

Just as barriers must be overcome when entering a market, companies face a different set of mobility barriers when leaving it, called exit barriers. The higher the exit barriers, the less hospitable the industry is during the industry's decline. If the assets are specialized to the business, company or location, this creates exit barriers. A company can also decide to remain in the industry due to strategic considerations linked to the overall corporate strategy. Planning on divesting impedes access to financial markets reducing in a drop of the company's financial credibility, ultimately lowering its attractiveness to potential acquirers or buyers if decided to exit. Vertical integration is also a factor affecting the decision, as barriers to exit will depend on whether the cause of decline affects the whole chain or just a link. Emotional barriers, such as managers' emotional commitment to a business, combined with pride and fear, can also arise and make the exit more difficult (Harrigan & Porter, 1983).

As a result of falling sales and excess capacity, competition in an end-game is often characterized by fierce price warfare. This is more likely if the industry has maverick competitors with different goals, if exit barriers are high, and if the market is very inhospitable.

4.2.1.2 Strategic Alternatives for Declining Businesses

Consequently, four generic strategy alternatives on coping with decline have been developed, which are illustrated in Figure 5:

	Has competitive strengths	**Lacks competitive strengths**
Favorable industry structure	*Leadership or Niche*	*Harvest or Divest Quickly*
Unfavorable industry structure	*Niche or Harvest*	*Divest Quickly*

Figure 5. Strategies for declining industries. Source: Harrigan and Porter, "End-game strategies for declining industries." (Harvard Business Review 1983, vol. 61, iss. 4, p.111)

Following the *Leadership* strategy, a company tries to reap above-average profitability by becoming one of the few companies remaining in the industry. The underlying premise is that by achieving leadership, the company can be more profitable after competitors leave, resulting in market power. This is due to more control over the process of decline and avoiding destabilizing price competition. As a result of this strategy, the company's position should give it cost leadership or differentiation that allows recovery of assets even if it reinvests during the decline period. This can be achieved by ensuring that other companies rapidly retire from the industry, reducing competitors' exit barriers, developing and disclosing credible market information. Moreover, raising the stakes by precipitating the need of other competitors to reinvest in new products or process improvements makes it costlier for them to operate in the industry.

When executing a *Niche* strategy, the objective is to identify a segment of the declining industry that will either ensure stable demand or slow decay, that allow high returns. A company then moves pre-emptively to gain a strong position in this segment while disinvesting from other segments. Management might decide to take some of the actions visible in their leadership strategy.

Harvest is primarily considered with cash flow generation, cutting investments and solely producing the most profitable products. To increase cash flow, management eliminates or severely curtails new investments, cuts maintenance of

facilities, and reduces advertising and research while reaping the benefits of previous actions. Other maneuvers include narrowing down the product portfolio, cutting the number of distribution channels, eliminating small customers, and eroding service in terms of delivery time, speed of repair, or sales assistance. Companies choosing this type of strategy often have difficulties maintaining suppliers' and customers' confidence. Harvesting tests managerial and administrative skills, seeing that it creates problems of retaining and motivating employees, which involves a certain risk. Eventually, managers following this strategy will sell or liquidate the business.

Lastly, *Quick Divestment* describes an exit in early declining stages entailing selling assets to competitors that remains in the industry. Executives employing this strategy assume that the company can regain more of its investment from the business by selling it in the early stages of the decline, compared to harvesting and holding of the sale. The earlier the business is sold, the smaller likelihood of potential buyers to foresee the reduction in demand, the more likely they are to identify potential buyers for their assets. Divesting quickly will force the company to confront its own exit barriers, such as its customer relationships and corporate interdependencies. However, planning for an early departure can, to some extent, help manager mitigate the effects of these factors.

As the characteristics of the competition and different strategies are presented, managers must now consider their position, if the industry can support a favorable structure and the potential for a profitable decline phase. What exit barriers do the different competitors face, who will exit quickly and who will remain? What are the company's strengths, and do they fit the remaining pockets of demand compared to competitors' strengths? How can competitors' exit barriers be overcome?

4.2.1.3 Organizational Responses to Decline

In order to select the appropriate strategy a match between the remaining opportunities, with their companies' positions, needs to be made (Harrigan and Porter, 1983). If low uncertainty and low exit barriers prevail, strong companies can either seek a leadership position or defend a niche, which is shown in the table 3 in the Appendix. If a company lacks internal strengths, it should either harvest or divest early. If, on the other hand, the company possesses competitive strengths

but exit barriers are high and the industry structure is uncertain, companies are advised to choose either a Niche or Harvest strategy. It is usually advantageous to make an early commitment to an end-game strategy, as the successful companies choose strategies before one is chosen for them. In other words, companies should anticipate decline as early as possible to be able improve their end-game position, including minimizing investments that will raise exit barriers, increasing the flexibility of assets and placing strategic emphasis on favorable market segments. Strategies can also be chosen based on the type of change a company faces (McGahan 2004a). During a radical change, firms often remain profitable and focus on the end game. An intermediating change is caused by alternative industries for buyers and suppliers. A creative change is caused by unpredictable innovation, which can be antagonized by diversification. Lastly, the progressive change appears in a comparably stable industry and demands companies to deepen and optimize their business relationships. McGahan (2014b) presents an alternative way of categorizing change trajectories. One category is labeled *architectural* and is suiting if activities of an industry are threatened, resulting in buyers and suppliers looking for alternatives. The other category is called *foundational* and describes change if core assets are threatened. Companies should in that case, according to McGahan (2014b), invest in making assets less specialized.

Summarizing, Harrigan and Porter's (1983) model for strategies in declining industries allows managers to choose the appropriate strategy to cope with the decline more proactively, based on the company's relative strengths in the declining environment.

4.3 Population Ecology

The population ecology perspective on organization-environment relations was initially introduced as an alternative to the former, dominating adaption perspective by Hannan and Freeman (1977). Models within the population ecology depend stronger on competition and selection of organizations in a population. All organizations are distinctive, therefore not affected identically by exogenous shocks. However, a relative homogeneity, in terms of environmental vulnerability, allows the classification of organizations into populations. A population can be briefly described as a "set of organizations engaged in similar

activities and with similar patterns of resource utilization" (Baum and Oliver, 1996). Its the types of resources that define a population, not the actual product. The term structural inertia plays a central role in population ecology, describing limits for organizational adaptation, arising from both internal, structural and environmental constraints. Further, Hannan and Freeman developed different theory fragments, including inertia and change, niches, resource partitioning, density dependence and age dependence in order to understand the high diversity of organizations. Organization's fitness is used as an indicator to determine whether a certain form of organization can persist in a given environment. From a population ecology perspective, the environment optimizes. Consequently, the environment selects an optimal combination of organizations, following the rationality of "natural selection" based on the organization's' ability to adapt. As long as resources are finite and populations have capacity to expand, competition exists. The question regarding which types of environment a specialist or generalist approach, in terms of business activities and portfolio management, is favorable, is another central topic of population ecology (Hannan & Freeman, 1977).

The approach of Hannan and Freeman was put forth by Zammuto and Cameron in 1985. They developed a typology of environmental decline and models suggesting both organization- and population-level responses, to various kinds of decline. This will be introduced in the following section.

4.3.1 Environmental Decline and Organizational Response

Hannan and Freeman's (1977) main ideas were utilized in a setting of environmental decline and organizational response by Zammuto and Cameron in 1985. Their model operates on two levels, population and organization, and is based on the following two concepts, *Ecological Niches* and O*rganizational Domains*.

4.3.1.1 Central Concepts

An *Ecological Niche* can be described as an environmental habitat of a population of organizations. Physical and social conditions provide common resources and place common constraints on the population's performance. The availability of resources, the level of demand determines the niche and regulations, whose interaction defines its size or carrying capacity. A *Fundamental Niche* describes

the size or carrying capacity whereas the *Realized Niche* describes the actual space of a population occupied by organizations. Niches are constantly changing based on external and internal factors. For example technological innovations, might result in a shifted demand or offers new forms of organizational performance.

An O*rganizational Domain* defines the part of a niche inhabited by an individual organization. The entity of organizational domains constitutes for the realized niche. *Population Density* then describes the extent to which a population occupies a fundamental niche (Zammuto and Cameron, 1985). Taggart (1995) ads that the clientele the organization serve, technology employed and products produced define the domain. Changes in a niche can result in changing conditions for a population, while adaptation takes place on the domain level.

4.3.1.2 Typology of Environmental Decline

The Typology categorizes change into four distinct classes and depends changes in niche size and shape, patterns of change and specialist or generalist classification, which will be explained in detail in the following three subsections.

4.3.1.2.1 Changes in Niche Size and Shape

Changes in niches may be caused by effects the population has no control over or by pro-active organizational actions. External causes include demographic or regulatory changes, while internal ones include technological advances. Changes of a niche are distinguished between the one affecting the size and the ones affecting its shape (Zammuto and Cameron, 1985). The size of a niche describes the carrying capacity, thus, the volume of the niche. The shape describes the content, thus, the products produced (Taggart, 1995). Reductions in the size result in decreased activity, while a change in the shape affect the type of activity. The shape of the niche is impacted by variation in consumer demand or by new technologies.

Creative Destruction is a complementary model created by Schumpeter (1942) describing radical technological advance or even leapfrogging influencing the shape or size of a niche. The theory states that technological advance is the main source of economic growth and improvements, where large incumbent firms are most likely to be the source of leapfrogging innovations. This is similar to the thoughts of Christensen (1995) who introduced the term *Disruptive Innovation*,

where performance attributes, which existing customers value, improve in such a rapid rate that the new technology later can invade those established markets. This indicates that leading companies have a problem with holding their position when technologies and markets change. The disruptive innovation could directly affect the processes and technologies employed within an industry or the ones in an up- or downstream industry. If the disruptive innovation challenges the internal processes, organizations within the respective industry have to adapt their technology to ensure efficiency. If downstream industries are affected, organizations may need to adapt their product portfolio as a result of the disruptive innovation and in order to remain legitimate. Considering Zammuto and Cameron's Model, a disruptive innovation may either change the size or the shape of a niche, as it either increases the possible efficiency or the demand. Contraction or Collapse would then be the respective outcomes organizations must cope with.

It is essential for populations to "do something right" in order to maintain the niche's size and "do the right thing" in order to maintain its shape (Zammuto and Cameron, 1985). Both changes may result in a decline of carrying capacity. However, the loss in carrying capacity resulted by the changes in niche shape is often replaced by the emergence of a new niche (Taggart, 1995).

4.3.1.2.2 Patterns of Change

In terms of impact through the external environment, change needs to be distinguished between *Continuous* and *Discontinuous*. The former is consistent with past experiences and seems to be a long-term trend, such as changing demographics. The latter is caused by individual and, sometimes unpredicted events, such as disruptive technologies, and therefore deviates from the past. Organizations therefore have a better chance of adapting to continuous, rather than discontinuous change.

The two dimensions, a change in niche shape and size occurs simultaneously with either continuous or discontinuous change, lead Zammuto and Cameron (1985) to develop four different archetypes of change: *Erosion, Contraction, Dissolution and Collapse,* as illustrated in Figure 6.

	Continuous Change	Discontinuous Change
Change in Niche Size	**Erosion**	**Contraction**
Change in Niche Shape	**Dissolution**	**Collapse**

Figure 6. Strategies for declining industries. Source: Harrigan and Porter, "End-game strategies for declining industries." (Harvard Business Review 1983, vol. 61, iss. 4, p.111)

Erosion is the archetype of change when the size of the niche is affected through continuous change. Populations experience a gradual reduction of the level of organizational activity.

Contraction is the result of a discontinuous change in niche size. A sudden reduction in demand or the availability of resources may cause this type of change.

Dissolution is caused by a continuous change in the shape of a niche, resulting in transformation into another niche.

Collapse results from a discontinuous change in the niche shape. This archetype describes the elimination of a niche, which is consequently replaced by another, requiring different forms of organizational activity (Zammuto and Cameron 1985).

4.3.1.2.3 Specialists, Generalists & r- and K-Strategists

Depending on the breadth of domains, organizations can be classified as either *Generalists* or *Specialists.* Generalists tend to have a broad portfolio, engaging in a wider range of activities, whilst Specialists have a narrow one. Operating in a relatively stable environment, specialists have an advantage over generalists owing to their exploitation of economies of scale (Hannan and Freeman, 1977). However, generalists are less vulnerable in case decline causes a certain niche to diminish. Regarding size and shape of a niche, generalists are believed to have a higher adaptive potential when the shape is affected, they can evolve with the niche. If the size is impacted, specialists have an advantage over generalist because they can use resources more efficiently (Taggart, 1995).

MacArthur and Wilson (1967) introduced another distinction between *r*- and *K*-*Strategists.* They describe the manner of how resources within a population are exploited. "r" refers to the intrinsic rate of growth within a population, "K" refers

to the carrying capacity. r-strategists tend to move quickly and exploit resources as early as possible, consequently depend on the first mover advantage. Organizations that chose this strategy succeeds if the population density is low and patterns of resource availability are uncertain and volatile in terms of when and where they become available. The main advantage is the quick utilization of new resources. K-Strategists benefit from densely populated niches. Their competitive advantage revolves around efficiency and economies of scale. K-Strategists will outperform r-Strategists when the density of a niche approaches its carrying capacity (Zammuto and Cameron, 1985).

According to Zammuto and Cameron (1985), K-Strategists succeed in most of the four change archetypes because decline results in a reduced carrying capacity and increased density. Concluding, four types of organizational forms can be identified: *r-Specialists, r-Generalists, K-Specialists* and *K-Generalists.*

4.3.1.3 Population-Level Effects of Decline

At the population-level, the typology of decline predicts the development of the level in competition and which organizational form tends to succeed.

	Continuity of Environmental Change	
Type of Change in Niche Configuration	**Continuous Change**	**Discontinuous Change**
Niche Size	**Erosion** Competition: Slow increase Success: K-Specialists Failure: r-Strategists, K-Generalists	**Contraction** Competition: Rapid increase Success: K-Specialists Failure: r-Strategists, K-Generalists
Niche Shape	**Dissolution** Competition: Moderate increase Success: K-Generalists Failure: K-Specialists	**Collapse** Competition: Overall decrease Success: r-Strategists Failure: K-Strategists

Figure 7. Population level effect on decline (Zammuto and Cameron, 1985).

Facing *Erosion*, K-specialists are the most successful in adapting due to their nature of efficient resource utilization. Competition will gradually increase due to the shrinking state of the niche. r-Strategists and K-Generalists are likely to fail because of their lack of efficiency.

Contraction includes a significantly increased level of competition meaning that K-Specialists are the organizational form that benefits, thanks to their high

efficiency.

Under conditions of *Dissolution,* competition slowly increases because of the decreasing carrying capacity of the niche. In this case, K-Generalists are prone to be successful because their broad domain offers comparably high possibilities for adaptation.

In case of *Collapse,* r-Strategists have advantages compared to the other forms. Their ability to quickly move and switch niche allows them to utilize the new portions. K-Strategists tend to fail because of the quickly declining carrying capacity (Zammuto and Cameron, 1985).

Regarding the organizational level, types of decline faced by organizations depends on two reasons: Specialists are stronger affected by changes in niche shape because of rather narrow domains. Generalists are more vulnerable to changes in the size of a niche owing to their relative lack in efficiency.

4.3.1.4 Organizational Responses to Decline

According to Zammuto and Cameron (1985), organizational responses are divided into *Structural Adjustment* and *Strategic Response*. The former describe internal changes under environmental pressure, the latter describe repositioning of the organization in its external environment. Four alternatives exist for structural adjustments, namely a change by *Deletion,* a change by *Substitution,* a change by *Addition* and a change by *Redistribution.* Respectively, activities tend to be eliminated, replaced, increased or relocated.

In a similar fashion, strategic responses can be described: *Domain Defense Strategies* are followed in order to preserve legitimacy of the active domain of activities. *Domain Creation Strategies* are employed to supplement active domains with new ones while the present organizational expertise can be used. *Domain Consolidation Strategies* aim at reducing the size of the domain occupied through eliminating core activities. Lastly, *Domain Substitution Strategies* replace the domain with another.

Figure 8 below, developed by Zammuto and Cameron (1985), shows the organizational level responses to environmental decline and offers insights into which strategies tend to be most successful depending on the nature of decline. Strategies are further differentiated depending on whether the decline was predicted or unpredicted.

	Continuity of Environmental Change	
Type of Change in Niche Configuration	**Continuous Change**	**Discontinuous Change**
Niche Size	**Erosion** Structural Adjustments Change by Redistribution Small, incremental changes (fine-tuning) Strategic Response Predicted: Domain Defense Unpredicted: Domain Consolidation	**Contraction** Structural Adjustments Change by Deletion Substitution across-the-board or selective cutbacks Strategic Response Predicted: Domain Creation Unpredicted: Domain Substitution
Niche Shape	**Dissolution** Structural Adjustments Change by Addition Search for new alternatives Strategic Response Predicted: Domain Defense, then Domain Creation Unpredicted: Domain Substitution	**Collapse** Structural Adjustments Change by Substitution Trial and Error search for past solutions Strategic Response: Predicted: Domain Creation Unpredicted: Domain Substitution

Figure 8. Organizational Responses to Decline (Zammuto and Cameron, 1985).

Erosion does not threaten the organization's survival immediately. In terms of Structural Adjustments, minor incremental adjustments improve efficiency. If the change is predictable, domain offense should be employed as a strategic response with the goal of expanding the organization's resource base and market share and therefore strengthening its market position. In case the change is unpredictable, Domain Consolidation is the appropriate response.

Contraction requires more significant adjustments because the niche shrinks more rapidly and sudden. If predicted, Domain Defense is appropriate so that the domain remains viable, even in a smaller niche. If unpredicted, Domain Consolidation is utilized in order to secure the core activities of the organization.

Dissolution asks for incremental adjustments in the organization's structure and activities. A Change by Addition and therefore the search for alternative activities is necessary. If the change is predicted in advance, first Domain Defense and then Domain Creation need to be considered. Firstly, the acceptability of the output needs to be retained. Secondly, the organization must be moved towards a more viable portion of the evolving niche. If the change is unpredicted, Domain Substitution is adequate since it will be too late for Domain Defense strategies. Survival of the organization can then be ensured by a change of its core activities.

Collapse requires a quick and larger-scale organizational adaptation. If predicted, Domain Creation strategies can be employed, leading to a more diversified

portfolio of activities and support a quick adaptation. Activities in the present niche are supported while the organization simultaneously expands into the evolving sector of a new or less threatened niche. If not predicted, the only viable option is Domain Substitution (Zammuto and Cameron 1985).

4.3.1.5 Summary of Theories on Declining Environments

Summing up, the model by Zammuto and Cameron (1985) focuses on both organization and population levels of decline. On the former level, the model examines why different types of organizations experience different forms of decline and what effects result in terms of population dynamics. On the latter level, it explains common conditions of decline for organizations and the population and why organizations employ various strategies to cope with decline. Following, competitive actions are explained, which organizational form is adequate in different situations and which kinds of structural adjustment and strategic response lead to success.

4.4 Comparison of the Perspectives

The two models of Industrial Organization within Strategy and Population Ecology have now been presented and form the basis of the integrated research framework. These models allow for an analysis of the success rate when operating in decline and present strategies to cope with it. Firstly, Harrigan and Porter's model (1983) is based on environmental factors and organization's strengths. This model focuses strongly on the firm level and respective competitive strengths in light of the respective industry attractiveness. The Industrial Organization within Strategy perspective is considered *proactive* in the sense that an assessment of internal strengths relative to the competition is conducted and structural adjustments are consequently made on this basis. From an Industrial Organization within Strategy's point of view, successful companies should actively choose a strategy than let the market and environment determine their position.

Secondly, Zammuto and Cameron (1985) present a model characterized by a different set of questions to analyze industry level changes. The model is stronger dependent on competition and selection of organizations within a population characterized by a relative homogeneity in terms of environmental vulnerability. Natural selection consequently occurs based on the adaptation abilities of

organizations regarding structural adjustments and strategic responses. Therefore, it is the environmental change for the population as a whole, which asks for strategic responses. From the perspective of Population Ecology, the position and success rate of the company is determined in a rather *reactive* way following the environment the companies operate in.

Applying both models result in several suggestions on how to cope with certain types of decline. The model by Zammuto and Cameron (1985) presents a more in-depth result by offering a two-folded suggestions, on the one hand regarding structural change, on the other hand strategic responses. It also takes into consideration whether the decline was anticipated or not. Harrigan and Porter's (1983) model, on the contrary, offers the managers one of four generic and rather general strategies to cope with decline depending on detailed firm level input such as competitive strengths. However, both perspectives also share common ground, as some of the factors inspected in both models are similar. The industry's certainty and speed of decline, a dimension of Harrigan and Porter's (1983) model, assesses the same factors as the industry's continuity of decline, used by Zammuto and Cameron (1985), when evaluating the industry's attractiveness. Further, the dimension within Harrigan and Porter's (1983) model regarding competitive strengths affects the outcome in a comparable way the dimension of Zammuto and Cameron's model about Generalists, Specialists and r- or K-Strategists do.

As previously mentioned, these perspectives could possibly both compete with and complement each other, or even result in different predictions when used to analyze empirical data. Applying these two perspectives in the context of the Norwegian Pulp and Paper Industry allows either the identification of the most suitable perspective or a reasonable combination of both.

5.0 Research Methodology

This section presents the research methodology applied in this thesis and the reasoning behind the choices. The paper has its origins in perspectives of Industrial Organization within Strategy and Population Ecology, which build the theoretical framework of this study. Based on prevailing theories and perspectives about declining industries and respective strategies, research questions were formulated. Consequently, based on the theoretical framework as well as the

research questions, an interview guide was formulated and constantly used for the twelve interviews conducted. In the light of theory, the empirical findings are analyzed and summarized in order to answer the previously mentioned research questions. This approach consequently shows both inductive and deductive traits Bryman and Bell (2015). The following sections firstly introduce the research design, followed by the data collection and analysis. Finally, the research quality is addressed, evaluating different types of validity and reliability.

5.1 Research Design

Bryman and Bell (2015) define research design or strategy as a framework for the collection and analysis of data. The authors state that the choice of research strategy reflects decisions about priorities given to the dimensions of the research process. According to Cooper and Schindler (2014), it is an activity- and time-based plan, which is based on a research question, a guide for selecting sources and types of information and a framework for specifying the relationships among the study's variables. Several different strategies are available when conducting research, which includes case studies, field experiments, cross-sectional studies, histories, analysis of archival information and longitudinal studies.

Instead of focusing solely on one particular research design, this thesis involves the usage of partly mixed methods. In its core, it is a case study but involves elements of a longitudinal design. The longitudinal approach is used in a sense that interviews are means to look back in time to map changes in the industry, comparing the present decline phase with an earlier state. However, in a purely longitudinal design a sample is surveyed at a certain point of time and surveyed again on at least one further occasion, which is not the case for this study. According to Cooper and Schindler (2014), case studies emphasize a full contextual analysis of fewer events or conditions and their interrelations. A case study combines empirical data, mostly interviews and observations with record analysis. Further, Yin (2009) argues that this type of research strategy is appropriate when addressing *why* and *how* questions, and when the researcher has limited control over behavioral events.

In the underlying case the analysis refers to the condition of decline and based on data conducted through interviews with and observations of different organizations accounting for the Norwegian Pulp and Paper Industry. Studying multiple subjects results in a deeper understanding of the entity, in this case the

industry, which is the core of the case study. Regarding Yin (2009) questions, the theoretical and practical research questions center around *why* the industry faces decline and *how* organizations consequently cope with it. Another support for choosing this research strategy is that this type is often used when the phenomena is contemporary. In the case at hand, the paper investigates strategic decision-making in a domestic, declining industry. The topic is therefore considered contemporary. As a result, a case study is considered the appropriate research strategy for this thesis and the research questions. The goal consists of firstly, receiving a deep understanding of the Norwegian Pulp and Paper Industry, and secondly, conducting a full contextual analysis. This is in accordance with the characteristics developed by Cooper and Schindler (2012) and Yin (2009).

Case studies, and therefore this paper, mostly apply qualitative research methods. Qualitative research includes an array of interpretive techniques, which seek to describe, decode, translate naturally occurring phenomena in the social world. Data collection involves individual in-depth interviews, case studies and observation. During the analysis, the approach includes content analysis of written or recorded materials and behavioral observation.

5.2 Selection of Companies

According to Bryman and Bell (2015), sampling methods are a technique for collecting data. The choice of sampling method reflects decisions about the type of instruments or techniques to be used. The population the underlying case is based on comprises the Norwegian Pulp and Paper Industry, *Treforedlingens Bransjeforening*. Within this population, each member is taken into consideration and empirical data in form of interviews are conducted to an equal extent for all companies. If the population was defined as a subset of a larger population, such as the European or global population of pulp and paper producers, then this paper would involve a complete subset. The resulting generalizability will be addressed in the section about external validity.

5.3 Collection of Data

For this study, a combination of quantitative and qualitative research method has been used, with a focus on the latter. Quantitative data was essential in the early stages in order to get an overview of the industry landscape. It included company reports, financial statements, research articles on the industry and news articles.

However, the greatest share of information is based on primary data gathered through in-depth interviews with company representatives of all member companies. Such a combination allows the methodologies to complement each other, combining the advantages of both quantitative and qualitative approaches (Bryman and Bell, 2015).

5.3.1 Primary Data

Primary data describes the data collected by the researchers themselves, which is tailor-made for a certain purpose where the researchers have full knowledge of the collection process. Primary sources are always most authoritative owing to the unfiltered information, which has not yet been interpreted by a second party (Cooper and Schindler, 2014).

This paper's data collection consists of qualitative data from twelve in-depth interviews and questionnaires with informants from the different companies representing the Norwegian Pulp and Paper Industry. All company representatives were in a position to provide valuable insights and a deep understanding of the historical development of strategic decision-making for each organization. To supplement this information with in-depth knowledge of the industry in general, an extensive interview with Marit Foss, operating manager at NPPA, has been conducted.

5.3.2 Secondary Data

A secondary analysis defines the review and use of data by researchers who were not involved in the collection of the initial data (Bryman and Bell, 2015). Its main advantage is that it offers a prospect of having access to high quality data. Many of the datasets that are employed most frequently for secondary analysis are of high quality, so that they also offer the opportunity for longitudinal research and cross-cultural analysis, which provide more time for data analysis, as data collection is time-consuming. Limitations on the other hand, include the lack of familiarity with the data, the complexity of the data and also the fact that the researchers have no control over the data quality. Data gained from numerical and statistical sources are of high interest. This type of data also allowed us to get a broader understanding of the historical development of the domestic industry in general, and to prepare simplified timelines and graphs presented in the presentation of the industry.

5.3.3 Conducting Interviews

Interviewing is the most widely employed method in qualitative research (Bryman and Bell, 2015). It is the flexibility of the interview that makes it attractive, as the interviewers can depart significantly from any schedule or guide used. One can also ask follow up questions and vary the order of questions or the wording. In qualitative interviewing, the researcher aims for rich, detailed answers, and the interviewee may be interviewed on several occasions. The empirical data for this paper is conducted through semi-structured interviews, ensuring that the responses can be compared through the theoretical framework. Researchers use a list of questions on fairly specific topics while the interviewees have a high degree of leeway in how to reply. Further, questions not included in the interview guide may be asked in order to pick up on things mentioned by the interviewee. All questions were asked in a similar wording for the participants. Given the complexity of declining industries and strategic decision-making, informants in leading positions provide primary data, which allows for in-depth understanding. The interviews were either conducted face-to-face at the headquarters of each company or via Skype. The time-frame of the interviews differed between 30 and 90 minutes, depending on the availability of the informants. To ensure not to miss any information, each interview was recorded and transcribed with the informants' acceptance. Further, all interviews were conducted in English.

5.4 Data Analysis

An appropriate strategy to analyze the data conducted for this study is an approach called *Pattern Matching*. Following this approach, this paper compares an empirically based pattern with the predictions made based on the two models within Industrial Organization Perspective in Strategy and Population Ecology. In other words, the actual strategies employed by the eleven companies are analyzed and compared to what is said to be most appropriate in the models. According to Yin (2009), Pattern Matching is one of the preferred analytical techniques when conducting case studies. The outcome of both models, whether the actual strategic pattern the companies employ is in accordance with the theoretically desired pattern, is based on internal and external factors affecting performance in the distinct niches.

5.5 Evaluating Research Quality

The trustworthiness of a study's findings is of high importance for both the reader and the researcher. According to Cooper and Schindler (2014), three major criteria evaluate the accuracy of measurement: internal validity, external validity and reliability. Validity can be defined as the extent to which a test measures what it is supposed to measure. Reliability is concerned with the accuracy and precision of the measurement process. The criteria refer to the underlying design, case studies as a part of qualitative research.

5.5.1 Internal Validity

This type of validity describes the ability of research to measure what it is supposed to measure (Cooper and Schindler, 2014). In terms of qualitative research, the thoroughness of the researchers' data collection plays a major role. In general, qualitative research involves a certain degree of subjectivism. Realities of research are assumed to be multiple, nevertheless, *Triangulation* is a dominating strategy to ensure a high degree of internal validity. It includes the use of *multiple investigators*, *multiple sources* of data and *multiple methods* to confirm emerging findings (Merriam, 2009). In the underlying case, insights were gained through two investigators, the two authors of this thesis, who conducted each interview jointly. Different sources describe the cross-checking of collected data through, for example, observations at different times or through various independent interviews. In the case at hand, twelve different interviewees answered the same questions at different times in different places. Regarding the requirement of multiple methods, insights gained from interviews were, as far as it was possible, verified through sources such as annual reports, corporate websites, news articles or the managing director of the industry umbrella organization.

5.5.2 External Validity

This form of validity is concerned with the generalizability of the findings across settings and times (Cooper and Schindler, 2009). A given requirement for external validity is internal validity to ensure the trustworthiness of the findings. This study ensures the highest possible degree of generalization by presenting empirical data on the entire population, including all its eleven Norwegian member organizations. If the population is considered a complete subset of a more

global pulp and paper producer population, finding will be transferrable to a high degree to similar subsets within the population. This paper provides sufficient descriptive data and a maximum variation in terms of the sample, which strengthens the transferability to similar cases. A particular approach to enhance external validity is to make use of a *Rich, Thick Description* as a means of enabling transferability. It refers to "...highly descriptive, detailed presentation of the settings and participants of the study, as well as a detailed description of the findings…" (Merriam, 2009) including references from interviews or field documents.

5.5.3 Reliability

Measurements are reliable if they result in consistent outcomes, so that findings can be replicated. It must ensure that a study, if repeated, yields the same results. Qualitative research in social science involves human behavior, which is never static, research can therefore not be isolated and outcomes not perfectly replicated. Identical results are therefore considered rather problematic. Therefore, quantitative research frequently use the terms *Dependability* or *Consistency* to substitute the term *Reliability* with. Instead of measuring if the research will provide the exact same findings again, consistency measures the fit of the results to the data collected. Again, triangulation provides certainty of an adequate level of consistency. An additional strategy, which ensures consistency, is called *Audit Trail.* Following this strategy, this paper provides the readers with sufficient in-depth information of their research procedures. More explicitly, readers are provided with information on how data were collected, categories formed, decisions made and findings derived. Additionally, all interview transcripts are available in the Appendix. Consequently, readers can authenticate the findings of the study themselves by following the trial of the researchers (Merriam, 2009). Both triangulation and audit trail is used to ensure the paper's findings consistency or reliability. Despite the problematic replication of results, information gathered through different interviewers will lead to similar outcomes owing to the semi-structured approach the interviews were led by.

6.0 Findings

To begin with, data conducted through the interviews will be summarized. Following, the two models discussed in earlier parts will be used to analyze the type of decline as well as the companies' strategies coping with their respective business environments.

6.1 Presentation of the Data

The Norwegian Pulp and Paper Industry consists of eleven companies. In-depth interviews with each allows for a credible analysis. Key information is presented in the Table 1 below.

Company	Main Products	Location	Employ-ees in Norway	Export Ratio	Interviewee	Date	Revenues 2015 in mio NOK
Borregaard AS	Specialty Cellulose, Chemicals, Lignin, Vanillin	Sarpsborg	814	95%	Dag Arthur Aasbø, SVP Organization and Public Affairs	15.03.2017	3,032
Hellefoss Paper AS	Publication Paper	Hokksund	93	95%	Arnfinn Kroken, Purchase Director & Jarle Borgersen, HR Director	01.03.2017	188
Hunton Fiber AS	Fiberboards	Gjøvik	117	90%	Arne Jebsen, CEO	27.03.2017	381
Huntonit AS	Fiberboards	Vennesla	209	25%	Roy Kenneth Grundetjern, Managing Director	16.02.2017	459
Nordic Paper AS	Greaseproof Paper	Greåker	117	0%	Terje Unneberg, Line Manager PM4 & Kenneth Bostrøm, Area Sales Manager	25.04.2017	601
Norske Skogindustrier ASA	Newsprint- and Magazine paper	Lysaker	4000	95%	Sven Ombudstvedt, CEO & Carsten Dybevig, VP of Communication and Chairman of NPPA	13.03.2017 & 20.03.2017	1,748
Peterson Packaging	Board for Packaging	Ranheim	920	0%	Tommy Prøitz, Sales Director	26.04.2017	1,021

Rygene-Smith & Thommesen	Mechanical Pulp	Rykene	27	95%	Kristen Hagestad, Operating Manager	09.03.2017	107
Vajda Papir Scandinavia AS	Household Paper	Drammen	119	90%	Per Andreas Rønsberg, Managing Director	21.03.2017	304
MM Karton FollaCell	Cellulose Pulp	Follafoss	61	95%	Odd Morten Aalberg, Managing Director	21.02.2017	430
Vafos Pulp AS	Mechanical Pulp	Kragerø	45	95%	Helge Myren, Sales Manager	16.03.2017	56

Table 1. Company Presentation

Regarding the product portfolios within the Norwegian Pulp and Paper Industry, several distinctions can be made. Three companies focus on the production of pulp, more precisely, CTMP, which is short for chemithermomechanical pulp and used in the production of board and cartonage, for example. Next, two companies produce actual publication and book paper, while two others focus on fiberboard, which is mainly used for construction purpose. Finally, the remaining companies focus on more distinct and specialized products, such as packaging board, household paper or greaseproof paper. Borregaard AS is the company that stands out the most and the one that cannot be categorized in a way the others can. Their product portfolio is comparably highly diversified and broadens rapidly through investment in R&D or acquisitions. In fact, the company invests around five percent of their annual revenues in research (Dag Arthur Aasbø, Borregaard ASA). Today, it includes products ranging from pulp, cellulose, bio ethanol and chemicals to lignin and vanillin.

All companies operate within the B2B market, selling downstream within their respective value chains. Customers include supermarkets, buying household papers, bakeries demanding greaseproof paper, publishing houses in need for book and magazine paper, hardware stores buying fiberboard or producers of board and paper who depend on different types of pulp.

The majority of companies employs up to 120 employees and generates revenues of up to 600 million NOK. However, three corporations stand out in terms of staff and revenues, namely Borregaard, which was described in more detail in the previous section, Norske Skog and Peterson Packaging. Borregaard benefits from its diversified portfolio, Norske Skog simply operates on a particularly large scale

and Peterson Packaging Norway is part of an international corporation. Regarding export ratios, eight out of eleven companies export almost all their products since the local demand is rather insignificant compared to demand from Europe, Asia or America. However, it strongly depends on the product type what shipping methods can be employed and consequently which countries can be served.
In the following section, the two models will use this data set to explore types of decline and strategies to cope with it.

6.2 Industry Evolution Phases through the Different Perspectives

Information gained through empirical research led to the distinction between different niches within the Norwegian Pulp and Paper Industry. It became apparent that companies operate in distinguishable niches in different industry evolution phases. While the paper niche is characterized by an obvious decline, the pulp niche is operating in a mature phase and other niches, such as packaging or greaseproof paper is in a growing stage. These stages will be analyzed through the two different models explained in the theoretical framework. Figure 9 offers two possibilities to structure the analysis. Data can be analyzed following an either vertical or horizontal approach.

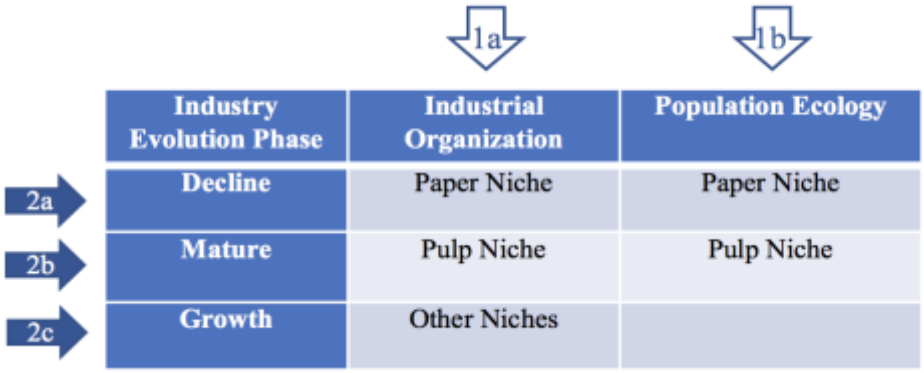

Figure 9. Approaches for Analysis

A *vertical* approach would make use of the models as *two starting position*, 1a and 1b, clearly separating Industrial Organization within Strategy from Population Ecology and look at the different industry evolution phases within the models. Each model can be used separately to analyze all evolution phases in one section. Else, a *horizontal* approach can be followed, using the *Industry Evolution Phases* as three distinct starting points, 2a, 2b and 2c. Within each phase, the two models

analyze the niches from different perspectives and allow for a clearer comparison of the companies operating in each.

	Industry Evolution Phase	Industrial Organization	Population Ecology
2a	Decline	Paper Niche	Paper Niche
2b	Mature	Pulp Niche	Pulp Niche
2c	Growth	Other Niches	

Figure 10. Approaches for Analysis

Compared to the vertical approach, the horizontal one allows for a clear distinction between the three different industry evolution phases that were determined and is therefore the more adequate one, illustrated in Figure 10.
Both the decline and mature phases will be evaluated through both perspectives. However, the growth phase cannot be analyzed through Zammuto and Cameron's (1985) model, since the continuity of change and consequential results depend on negative change and therefore cannot be used to analyze growth.

6.2.1 Paper as a Niche facing the Decline Phase

The most significant decline within the Norwegian Pulp and Paper Industry can be observed within the Paper Niche, according to the eleven companies interviewed (Appendix 7.3). To begin with, this niche will be analyzed using firstly Harrigan and Porter's model (1983) and secondly, Zammuto and Cameron's model (1985).

6.2.1.1 Industrial Organization in Strategy

When assessing the industry structure and competitive strengths, Harrigan and Porter (1983) mention several reasons explained in the theoretical framework for why industries enter a decline phase and provide strategic responses. According to Table 3 in the Appendix, these structural factors are grouped into *Conditions of Demand*, *Exit Barriers* and *Rivalry Determinant*.

6.2.1.1.1 Industry Assessment

Following the structure of Harrigan and Porter's model (1983) beginning with *Conditions in Demand* (Table 3), the paper producers Norske Skog and Hellefoss are characterized by a more accelerated speed and certainty of the decline compared to pulp producers. Recently resigned CEO of Norske Skog Sven Ombudstvedt (Norske Skog) explains that the graphic paper segment faces strong decline. According to Ombudstvedt, the decline in Europe started around 2007 and 2008 with the introduction of advanced mobile devices, which has essentially impacted the graphic paper segment, and the financial crisis. Further, Norske Skog estimates that a decline will enter in Asia in about three years' time. Advertisement has moved from print to digital media, and so have consumer preferences (Carsten Dybevig, Norske Skog). In terms of product differentiation (Table 3), it is possible to differentiate paper products in both price and quality. Moreover, compared to other products such as cars and electronics, it is hard to develop customer loyalty in this industry. Further, governmental support differs between the countries in which Norske Skog is operating. In Australia and France, they benefit from high support which stands in contrast to the regulations the Norwegian government is placing upon the Norwegian Pulp and Paper Industry (Dybevig, Norske Skog). Ombudstvedt (Norske Skog) further states that the environmental restrictions in Norway are much higher than in neighboring markets, making it difficult to stay competitive. Eastern European competitors are threatening as they do not need to follow as strict environmental rules, creating a competitive disadvantage for Norske Skog. Even compared with Sweden and Finland, Norway has disadvantages, as Norske Skog is not allowed to use trucks of the same size like their competitors do, resulting in additional costs. Transportation is costly for Norske Skog since it partly requires overseas shipping. In Norway, Enova is supporting the paper producer with energy, but will rather spend future funding on new technologies instead of energy efficiency, which will result in reduced financial support for Norske Skog. Dybevig (Norske Skog) estimates that around 80% of money spend on R&D will be wasted on conducting research on products that won't work out. Since costs in Norway regarding maintenance and labor have raised, Norway does not offer any clear location advantages, besides low electricity and timber prices as the companies are located close to the forest. However, Arnfinn Kroken and Jarle Borgersen (Hellefoss) explained that they have low negotiation power facing energy

providers and that fluctuation of energy prices affected their business to a great extend. The company went bankrupt in 2013, as a result of not being able to pay back 30 million NOK to energy providers. The company was shut down for 6 weeks before opening again. Former employees and most of the customers were loyally waiting for the company to start operating again. Moreover, Hellefoss shares the same view as Norske Skog regarding governmental regulations and funding, stating that Innovation Norway does not show interest for the paper industry.

Following the structure of Harrigan and Porter's model (1983), high *Exit Barriers* (Table 3) for the paper producers exist. Both Norske Skog and Hellefoss possess old and specialized assets, with large fixed costs associated with leaving the business. It consequently is considered difficult to resell equipment and costly to convert machinery in order to produce other, more profitable types of goods.

Summarizing, for the paper producers and Norske Skog in particular, the industry structure can be considered unfavorable, as demand for graphic paper has declined heavily, and governmental funding is limited. High regulations create a competitive disadvantage compared to neighboring countries and maintenance and labor costs are increasing. Both companies also struggle to differentiate their products making it hard to ensure customer loyalty. Further, exit barriers are high as both companies possess old and very specialized assets, making reinvestment requirements for possible buyers high.

6.2.1.1.2 Assessment of Competitive Strengths

Hellefoss' competitive advantage in this unfavorable environment revolves around their high flexibility and ability to react quickly to customer demand. If customers spontaneously demand paper, Hellefoss is the preferred option (Arnfinn Kroken, Hellefoss). This distinguishes them positively from the large-scale producer Norske Skog. At the moment, Hellefoss is enjoying a 10% market share in Europe, facing only two other larger competitors. Norske Skog is considered the largest European player (Sven Ombudstvedt, Norske Skog) whose competitive advantage lies in scale efficiencies, superior technology and global competencies and knowledge. Many smaller companies have already divested whereas Norske Skog continues to run on low capacities. Today, around 900 mills operate worldwide but in some years the number might shrink to around 400 (Carsten Dybevig, Norske Skog). Norske Skog plans to diversify the product

portfolio, letting 25% of their revenues in 2020 come from new products such as bioenergy, pallets and tissues. However, switching to board production is no option as the market is saturated according to Ombudstvedt and as it would be costly to adapt the machines (Norske Skog). In the case of Hellefoss, the demand for their products has been more stable for the last couple of years, the focus has been towards improving efficiency of the machinery. However, for both companies, customer switching costs (Table 3) are considered low since they produce a similar product.

Norske Skog plans to harvest the cash flow in this declining industry, having competitive mills with around 80% capacity and try to stay profitable as long as possible. One of the few advantages for both companies operating in a declining industry is that no competition enters the market and takes shares (Sven Ombudstvedt, Norske Skog). Hellefoss plans to focus more heavily on robotics and automatize the processes to gain efficiency.

6.2.1.1.3 Organizational Response

Regarding the paper producers, both Hellefoss and Norske Skog are identified as companies following a *Harvest* strategy. Even though access to raw material is affordable, the industry structure is unfavorable for both companies. None of the companies receives governmental funding, which could improve the companies' situations and competitiveness. Both Norske Skog and Hellefoss are concerned with cash flow generation and have focused heavily on cost cuttings and increasing efficiency during recent years. Norske Skog's strategic direction, given its strong presence in the European market, shows additionally elements of a *Leadership* strategy, remaining in the industry as one of the few players and managing high market shares (Sven Ombudstvedt, Norske Skog). Hellefoss has enjoyed stable demand recently, whereas Norske Skog have been highly affected by the declining demand for graphic paper. However, both companies try to use their respective strong positioning in Europe and try their best to stay profitable as long as possible. Norske Skog is planning on diversifying its product portfolio and aims to gain 25% of its revenues new products. Neither Norske Skog's competitive advantage revolving around global competencies and economies of scale nor Hellefoss' competitive advantage, namely flexibility, can counter the unfavorable environment they operate in. *Harvest* is therefore the organizational

response the companies follow, utilizing their strong position in the European market to generate cash flow.

6.2.1.2 Population Ecology

After analyzing the declining Paper Niche using the model of Harrigan and Porter (1983), Zammuto and Cameron's (1985) model will shed an additional light on this particular niche.

6.2.1.2.1 Changes in Niche Size and Shape

In the first step, change in size and shape of the niche is to be determined. The newspaper and magazine niche is characterized by a change in shape rather than a change in size. External technological advance, more precisely digitalization and the emergence of digital newspapers, magazines and literature has influenced consumer patterns. According to recently resigned CEO of Norske Skog Sven Ombudstvedt, VP of Communications at Norske Skog and Chairman of NPPA Carsten Dybevig as well as Hellefoss' Purchase Director Arnfinn Kroken, paper has been substituted by digital alternatives to a great extent, which affects the legitimacy of organizational activity within the paper niche (Appendix 7.3.3, 7.3.5 and 7.3.8).

6.2.1.2.2 Patterns of Change

Regarding the continuity of the decline, the paper niche is affected by a Discontinuous Change. The emergence of digital alternatives has occurred in a sudden manner and is described as a Disruptive Innovation and an individual event rather than a long-term observable trend. Sven Ombudstvedt and Carsten Dybevig state that the decline within the paper industry started in 2007 with the introduction of modern mobile devices and was impaired by the financial crisis in 2008 (Appendix 7.3.5 and 7.3.8). Since Norske Skog's customers are almost exclusively publishing houses, this sudden decline could not be countered.

	Continuous Change	Discontinuous Change
Niche Size	Erosion	Contraction
Niche Shape	Dissolution	Collapse

Figure 11. Pattern of Change - Paper Producers

Consequently, the archetype of change resulting from a discontinuous decline in the niche shape is called *Collapse*, describing the elimination of a niche and its replacement by another one. The eliminated niche in this case is the one revolving around the production of paper for the use of print magazines and books, the emerging niche replacing the declining one deals with its substitutes, digital media in a broad sense.

6.2.1.2.3 Specialists and Generalists

In terms of organizational strategy, both Hellefoss Paper AS and Norske Skog are characterized as K-Specialists. Both companies offer a rather narrow product portfolio and operate in narrow domains (C. Dybevig, Norske Skog, Appendix 7.3.8 and A. Kroken, Hellefoss, Appendix 7.3.3). Further, they would benefit from densely populated niches and try to get competitive advantages through economies of scale and cost-reduction rather than the exploitation of new opportunities and first-mover advantages. Both Hellefoss and Norske Skog invest relatively little in R&D. Within the archetype of *Collapse*, competition decreases since companies move to other niches, which is in accordance with the information provided by Marit Foss, Operating Manager of NPPA (Appendix 7.3.13), Sven Ombudstvedt and Jarle Borgersen (Hellefoss, Appendix 7.3.3 and Norske Skog, Appendix 7.3.5) who state that many companies within the paper production niche have already divested and that many more international competitors are expected to divest or relocate. K-Strategists tend to have a disadvantage compared to r-Strategists facing this type of decline since they cannot move or adapt as quickly in order to switch the niche. In addition, Specialists are more negatively affected than Generalists owing to their narrow domain and strong dependency on it.

6.2.1.2.4 Organizational Response

The structural adjustment of the organizational response suggests *Change by Substitution*, describing the replacement of organizational activities in order to stay viable. Since the decline was unpredicted due to its disruptive nature, *Domain Substitution* is suggested, stating that the current domain the two companies operate in needs to be replaced by another domain with better future prospects. In general, the organizational responses require quick and large-scale adaptation to ensure the survival of the companies. However, many smaller competitors of Hellefoss and Norske Skog had to divest early since they had no financial resources to invest in substitution and relocation of their organizational activities. This was the case owing to the discontinuous and unpredictable nature of the decline (Carsten Dybevig, Norske Skog, Appendix 7.3.8). In comparison to that, especially Norske Skog, as a large international company has the financial means to follow the structural adjustment of *Change by Substitution*. According to Sven Ombudstvedt and Carsten Dybevig (Norske Skog, Appendix 7.3.5 and 7.3.8), in 2020, 25% of the company's domain will be substituted by other, more profitable domains such as tissues, pallets and bioethanol, while still maximizing profits from machines producing publication paper. This will diversify their product portfolio and move the strategy from Generalist to Specialist.

6.2.2 Pulp as a Niche facing the Mature Phase

In general, companies specializing in the production of TMP, Thermomechanical Pulp, are directly affected by a decline in demand for paper based products since TMP is a core product paper producers source for their operations. If the demand for paper declines, the demand for the upstream product pulp declines consequently, if it is not evened out by rising demand from other sources. However, Norwegian pulp producers switched from producing TMP to Chemithermomechanical Pulp (CTMP) before the recent decline was anticipated. They now serve mainly the packaging and board industries, which are growing (Kristen Hagestad, Rygene-Smith, Appendix 7.3.4, Helge Myren, Vafos, Appendix 7.3.7). While consumers tend to read less physical magazines and books, they order greater amounts of goods online, which need to be wrapped and sent in packages according to representatives of all pulp producers within the Norwegian Pulp and Paper Industry (Kristen Hagestad, Rygene-Smith, Appendix

7.3.4, Odd Morten Aalberg, FollaCell, Appendix 7.3.2 and Helge Myren, Vafos, Appendix 7.3.7). Summing up, the pulp industry in total faces on the one side a decline caused by the shrinking demand for paper, on the other side a growing demand caused by the packaging industry, which requires pulp as a core ingredient. Consequently, the pulp niche is situated in a segment less threatening than the paper niche.

Following the above structure, the perspective of Industrial Organization in Strategy will first be applied before moving to the perspective of Population Ecology.

6.2.2.1 Industrial Organization in Strategy

6.2.2.1.1 Industry Assessment

Regarding the *Conditions in Demand* (Table 3) and more specifically the speed and certainty of decline, production of CTMP has been relatively stable for the Norwegian producers during recent years. Only FollaCell has increased production, running on full capacity and expecting further increase of 3% annual demand. Rygene-Smith & Thommessen and Vafos are currently not running on full capacity. Kristen Hagestad (Rygene-Smith & Thommessen) considers the high supply of pulp the main reason. Due to the maturing and certain demand, the environment for pulp production can be considered favorable. Pulp is a commodity product, therefore it is difficult for companies to differentiate themselves from another. Customers have low switching costs and also a lower degree of loyalty, which becomes obvious when Vafos declared bankruptcy in 2013, as the company lost its key customer, responsible for 50% of the revenues, to FollaCell (Helge Myren, Vafos AS). All three companies point out favorable prices in terms of raw material and electricity as favorable for the industry. This is connected to total costs, where for example wood and energy constitute 70% of total costs for Rygene-Smith & Thommessen. All three companies also benefit from governmental funding, where Kristen Hagestad (Rygene-Smith & Thommessen) mentioned that Innovation Norway provides valuable support, for example when adapting the product portfolio to increasing demand for CTMP. Further, the Norwegian Paper Institute consults the companies occasionally about product development. Sales Manager Helge Myren (Vafos) states that the government provides financial support for the company to improve its

environmental footprint. In general, however, the government's policy is too strict and includes too many unfavorable regulations.

Next, the second section of Harrigan and Porter's (1983) model (Table 3), *Exit Barriers*, is analyzed in the light of the Norwegian pulp niche. Just as companies must overcome barriers when entering a market, they meet exit barriers when leaving it. The higher the Exit Barriers, the less hospitable the industry during the industry's decline (Harrigan and Porter, 1983). For the Norwegian producers of pulp, most of the assets are specialized to the business and as a result it is difficult to find potential buyers, which creates exit barriers. As there are large fixed costs associated with leaving this industry including labor settlements, contingent liabilities for land use, costs of dismantling facilities, exit barriers raise for the pulp producers. Most assets of all three companies are old, instead of buying new machinery, companies have invested to improve productivity by adjusting the old ones in terms of automatization and robotics (Helge Myren, Vafos., Odd Morten Aalberg, FollaCell. and Kristen Hagestad, Rygene-Smith).

Summarizing, the pulp producers highly benefit from favorable and stable prices for electricity, and proximity to raw materials. Further, demand has been relatively stable and even growing the last years, and companies benefit from governmental funding when making new investments. However, it is difficult to differentiate, which lowers customer loyalty, or seek new niches when producing pulp. In general, the companies face high Exit Barriers due to specialized assets and large fixed costs connected with leaving the industry.

6.2.2.1.2 Assessment of Competitive Strengths

The third section of Harrigan and Porter's model (Table 3) deals with *Rivalry Determinants*. FollaCell is operating in a larger scale than Vafos and Rygene-Smith. Odd Morten Aalberg (FollaCell), explained that they highly benefit from economies of scale and the internal knowledge and experience forwarded and secured through generations, which results in effectiveness. He further revealed that FollaCell is planning on diversifying in a different market to lower risk. Since this process is in the early stages, Aalberg could not reveal further details regarding what market segment or type of product is considered. Vafos (Helge Myren) has primarily invested in quality and has aimed to reduce costs for both production equipment and employees operating on every shift. At the moment three to four workers run a shift. The company's strength lies in cost effective

production, as they are utilizing timber more effectively than competitors. Rygene-Smith & Thommessen (Kristen Hagestad) considers as one of their main competitive strengths the fact that they do not require more than 2 people to run a shift. Investments regarding robotics and automatization around 2006 has ensured efficiency. However, as these players are offering a commodity product, customer switching cost (Table 3) are considered weak, which can be observed in the situation when Vafos' key customer switched to FollaCell as a supplier and Vafos consequently went bankrupt.

Summing up, all companies have invested heavily in cost reduction during recent times. FollaCell has even increased capacity, planning to expand even further and even enter a new market in the near future.

6.2.2.1.3 Organizational Response

According to Harrigan and Porter's (1983) model, all three companies follow the *Harvest* strategy. This strategy is concerned with cash flow generation, cutting investments and solely producing the most profitable products. All companies are producing CTMP, which can be used as an ingredient for a variety of products and be supplied to a range of companies. It can be argued that FollaCell is not following a *Harvest* strategy, as they are planning to increase investments and capacity, and rather follow a *niche* strategy. However, the strongest argument in favor of *Harvest* is the current product portfolio including CTMP as a commodity product, indicating that the generation of cash flows and the harvest of the current demand are essential to stay profitable. In the case of Rygene-Smith & Thommessen and Vafos, the *Harvest* strategy is more obvious since cost cuttings are essential. However, as all companies are offering a commodity product without many opportunities to differentiate themselves, a *Harvest* strategy is reasonable.

6.2.2.2 Population Ecology

Within this second perspective Zammuto and Cameron's (1985) model will be firstly used to describe the effect of the declining demand from the paper industry on the TMP industry before considering the growing demand within the packaging industry and the early shift in the Norwegian companies' product portfolios.

6.2.2.2.1 Changes in Niche Size and Shape

To begin with, compared to the paper niche, the pulp niche changes both in size and in shape. Companies producing TMP would face a reduction of the size owing to the decreasing demand. CTMP producers such as Vafos, Rygene-Smith and FollaCell produce, neither need to adapt nor substitute their product since it is used mainly in the growing packaging segment. Rygene-Smith already switched from producing TMP to producing CTMP around 2000 before the recent decline was predicted (Kristen Hagestad, Appendix 7.3.4). Also Vafos changed their product portfolio in a similar fashion during the 80s, long before the disruptive substitute for newspaper and magazines was anticipated (Helge Myren, Appendix 7.3.7). Their decision to change to CTMP was based on the already prevailing growth in packaging. However, the change in shape is not based on changing demand or different ingredients the downstream paper industry requires.

6.2.2.2.2 Patterns of Change

Based on the disruptive innovation threatening the paper niche, the demand for TMP declined and therefore the change within this niche occurs accordingly discontinuous. The type of change is called *Contraction*, a sudden reduction in demand. Vafos, Rygene-Smith and FollaCell's situation, however, can be characterized as *Dissolution*, which describes a gradual transformation into another niche. The shift in their product portfolio did not occur suddenly or as a reaction to a disruptive event, such as the substitution of magazines and newspapers, but more as a reaction to a long-term observable trend, namely the growth of the packaging and board industry. This affected the carrying capacity of the CTMP niche in a positive way and resulted in an increasing niche volume. The three Norwegian companies consequently decided to focus on producing a modified version of their original product, CTMP instead of TMP. Nowadays, the TMP niche's significance decreases while the CTMP niche's increases. The shape of the pulp niche consequently evolves.

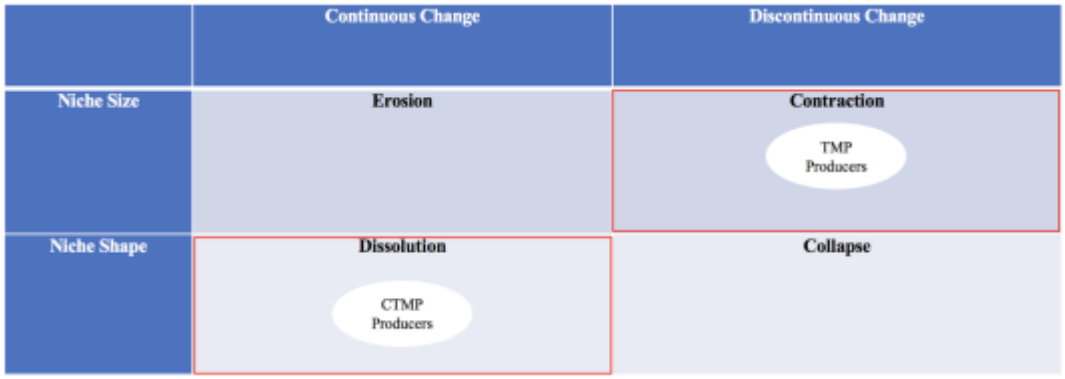

Figure 12. Pattern of Change - Pulp Producers

6.2.2.2.3 Specialists and Generalists

For TMP producers, the demand declines rapidly while the competition in the segment increases. In the case of the three Norwegian CTMP producers, the competition increases moderately, which is in accordance with their statements (Kristen Hagestad, Rygene-Smith, Appendix 7.3.4, Odd Morten Aalberg, FollaCell, Appendix 7.3.2 and Helge Myren, Vafos, Appendix 7.3.7). The three companies, however, all offer rather narrow product portfolios and operate in narrow domains, which classifies them as Specialists. They are further classified K-Strategists, relying on economies of scale. In order to increase their efficiency, automatization and robotics are made use of (Kristen Hagestad, Rygene-Smith, Appendix 7.3.4). In a declining landscape, such as the TMP niche, this strategic orientation would be prone to fail. In the growing CTMP segment though, this logic cannot be applied.

6.2.2.2.4 Organizational Response

Moving to the companies' organizational responses, *Contraction* would be the sole archetype of change for TMP producers. The less threatening nature of the change the pulp industry faces allows for more time to react, even for TMP producers, therefore structural adjustments of the archetype *Erosion,* characterized by continuous change, need to be looked at additionally. Again, K-Specialists are the strategists tending to succeed whereas the competition is increasing slower than in *Contraction. Contraction* in fact suggests the structural adjustment *Change by Deletion*, which describes the elimination of the organizational activities. This would be adequate for pure TMP producers, which do not possess financial resources to adapt their product portfolio. *Erosion* offers a suitable

structural adjustment, *Change by Redistribution,* for TMP producers financially capable of adjusting their portfolio. It describes the relocation of resources and smaller, incremental changes. Resources spent on the production of TMP which is supplied to paper producers, can be relocated and used for the production of CTMP. Regarding the strategic responses, both *Contraction* and *Erosion* suggest the same: *Domain Defense* if the change was predicted and *Domain Consolidation* if it was unpredicted. Again, if the companies would entirely depend on the downstream paper niche, the decline would be unpredicted and *Consolidation* would be the only response. However, the perspectives within the packaging industry ask for a *Defense* strategy in order to preserve legitimacy of the core activities. This legitimacy is achieved by the previously described structural adjustments and the adaptation of the portfolios. In the case of CTMP producers Vafos, Rygene-Smith and FollaCell operating in a growing segment, *Deletion* is inadequate while *Redistribution* is not necessary.

6.2.3 Remaining Niches facing the Growth Phase - Industrial Organization

Since Zammuto and Cameron's model cannot be used to analyze a niche facing growth, this subsection solely contains the perspective of Industrial Organization in Strategy in order to analyze the Remaining Niches.

6.2.3.1 Industry Assessment

The remaining cases offer a diverse range of products, both compared to pulp and paper, and also between the cases in this group. For all companies representing this group, *Demand Conditions* (Table 3) oppose the conditions within the pulp and paper industry; demand is growing. Managing Director of Huntonit, Roy Kenneth Grundetjern, states that the fiberboard industry is characterized as technology driven, so the costs of production are similar in Norway compared to Poland for example (Huntonit). Arne Jebsen, CEO of Hunton, the second fiberboard producer, shares a similar view regarding costs, explaining that they are lower in Norway compared to other countries due to low electricity prices and easy access to wood (Hunton). Further, wood prices have even decreased since a lot of sawmills now have to charge lower prices as there are less paper factories to supply. For the remaining niches, governmental support is not as crucial as for

paper producers. However, it is necessary that companies operate under the same frames as neighbouring competitors in Sweden and Finland, which is, according to Arne Jebsen, currently the case. "Politicians come and go, so it is better to focus on what we (Hunton) can do with our resources. Even with poor regulations, you can still be competitive in terms of being smarter and more effective than your competitors" (Arne Jebsen, Hunton). Managing director of Vajda Papir, Andreas Rønsberg, underlines that the cheap electricity provided by ENOVA is an essential support, but also mentions that Swedish and Hungarian companies receive much more governmental funding compared to companies operating in Norway (Vajda). Grundetjern (Huntonit) explains that the availability of skilled engineers allows for successful R&D and that innovation projects are financially supported. Terje Unneberg and Kenneth Boström (Nordic Paper) however, cannot identify any clear location advantages other than being close to raw material.

None of the cases within this group considers the markets they operate in declining but rather growing and profitable, even in the long-term (Table 3). Further, all cases have some excess capacity (Table 3). SVP of Organization and Public Affairs at Borregaard, Dag Arthur Aasbø, states that the company actively observes megatrends in terms of population growth, the growing middle class, globalization, more efficient farming as well as increasing demand for more environmental friendly products (Borregaard). All these trends are in Borregaard's favor, as there is no domestic competition. Within cellulose, only five players compete in the global market. Regarding lignin, Borregaard has 60% market share globally. Nordic Paper is experiencing an annual two to five percent increase in demand for their products depending on the segment. Additionally, customer focus on hygiene has increased, favoring the company since almost all their products serve the food sector. Sales Director of Peterson Packaging, Tommy Prøitz, states that the company is facing two percent annual growth, as the focus on food waste has increased, and people prefer smaller packages (Peterson Packaging). The Norwegian population is growing, and an ongoing change from plastics to board based products, offered by Peterson Packaging, is evident. Per Andreas Rønsberg, managing director of Vajda, explains that the company produces a product, toilet paper, that has no direct substitutes, supporting a favorable environment according to Harrigan and Porter (1983) and Table 3 (Vajda). Further, the usage of toilet paper is increasing owing to the high

immigration especially in Sweden, consumption is twice as high as in Norway.

Moving on with *Exit Barriers* (Table 3), machinery is generally old and specialized. Machinery of Nordic Paper is, according to Terje Unneberg, up to 100 years old and still among the newest in the industry. The company is considered market leader within the greaseproof paper segment without many competitors, and for that reason expecting more competition to enter soon. Entry barriers are high as converting machines to production of greaseproof paper require massive investments and the correct know-how and new machines are close to unaffordable. However, it would be easier to sell the assets (Table 3) that these companies possess, compared to pulp and paper, as Nordic Paper is operating in a growth segment.

For these segments, competition is low at the moment but several companies expect new competitors to enter the market. All companies face stable and some even growing demand for their products, some excess capacity, and all informants were satisfied with the government's effort to ensure an internationally competitive industry. Entry Barriers are high as it requires major investments but also expertise to enter the different niche segments. Consequently, the industry structure for all companies can be considered favorable.

6.2.3.2 Assessment of Competitive Strengths

Continuing with the next section of Table 3, Unneberg (Nordic Paper) argues that it is the expertise and experience within greaseproof paper of over 100 years, which makes them competitive. Further, they try to participate in direct dialogues with their customers, enabling the company to respond immediately to changing customer preferences. Customer proximity is also of great importance for Vajda Papir. Rønsberg (Vajda) explains that one cannot import toilet paper or tissues from China and expect economies of scale, due to the expensive transportation costs. Even buying toilet and household paper from Slovakia or Hungary is financially unreasonable for supermarkets. Vajda is therefore located close to the Nordic market, which has some of the highest per capita consumption. Being the last tissue mill in Norway, provides the company with special economic opportunities. Even though labor in Norway is expensive, the knowledge is much more advanced and has been forwarded through many generations. Further, Vajda wishes to expand capacity even more as well as entering into new segments and

targeting new types of customers. For Peterson Packaging, direct contact and continuous communication with customers is essential. This enables the company to lower costs and improve quality in both the products and logistics (Tommy Prøitz, Peterson Packaging). Arne Jebsen (Hunton) mentions their experienced sales force as a competitive advantage, which allows the company to communicate easily and adjust quickly to changing customer demand. Hunton has the competitive advantage of offering complete solutions to their customers including fiberboard for all parts of the house as well as isolation. This allows Hunton to charge a premium. They further consider their employees including transferable but also tacit knowledge as an advantage. Employing staff with the right competence ensures the correct and efficient use the equipment. Without the right competence in Norway, one does not stand a chance to compete (Arne Jebsen, Hunton). Also, according to Rønsberg (Vajda), the knowledge of the employees on the production lines as well as the one of the management is stated as the most important capability. As products are more specialized and continuously adapted to customer preferences based on continuous communication, customer switching costs are raised (Table 3). Grundetjern (Huntonit) explains that Huntonit, the second fiberboard manufacturer, follows a strategy demanding heavy investment in the Nordic market and plan not to offshore production outside Norway. Further, they benefit from differentiation. Huntonit produces a special type of fiberboard, which is environmental friendly compared to its competitors and the only one which is approved by the Norwegian Asthma and Allergy Association (NAAF). Further, they rely on a large department of skilled engineers who are constantly working on the development of new, environmental friendly solutions (Roy Kenneth Grundetjern, Huntonit).

Aasbø (Borregaard) points out competitive advantages based on three core competencies: R&D, marketing and product portfolio. In terms of the portfolio, Borregaard has the most diversified one. In terms of sales and marketing, they gain deep global insights as they sell and market their products through their own employees compared to competitors who use agencies. Borregaard employs a sales force of 18 employees who consult about the products and market development and who have a detailed knowledge of the products. Borregaard further spends five percent of its global revenues on R&D whereas the average of what competitors spend is around one to two percent (Dag Arthur Aasbø,

Borregaard). Borregaard will continue growing based on two pillars, firstly further diversification and niche focus of their portfolio combined with high investments in more advanced and specialized products. Secondly, an increase capacity, especially in lignin where they have started to build another factory in the U.S. together with a local pure lignin producer. Within a five years' horizon, they plan to increase the lignin capacity by 40%. Borregaard further receives R&D support of around 250 million Euros for entering new business areas.

For the companies operating in the *Other Niches*, customer proximity, excellent communication, expertise on the field, combined with high quality products are of great importance to stay competitive. All cases can therefore be said to have competitive strengths.

6.2.3.3 Organizational Response

Borregaard and Nordic Paper stand out as the market leaders in their respective segments. Borregaard does not face any direct competition within Norway but rather on a global level. Nordic Paper competes with only four other companies in its respective niche. Both companies follow a *Leadership* strategy. However, according to the framework of Harrigan and Porter (1983), one underlying premise for following this strategy is that companies increase profitability and market power when competitors leave the industry. This particular premise is not met in this case, as competitors are rather entering these niches instead of leaving them. For this reason, aspects of the *Niche* strategy need to be considered in addition for both cases, as the companies have identified niche segments ensuring stable demand and structural characteristics that allow high returns. Elements of the *Leadership* strategy (Harrigan and Porter, 1983) that can be found in these two cases include the creation of high entry barriers due to high investments costs, and the need for expertise and know-how on the respective fields.

Hunton, Huntonit, Peterson Packaging and Vajda are identified following a clear *Niche* strategy. All cases have managed to enter a niche segment in the Norwegian Pulp and Paper Industry, where demand is considered stable or even growing. Structural characteristics such as favorable regulations, cheap electricity and access to raw material in combination with specialized expertise regarding their respective products and processes creates competitive advantages.

7.0 Discussion

This section will discuss the findings presented in the previous section in light of the theoretical framework and help identifying both theoretical and managerial implications about strategizing in declining industries.

7.1 Theoretical Implications

One major finding is that the intuitive perception that the Norwegian Pulp and Paper Industry as a whole faces declining demand is incorrect. More than half of the industry is in fact enjoying growth. It appeared that companies were clustered at three different evolutionary stages of the life cycle: Growth, Mature and Decline. Niche producers face growth, pulp producers face both decline and growth, depending on whether their customers produce paper or packaging, and finally graphic paper producers face a clear decline.

Harrigan and Porter's model can be used to analyze all three stages of the life cycle the companies operate in. The competitive strength combined with the favorability of the industry structure suggest a strategy and can be applied for growing, maturing and declining niches. In contrast, Zammuto and Cameron's (1985) model cannot be applied to analyze strategies of companies facing growth since the continuity of change refers to a negative change, namely the decline.

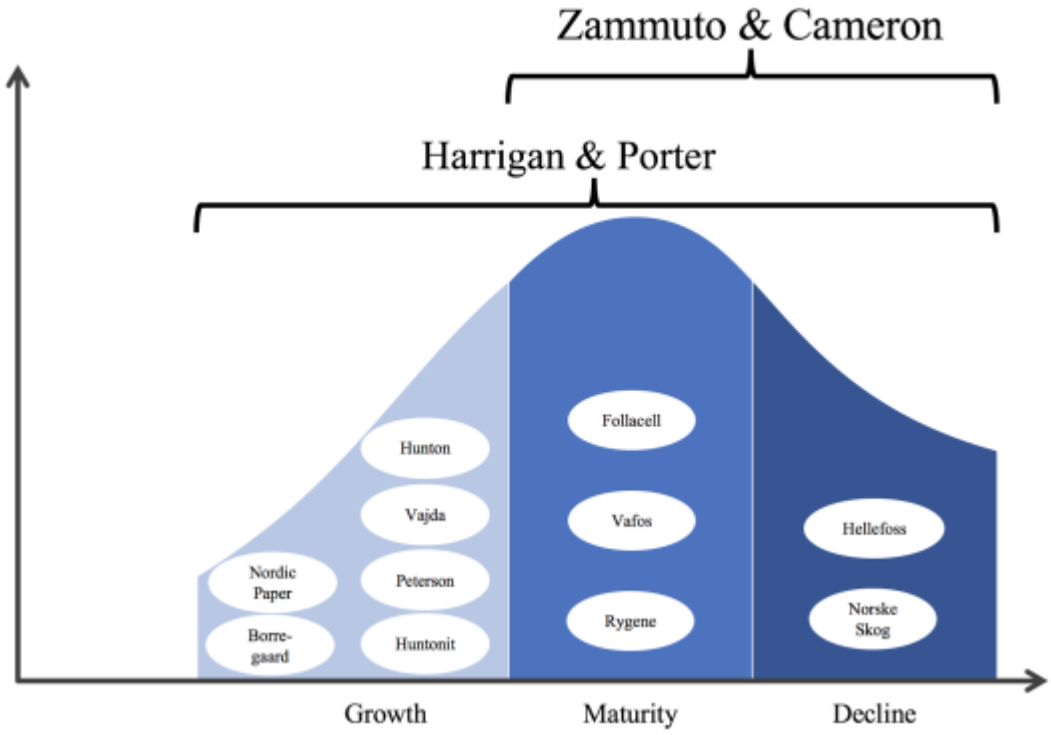

Figure 13. Mapping the Companies and Models in the Industry Life Cycle

Based on information the companies' representatives provided as well as information gained from company reports, a distinction can be made between proactive and reactive strategic behavior. Most firms, namely the ones operating in a growth or mature phase of the life cycle, have applied proactive strategies, entering new niches or adapting their product portfolio. Borregaard is an exceptional example for a proactive mindset, continuously investing in R&D and entering additional niches. Contrary, the two paper producers have not applied this behavior and especially Norske Skog is now forced to react to the strong decline because they have not previously tried to diversify or enter growing niches.

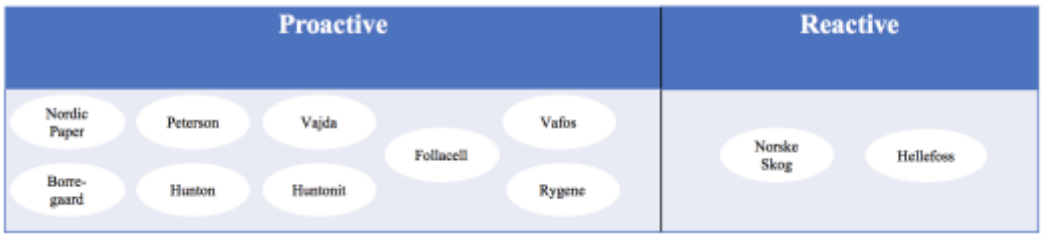

Figure 14. Mapping the Companies as Proactive or Reactive

Both models applied in this paper are further described by an either proactive or reactive approach. The structure of Harrigan and Porter's model fits well for companies characterized by proactive behavior, strategic suggestions are more precise and applicable compared to ones offered by Zammuto and Cameron's model. The great fit is based on the initial input, the favorability of the industry and the competitive strengths. Competitive strengths can theoretically be developed or adapted by proactive decision making of the companies, which consequentially influences the respective favorability of the industry. This ultimately affects the strategic suggestion the model offers.

Zammuto and Cameron's model is, owing to its reactive structure, preferably applicable for companies following reactive behavior. Compared to Harrigan and Porter's proactive initial input, the first step of Zammuto and Cameron's model depends on factors the companies have no influence on, namely the continuity of change as well as the change in size or shape. In the following step, the factor defining whether the change was predicted or unpredicted can also not be impacted by managerial decisions. The sole factor the companies can actually influence before a strategy is suggested is the choice regarding r- or K- Specialists or Generalists. Resulting strategic suggestions have ultimately been more useful and reliable for companies characterized by reactive behavior.

Concluding, both models have their respective strengths in analyzing certain stages of the life cycle as well as strategic mindsets. They complement each other and can be jointly applied to examine the three underlying phases of an industry life cycle.

7.2 Managerial Implications

In total, eleven cases were analyzed from two different perspectives in order to understand what types of strategies are followed by members of the Norwegian Pulp and Paper Industry. According to the framework of Harrigan and Porter (1983), all eleven companies are mapped in Figure 15 below. Depending on the favorability of the respective niches as well as the degree of competitive strengths, one of three strategies is suggested to be followed by each firm.

Figure 15. Mapping the Companies based on Harrigan's Model.

Next, the table below maps the companies, which face either a decline or a stagnating demand in accordance to Zammuto and Cameron's model from the perspective of Population Ecology. The positioning of the companies represents the type of change their respective niches are impacted by and determines according strategies.

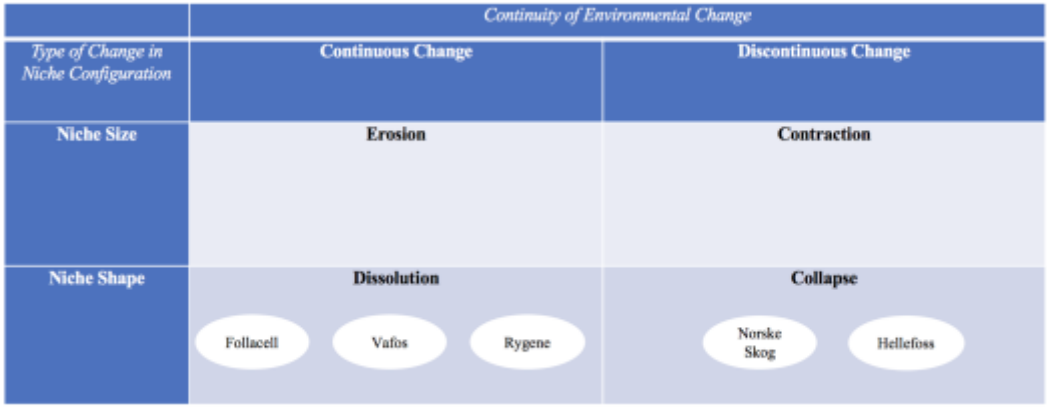

Figure 16. Mapping the Companies based on Zammuto and Cameron's Model.

7.2.1 Comparison of Theoretically Suggested and Currently Applied Strategies

Comparing the two models and beginning with the paper producers Norske Skog and Hellefoss, the strategies suggested do not resemble each other. Harrigan and Porters' *Harvest* considers cost cuttings most important. It further suggests ensuring cash flow generation by solely focusing on the most profitable products. In a different fashion, Zammuto and Cameron suggest *Domain Substitution*, replacing the domain the company operates in with another domain not characterized by a decline.

Comparing these theoretical advices with the strategic approaches the two companies actually follow, some discrepancies become apparent. Sven Ombudstvedt, former CEO of Norske Skog, stated that the paper producer aims at harvesting the remaining cash flow by keeping the mills competitive, running at around 80% capacity. These strategic steps are similar to what Harrigan and Porter suggest. However, Ombudstvedt further highlighted the importance of diversifying Norske Skog's product portfolio, 25% of the revenues are planned to be generated from products other than paper. This approach goes along with Zammuto and Cameron's domain substitution strategy. However, Norske Skog is the largest European paper producer, cutting all investments in the paper segment and substituting the domain completely would be unrealistic. A gradual substitution is more applicable. Summing up, Norske Skog follows two contradicting strategic approaches, diversifying the product portfolio does not support the harvest strategy while harvesting delays the urgent substitution of the domain.

Considering Hellefoss, the second paper producer, their purchase director, Arnfinn Kroken, revealed that cost cuttings is essential for the company's survival. Robotics and automation will be focused on in the near future, which safes wage payments and increases efficiency. The company will further focus on its core product and has no intention to diversify. All these approaches go along with Harrigan and Porter's *Harvest* strategy, which is said to be appropriate in Hellefoss' situation. In contrast, Zammuto and Cameron's domain substitution is not considered at all by Hellefoss. Arnfinn stated that adjusting the machinery or buying new machinery in order to switch niche would be too costly. Instead of substituting the domain, Hellefoss is still considering to enter new markets, such as Germany and Turkey, to make use of economies of scale. Hellefoss reasoning shows that domain substitution strategies can only be applied if the companies

possess the financial strength of adjusting their assets or if the substituting domain does not require costly adjustments.

Continuing with the three pulp producers, Harrigan and Porter's model again suggests *Harvest* as an adequate strategy. Zammuto and Cameron's model, however, considers *Domain Defense* the strategy ensuring success. Retaining the acceptability of the core operations and simultaneously moving slightly to a more viable area of the niche is considered necessary. According to the *Harvest* strategy, Vafos, Rygene-Smith and FollaCell mention their efforts on reducing costs and increasing efficiency. However, contradictory to the *Harvest* strategy but according to Zammuto and Cameron's *Domain Defense,* the companies strive to enter either stronger growing pockets of the niche or promising markets. Rygene-Smith plans on diversifying more and additionally focus the strongly growing hygiene and tissue segment, Vafos entered the Turkish market half a year ago and FollaCell also stated that investments into an additional sector will be made in near future. The acceptability of the core product, CTMP, is assured by the strong growth in the packaging sector. Nonetheless, all companies still move to increasingly viable parts of their domains.

Finally, Harrigan and Porter's model suggests the *Niche* strategy for companies operating in the remaining niches of the Norwegian Pulp and Paper Industry. In accordance with this strategy, all companies identified sub-segments of the industry offering high returns and a growing demand. According to Harrigan and Porter, aspects of the *Leadership* strategy can sometimes be found in the *Niche* strategy. Borregaard, as an exceptional example, operates in many different niches and even plan to broaden their product portfolio further as well as increasing capacity while fighting to achieve market leader positions in most pockets the company operates in. The remaining companies offer a much more narrow portfolio but still identified niches that fulfill the requirements of Harrigan and Porter's suggested strategy.

7.2.2 The Companies' Perception of Governmental Support

Increasing the companies' chance for survival and success, both internal and external adjustments are necessary. Representatives of the paper industry frequently mentioned missing governmental support as reasons for failure. Beginning with the paper producers, Carsten Dybevig, VP of Communication and Chairman of NPPA, highlights the unadvantageous differences between

Norwegian and Eastern European regulations. Eastern European competitors do not need to follow environmental rules as strict as in Norway, which results in lower costs. Even compared to Sweden and Finland, Norwegian paper producers suffer from location bound disadvantages. Norwegian trucks, for example, are not allowed to carry as much as competitors from neighboring countries, resulting in higher transportation costs. According to Norske Skog's CEO as well as Hellefoss' purchase director, governmental subsidies are not directed at the struggling paper industry but rather at more promising niches. ENOVA does not spend money on increasing energy efficiency, which would benefit the paper producers but rather subsidizes innovative projects, such as new technologies, which rather benefits companies such as Borregaard.

Compared to paper producers, the three pulp producing companies, according to their statements, to a certain extent even benefit from governmental support. FollaCell receives and will continue to receive subsidies covering around 40% for R&D programs focusing new product development. Rygene-Smith states that Innovation Norway financially supported their transformation from a TMP to a CTMP producer and that the Norwegian Paper Institut consults the company on product development. Finally, Vafos receives subsidies supporting environmentally friendly product development while still mentioning that environmental regulations are too strict compared to neighboring countries. All three pulp producers stress the beneficial frame conditions created by the government in terms of cheap electricity, which is considered one of the most important resources.

Members of the industry operating in the remaining niches receive respectively more funding since the industries offer more promising perspectives. Vajda's managing director stresses the importance of ENOVA, subsidizing energy costs but also mentions that competitors from, for example, Sweden or Hungary receive much more financial support while not facing as many regulations. Peterson Packaging as well as Nordic Paper mention that they do not rely on governmental support, which makes them more independent. However, Nordic Paper also states that there are no location bound advantages of staying in Norway. Interestingly, according to Huntonit, the advance technology and automation used in Norway results in similar production costs compared to the less advanced Polish environment, which offers cheaper labor and cheaper resources. The fiberboard

producer additionally mentions that the government supports product development with 40% cost absorptions.

Summing up, according to the consentaneous statements of representatives of the Pulp and Paper Industry, the government resists investing directly in the declining paper niche while, simultaneously, subsidizing activities within more promising domains. All companies, however, benefit from low electricity prices. A demand from some members of the industry towards the government is that Norwegian players require same conditions compared to at least Sweden and Finland in order to stay competitive, even though most companies consider the conditions comparable.

7.2.3 Suggestions for Internal and External Adjustment

The decision not to invest heavily in a declining industry is comprehensible and reasonable. Regarding the paper industry, any attempt to preserve legitimacy would fail, defending the domain is no alternative. Harvest and gradual substitution of the niche, in accordance with the two models, are the only appropriate strategies. Financial support for these industries would simply postpone the decline but not stop it. The declining demand from the customers' side cannot be stopped by any governmental action. The argument of securing jobs through financial support of the paper industry is not strong enough since the government uses the financial means to support research and development for more innovative and promising industries and niches, which then will offer additional vacancies. Still, a distinction must be made between Hellefoss and Norske Skog. Hellefoss is a rather small paper producer who recently went bankrupt while Norske Skog is a large multinational company with over 4,000 employees and a successful past. On the one side, Hellefoss, according to their statement, does not plan to switch niche or adjust any strategic direction to withstand the decline. On the other side, Norske Skog published their plan to diversify and enter niches characterized by growth. The urgency for financial support in the case of Norske Skog has been further increased by recent statements that the company struggles to repay debts (DN, 2017). Nevertheless, the strong decline in demand for paper asks for a more urgent action that replacing 25% of their product portfolio by 2025 with products other than paper. The experience with wood and technological expertise the company possesses needs to be sustained and therefore transferred to relevant niches by focusing on a much

higher share of replacing products by 2025. If Norske Skog is able to present a reasonable and more ambitious plan on how to achieve the replacement of paper by much more than 25% through biofuel, biogas, tissues and pallets, the government would potentially reconsider their choice of not subsidizing Norske Skog's R&D activities and could consequential support a successful domain substitution. According to Zammuto and Cameron's model, Norske Skog would in that case be transformed from a K-Specialist, who is prone to fail in the declining paper niche, to a r-Generalist whose strength is escaping a collapsing industry and capturing new opportunities in growing niches.

Regarding pulp producers and companies operating in the remaining niches of the Norwegian Pulp and Paper Industry, governmental support is considered rather sufficient. Companies in these mature or growth domains are internationally highly competitive, owing to support through ENOVA, advanced technology and skilled labor.

7.3 Limitations of the Study and Suggestions for Further Research

The survival bias of the companies is considered a limitation, as none of the investigated cases have divested from the industry. Even the two paper producers have managed to survive in the declining industry. However, Figure 3 showed that several companies have in fact left the Norwegian industry since 1997. To enhance the understanding of the survival rate of companies operating in declining industries, it would be of high interest to understand and analyze their strategic decisions and reasons to divest. This would offer in-depth insights of the risks associated with different strategic maneuvers. If the companies previously divesting were included and analyzed through the two models used in this paper, failure rates of the respective strategies could be calculated. This paper represents a snapshot of the industry and strategies applied today. It would be interesting to investigate the companies' ability to adapt to different life cycle stages over time.

Another limitation is connected to the small sample size of eleven companies. Even though it covers the entire population of the Norwegian Pulp and Paper Industry, it is a fraction of the global industry. The decline might be more or less severe in other geographic areas depending on competition, technology and consumer preferences.

Finally, due to the potential subjectivity of the representatives of the industry, results might be biased. Informants interviewed mostly occupied high positions,

ranging from department directors to CEOs and are therefore responsible for a high number of stakeholders. Since internal motivation, the external perception of the company and even stock prices are based on a certain degree of optimism, statements needed to be treated with care. This limitation is stressed by Norske Skog's former CEO, Sven Ombudstvedt, who seemed optimistic concerning Norske Skog's long-term performance but resigned a few weeks after giving the interview, which caused the stock price to drop by 66 percent within one week (Norske Skog's stock price).

Suggestions for further research are based on these limitations. It would be of great value to conduct longitudinal research on the underlying topic, taking into consideration earlier years of the declining Pulp and Paper industry, including the divestment of competitors as well as the adaption of product portfolios to escape the decline. Additionally, the industry today and this paper's findings as well as managerial suggestions could be analyzed at a future point of time, comparing them to an actual development of the industry.

Another suggestion for further research revolves around the sample size. Comparing the Norwegian Pulp and Paper Industry to similar industries from both countries culturally and economically close and distant to Norway, could offer promising insights. It could provide information on how impactful internal or external decisions, such as governmental action, as well as customer preferences are on the speed and degree of decline.

8.0 Conclusion

This paper's initial goal was to investigate the Norwegian Pulp and Paper Industry, which was assumed to face decline as a whole. The research questions "*Which different types of decline exist?"* and "*Which different strategies can companies apply to cope with decline?"* represent this idea. However, in addition to answering these questions, the data collected, interviews conducted and findings concluded, showed that only parts of the industry consisting of eleven companies are in a decline phase. Two companies, namely Norske Skog and Hellefoss, who are characterized by reactive behavior representing the lack adaption to change in consumer demand, face strong decline and consequently struggle to survive. The remaining companies are positioned in different phases of the industry evolution.

Three pulp producers operate in the mature phase while the remaining six companies operate under growth.

Consequently, the scope of the paper went beyond the pure decline and used models within Population Ecology and Industrial Organization in Strategy to analyze the different phases the eleven companies are operating in. Applying these models resulted in managerial suggestions regarding which type of decline the companies phase and which strategic adjustments are necessary to cope with it in order to ensure survival.

Both models have respective strengths and weaknesses, depending on which stage of the industry life cycle they deal with. Harrigan's model is more reliable in analyzing companies operating in a growing or mature environment, characterized by proactive behavior while Zammuto and Cameron's model is more applicable for corporations facing decline and following a reactive approach.

The degree of governmental support and the companies' opinion about it has been another key issue. Except for the two paper producers' managers, representatives of the companies were satisfied with the support, which can be explained by their proactive behavior allowing for independence from external support. Summarizing, companies within the Norwegian Pulp and paper Industry that are successfully operating under growth or mature conditions have applied Harvest or Niche Strategies according to Harrigan and Porter or Domain Defense or Substitution Strategies according to Zammuto and Cameron.

Finally, this paper serves as a basis for extended further research in the declining niches of the Norwegian Pulp and Paper Industry, both regarding past and future events. The models applied and conclusions achieved in this paper will support the investigation of reasons for previously divested companies as well as the observation and analysis of future development.

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Interviewees:

- Marit Foss, Managing Director Treforedlingsindustrien, conducted the 07.02.2016 in Oslo, Norway

10.0 Appendix

Table 2: Divested companies from the Norwegian Pulp and Paper Industry since 1997. Production capacity tonnes per year

Companies	Year	Pulp	Cellulose	Paper
Egelands Verk A/S	1998	15.00		
Norsk Finpapir AS	1998			35.000
Rena Kartonfabrikk	1998	40.000		
Treschow-Fritzøe	1998	35.000		
Sande Paper Mill A/S	2002		32.387	46.473
Norske Skog Union	2006 (1/3)			250.000
Larvik Cell AS	2008 (jan)		30.000	
Hurum Papir AS	2008 (aug)			40.000
Hunsfos Fabrikker	2011 (sept)			58.000
Norske Skog Follum	2012 (31/3)	340.000		280.000
Peterson Linerboard Moss	2012 (13/4)		182.000	272.000
Södra Cell Tofte	2013 (24/8)		375.000	

Table 3: Harrigan and Porter's Structural factors

Structural Factors that Influence the Attractiveness of Declining Industry Environments		
Structural Factors	Environmental Attractiveness	
	Hospitable	Inhospitable
Conditions of Demand		
Speed of Decline	Very Slow	Rapid or Erratic
Certainty of Decline	100% Certain Predictable Patterns	Great Uncertainty, Erratic Patterns
Pockets of Enduring Demand	Several or Major Ones	No Niches
Product Differentiation	Brand Loyalty	Commodity-like Products
Price Stability	Stable, Premium Attainable	Very Unstable, Pricing Below Costs
Exit Barriers		
Reinvestment Requirements	None	High
Excess Capacity	Little	Substantial
Asset Age	Mostly Old Assets	Sizeable New Assets and Old Ones not retired
Resale Markets for Assets	Easy to Convert or Sell	No Markets Available, Substantial Costs to Retire
Shared Facilities	Few, Free-standing Plants	Substantial
Vertical Integration	Little	Substantial
"Single Product" Competitors	None	Several Large Companies
Rivalry Determinants		
Customer Industries	Fragmented, Weak	Strong Bargaining Power
Customer Switching Costs	High	Minimal
Diseconomies of Scale	None	Substantial Penalty

10.1 Interview Protocols

10.1.1 Interview Protocol 1 with **Huntonit AS**, conducted the 17.02.2017

Participants: Roy Kenneth Grundetjern, Managing Director
Philipp Braun, Student BI
Sigurd Ytterstad, Student BI

General Information

Question 1:

- Tell us about your position, and your responsibilities within the company.

Answer 1:

- Two jobs, responsible as the operating director of Huntonit, but also for head of IT in Byggma ASA.

Question 2:

- What are the rationales being integrated in Byggma AS?

Answer 2:

- Byggma is on the Norwegian stock exchange, and the owner of Huntonit. Byggma is also the owner of several other countries in the industry, which serves different aspects of the production and in size.

Question 3:

- Why is Huntonit part of NPPA, when that is not the case for the remaining companies in Byggma?

Answer 3:

- All companies are responsible for their own businesses and operations, so some of the companies are in some kind of clusters, and others aren't. For Huntonit, the production process is the same as in producing paper, but at the end-product is fiberboards for interior instead of paper.

Question 4:

- What are your main target markets?

Answer 4:

- Norwegian market = 75%. Sweden = 20%. Remaining 5 % goes to Denmark, Finland, Netherlands and the Baltic countries.

Question 5:

- Which customer segment do you serve?

Answer 5:

- It depends on the market, in Norway for instance, they make use of distributors and warehouses represented by large chains like Maxbo, Optimera and Byggmakker. The chains distribute the main products, so they receive the invoices, and sell it to the end-consumer. In Sweden, it is a different story where they make use of big distribution centres (2-3 in Huntonit).

Competition

Question 6:

- Who do you consider your main competitors?

Answer 6:

- Strong competitors from Poland and Germany, but also Norwegian companies like Moelven, and Södra and SIA from Sweden. When it comes down to board production, you have about five production companies in Norway. The rest is located outside of Norway.

Question 7:

- How are you able to stay competitive? Competitive advantage?

Answer 7:

- Special strategy where they aim for not offshoring any production outside Norway, heavily investing in the Nordic market. As a result of the industrial revolution, where you have operating in a technology driven industry, the total cost of producing fiberboards are about the same in Norway compared to Poland. The number of employees are going down, since physical robotic solutions are taking over to increase productivity.
- Also the special type of fiberboard is a competitive advantage in the sense that they are the only company in Northern Europe to use the way of producing as they do (wet process instead of dry, more environmental friendly productions). Lignin is used instead of glue - no emission. Only fiberboard company which is approved by Norsk Astma og Allergiforbund. This is heavily communicated by our distributors to the customers, so that our green products are really important.

Question 8:

- Are there any specific location or cluster advantages of Norwegian firms?

Answer 8:

- We have seen that the local cluster is more important for us, the Eide-cluster is based in Vest-Agder and Aust-Agder and they are working closely with companies such as Fibo and Nordic Door, and other big production companies located in the Southern parts of Norway. On the other hand, it was used in a larger extent earlier. The distance between the companies is a problem, and locally you have a lot more focus on your own processes. Today we meet occasionally to discuss different matters orally, but not more than that.

Strategy

Question 9:

- Do you invest a lot in R&D? Main reasons?

Answer 9:

- If you are going to be competitive in this market, you have to invest a lot in R&D. Main reason why their position is so strong domestically.

Question 10:

- Has your product portfolio changed or shifted since the company was founded in 1950?

Answer 10:

- In the beginning it was just wimple fiberboards. Now it is actually painted and finished fiberboards, so you can just install it directly on the wall.

Question 11:

- How about your target group?

Answer 11:

- It remained the same market.

Decline

Question 12:

- Do you consider the woodworking/ wood processing industry to be in a decline phase? Or parts of it?

Answer 12:

- No, it is more or less stable and have been that for the last 4 or 5 years. Due to the financial crisis, it almost stopped. What we had to invest in automation and get rid of people, as production went down and had to compete on price to a larger extent. So for 5 years we had to change the strategy, but they are now competitive. European companies realized that Norway was still a good market to invest in during the financial crisis, and

since Norwegian consumers had a high willingness to pay for products. They partly succeeded as they are still present in the market, but they did not think that a Norwegian company operating in the Norwegian market could be that competitive.

Question 13:

- Has there been any disruptive technology from within or outside the industry that changed the landscape?

Answer 13:

- Not for Huntonit, but in July last year, we sold the company Fibo AS, and they are kind of disruptive, as they have revolutionized the tiles industry, with the introduction of fiberboards in the wetrooms. Easy boards which are easy to install.

Question 14:

- Broad product portfolio or specialization on core products?

Answer 14:

- We have specialized in painted fiberboards, for ceilings and for walls. Not any products for floors. We change our decorations constantly.

Question 15:

- What resources and capabilities within the company do you feel are the most important?

Answer 15:

- Really big department of highly skilled engineers, and they constantly working on new solutions.

Question 16:

- Have prices changed? Both for the raw material you are charged for and the prices you charge your consumers? Why?

Answer 16:

- Every you negotiate the prices for the raw material, but in our local area, we are buying 85% of all wood in the Southern part of Norway.

Question 17:

- Do you use low costs when competing?

Answer 17:

- The price on our products are much higher than our competitors, but by being approved from Norges Astma og Allergiforbund we are able to sell

it at a higher price. On the other hand, we are also offering quality products. We are the Mercedes, and our competitors the Kia.

Future Prospect

Question 18:

- Please give us a realistic view about revenue/ profitability development in the future.

Answer 18:

- Heavily investing in new solutions, and just two days ago we agreed upon a 65m deal to invest in a new part of the factory. Improved machinery and product development are our main focus for the future.

Question 19:

- What are the spendings on research and development/ Degree of Governmental or European funding?

Answer 19:

- A lot of opportunities for Norwegian companies to benefit from, for example help from engineers with expertise on the field, but also funding on different projects and are usually 40% of the total cost of a project. This is more connected to innovation products.
- Not concerned about disruptive innovation in this industry, but in the wood production I am expecting a lot of new companies developing new solutions from using wood as raw material. The main reason is because everything you can make from oil, you can also make from wood, only that using wood is a more sustainable way. It all comes down to available technology and the knowledge on solutions when using wood.

10.1.2 Interview Protocol 2 with **MMK FollaCell AS**, conducted the 21.02.2017

Participants: Odd Morten Aalberg, Managing Director
Philipp Braun, Student BI
Sigurd Ytterstad, Student BI

General Information

Question 1:

- Tell us about your position, and your responsibilities within the company.

Answer 1:

- Managing Director, responsible for administration of the site and operational activities in the mill. The company itself produces chemical pulp and is a part of the MM Karton group, one of the largest board producers in the world. 55% of our produced goods we forward to the group and sell the rest in the open board market. We sell these unfinished products to board or paper producers. It is a raw material for their production

Competition

Question 2:

- Who do you consider your main competitors? Mostly local, maybe Scandinavian, competitors or competition from other parts of the world?

Answer 2:

- Canadian competitors are the biggest ones, NZL, Sweden as well. There are no Norwegian competitors. We are the only mill of its kind in Norway
- Canada to Asia is an equal distance as Norway to Asia. In US, the domestic demand is low, so they need to export a greater share, higher transportation cost are a greater issue for them.

Question 3:

- How are you able to stay competitive? Competitive advantage?

Answer 3:

- We are the a very effective mill and benefit from cheap electricity, which is our main advantage, Norwegian electricity is among the cheapest in world.
- Electricity is one of our main costs, in addition wood is also relatively cheap compared to other European markets.

Question 4:

- Are there any specific location or cluster advantages of Norwegian firms?

Answer 4:

- No direct cluster advantage, only the electricity, supply of woods are advantageous.
- One more advantage might be the fact that there is a third generation of workers employed in the mill, it is an old company, we have educated people, growing up with the factory, their experience is a great advantage.

Strategy

Question 5:

- Have you implemented any strategic changes the last couple of years?

Answer 5:

- This mill was closed down by the old owner in 2012. We overtook it in 2013.
- Our first task was to increase capacity with 25% without investments, it was possible. High volume and therefore fixed costs per ton reduced, was our strategy.
- Right now working to increase capacity more, but investments needed, plans for this are going on.
- 140k tons capacity at the moment as a maximum, the mill is active 355 days per year, the rest needed for maintenance and projects.
- The current target is 180k tons, we will start to work on that in 2018.
- The market demand is always there, US had to cut down because of weak dollar in 2015.
- Also seen that you have managed to turn the financials positive during the last 5 years. What strategic moves have been conducted in order to achieve this?

Question 6:

- Do you invest a lot in R&D? Main reasons?

Answer 6:

- Not a lot so far, starting right now together with PFI in Trondheim, project over 3 years. first 1.5 y research in PFI.

Question 7:

- Has your product portfolio changed or shifted since the company was founded in 1950?

Answer 7:

- Planning on diversifying in another quite different market, extra feet to stand on but we can't reveal too much.
- All in all it hasn't changed too much but the quality improved a lot.

Question 8:

- How about your target group?

Answer 8:

- Stayed the same.

Decline

Question 9:

- Do you consider the woodworking/ wood processing industry to be in a decline phase? Or parts of it?

Answer 9:

- Not this sub-industry. Board not comparable with paper, not decreasing at all, everything needs to be packed in board, save industry, yearly demand increased with around 3% per year.
- The paper industry is declining though.

Question 10:

- Have you suffered from any sort of decline since 1950?

Answer 10:

- No

Question 11:

- How did the competitive landscape change (did many competitors leave the industry)?

Answer 11:

- No, there were no competitors in the Norwegian industry directly.
- With Norske Skog, for example, there is competition only in raw material purchasing.

Question 12:

- Any disruptive technology from within or outside the industry that changed the landscape?

Answer 12:

- No, not so far, but in future the use of different types of chemicals will influence the landscape a lot, prepare fibers will be produced in different ways compared to now.
- We have projects going on to cope with these type of change.
- As a part of the Treforedlingens bransjeforening we can stay in contact with other companies who use at least the same raw material and exchange information about progress.

Question 13:

- Broad product portfolio or specialization on core products?

Answer 13:

- Average industry portfolio, rather small compared to other industries.

Question 14:

- What resources and capabilities within the company do you feel are the most important?

Answer 14:

- Most important is the internal market, which is our biggest customers.
- The big platform (the company) allows us to make use of economies of scale, treasury deals, financial aspect, stay more efficient.

Question 15:

- Have prices change? Both for the raw material you are charged for and the prices you charge your consumers? Why?

Answer 15:

- There are quite stable prices in Europe, in China, though, everything is sold in dollars, affected by currency fluctuation. All in all the biggest struggle is the currency, NOK is quite volatile because it's so small.

Future Prospect

Question 16:

- Realistic views about revenue/ profitability development in the future, regarding your company? For the Norwegian industry as a whole?

Answer 16:

- For the industry, revenues of 5-9% are desirable, right now, goal is to keep it stable or increase slightly, for our company as well as the cardboard industry as a whole.
- Our revenues were 5.5% revenues the last year, 7% the year before that and next year around 8% expected.

Question 17:

- Any restructuring/ disruptive change of the industry expected?

Answer 17:

- No.

Question 18:

- Spendings on research and development in the future? Degree of Governmental or European funding?

Answer 18:

- Spendings mainly on the project through next 3 years.
- Public funding around 40% from government.

10.1.3 Interview Protocol 3 with **Hellefoss Paper AS**, conducted the 01.03.2017

Participants: Arnfinn Kroken, Director Purchase
Jarle Borgersen, Director HR
Philipp Braun, Student BI
Sigurd Ytterstad, Student BI

General Information

Question 1:

- Tell us about your position, and your responsibilities within the company.

Answer 1:

- Few employees in administration, Logistics, Product Engineers, HR, Purchase.
- The sales manager operates from London.

Competition

Question 2:

- Who do you consider your main competitors? Mostly local, maybe Scandinavian, competitors or competition from other parts of the world?

Answer 2:

- We have 10% market share in Europe but there are very few competitors, only three in Europe and we are the only company operating in Norway.
- One Finnish and one Swedish competitor, both much bigger than us.

Question 3:

- How are you able to stay competitive? Competitive advantage?

Answer 3:

- We are highly flexible and can react quickly on customer orders, sometimes within one week, while larger competitors need 6 or more weeks.
- If spontaneous demand requires paper, we are preferred.
- Spain is a big market for us and we use the Spanish trucks that bring fruits to Norway to ship paper back.

Question 4:

- Are there any specific location or cluster advantages of Norwegian firms?

Answer 4:

- The low price for electricity is the main advantage. However, we are in no good negotiation position with the energy provider. The fluctuation of the energy price might affect our business a lot.

Strategy

Question 5:

- Have you implemented any strategic changes the last couple of years or do you plan to change your strategy in the near future?

Answer 5:

- Since 1972, we focused solely on book paper instead of newspaper.
- The company went bankrupt in 2013 because money to run the mill was missing. We were not able to pay back the energy providers, around 30 million NOK. The company was closed for 6 weeks. The former employees were loyally waiting for the company to run again and also most of the customers remained, except for German ones. A local private firm then bought the land including the machines and started the business again.
- For the future, Turkey is a very interesting and promising market. Only the political situation is hindering. We also want to get back into the German market, the distance is much more favourable than to Turkey for example.

Question 6:

- Do you invest a lot in R&D? Main reasons?

Answer 6:

- Not in particular, we have some engineers who try to improve the efficiency of the machinery.

Question 7:

- Has your product portfolio changed or shifted since the company was founded?

Answer 7:

- We began producing pulp before switching to paper in 1917. It was then mainly used for newspaper.
- In 1953 a water powered plant produced the energy to improve the paper production efficiency.
- In 1972, we invested in another plant to bleach the paper enough to sell it as book paper, which we are producing now.

Question 8:

- How about your target group?

Answer 8:

- According to the change in our products, we sell B2B only. Our customers are mainly publishing companies. All customers are outside Norway, no paper is printed within Norway.

Decline

Question 9:

- Do you consider the woodworking/ wood processing industry to be in a decline phase? Or parts of it?

Answer 9:

- The digitalization surely comes with challenges. The book market though, is not in a serious decline. People still read books. The decline refers stronger to the newspaper and magazine industry.

Question 10:

- Have you suffered from any sort of decline?

Answer 10:

- Just slightly.

Question 11:

- How did the competitive landscape change (did many competitors leave the industry)?

Answer 11:

- No competitors recently.

Question 12:

- Any disruptive technology from within or outside the industry that changed the landscape?

Answer 12

- The digitalization and the change in consumer demand.

Question 13:

- Broad product portfolio or specialization on core products?

Answer 13:

- It is the product paper but we offer many different bleaching variants of it for different customer preferences and different use.
- We offer different widths, brightnesses, thicknesses.

Question 14:

- What resources and capabilities within the company do you feel are the most important?

Answer 14:

- The low timber cost are the most important advantage, we are so close to the forest that transportation costs are that low.
- Besides that, electricity is a major advantage.

Question 15:

- Have prices change? Both for the raw material you are charged for and the prices you charge your consumers? Why?

Answer 15:

- The prices for the paper have almost remained the same since 1990 even though the price for the timber is increasing.
- This is why we have to increase our efficiency to remain profitable.

Future Prospect

Question 16:

- Realistic views about revenue/ profitability development in the future, regarding your company? For the Norwegian industry as a whole?

Answer 16:

- We plan to use more robotics and automatize the processes to gain efficiency. Robotics haven't been regarded much until now but we are aware of their importance.

Question 17:

- Any restructuring/ disruptive change of the industry expected?

Answser 17:

- Not predictable, it depends a lot on the consumer's' preferences.

Question 18:

- Spendings on research and development in the future? Degree of Governmental or European funding?

Answer 18:

- The government does not support our company. Innovation Norway does not fund anything in pulp and paper. Borregaard might be an exception caused by their high degree of innovation.

10.1.4 Interview Protocol 4 with **Rygene-Smith & Thommesen AS**, conducted the 09.03.2017

Participants: Kristen Hagestad, Operating Manager,
Philipp Braun, Student BI
Sigurd Ytterstad, Student BI

General Information

Question 1:

- Tell us about your position, and your responsibilities within the company.

Answer 1:

- We are employing 20 people at the moment but the production can be managed by 2 people per shift.

Question 2:

- What are your main target markets?

Answer 2:

- Europe is our general target. Germany is our main target country, besides that, Portugal, Italy, Spain and France are target markets. We have one sales office in Frankfurt, Germany.

Question 3:

- Which customer segment do you serve?

Answer 3:

- Companies that require CTMP pulp for their production of board. We moved from TMP to CTMP production.

Competition

Question 4:

- Who do you consider your main competitors?

Answer 4:

- FollaCell, Vafos in Norway and some other Finnish, Swedish, Spanish and Croatian companies.

Question 5:

- How are you able to stay competitive? Competitive advantage?

Answer 5:

- We currently do not run at full capacity. But our advantage is that we do not require more than 2 people to run a shift. Automatization and robotics helped us improve productivity around 2006 and 2007 and save costs.
- We further rely on the proximity to the resources, namely the woods as well as low energy costs.

- Wood and energy combined constitute of 70% of all costs.

Question 6:

- Are there any specific location or cluster advantages of Norwegian firms?
    - Why is Rygene-Smith part of NPPA?

Answer 6:

- Not directly. We only get a broader overview about what happens in the industry, but we don't share R&D insights or spendings.

Strategy

Question 7:

- Do you invest a lot in R&D? Main reasons?

Answer 7:

- Yes, we try to improve our processes on a daily basis.
- Yearly, we spend around 2-3 million NOK on R&D.

Question 8:

- Has your product portfolio changed or shifted since the company was founded in 1883?

Answer 8:

- We previously served many companies producing newspaper and magazines.
- The mechanical pulp we produced is now mainly during the recycling processes of the creation of board, which mainly consists of recycled materials.
- An increasing amount of products nowadays is packaged and shipped, so the demand for board increases.

Question 9:

- How about your target group?

Answer 9:

- Around 2000, the demand declined and we stopped serving these customers.

Decline

Question 10:

- Do you consider the woodworking/ wood processing industry to be in a decline phase? Or parts of it?

Answer 10:

- The graphic paper industry is in an obvious decline. Tissues and board are growing, though.
- Regarding the pulp production and our competitors, there is a high supply, that's why we do not run on full capacity.

Question 11:

- Has there been any disruptive technology from within or outside the industry that changed the landscape?

Answer 11:

- The portables have erased the demand for newspapers and graphic magazines but regarding the production processes and the product, there has been no disruptive change.

Question 12:

- Broad product portfolio or specialization on core products?

Answer 12:

- Narrow, mechanical pulp only, which is 95% of wood.

Question 13:

- What resources and capabilities within the company do you feel are the most important?

Answer 13:

- Energy costs but also transportation and labor costs.

Question 14:

- Have prices changed? Both for the raw material you are charged for and the prices you charge your consumers? Why?

Answer 14:

- The prices we pay haven't changed much, have been stable for the last five years. The currency fluctuations impacts our business as well, we rely on a weak NOK.

Question 15:

- Do you use low costs when competing?

Answer 15:

- Sometimes yes. But then the margin is extremely low. Especially as a raw material supplier, the customer squeezes the margins.

Future Prospect

Question 16:

- Please give us a realistic view about revenue/ profitability development in the future.

Answer 16:

- For the future we might focus additionally, besides the board market, on the tissue and hygiene market.
- The market size will certainly increase.

Question 17:

- What are the spendings on research and development/ Degree of Governmental or European funding?

Answer 17:

- Innovation Norway is providing us with support. For example when we changed to CTMT, IN supported us. The Norwegian Paper Institute further consults us from time to time about product development.

10.1.5 Interview Protocol 5 with **Norske Skogindustrier AS**, conducted the 13.03.2017

Participants: Sven Ombudstvedt, CEO
Philipp Braun, Student BI
Sigurd Ytterstad, Student BI

General Information

Question 1:

- Tell us about your position, and your responsibilities within the company.

Answer 1:

- I am the CEO, controlling the board, preparing strategies, annual reports, quarterly reports due to our stock exchange listing. I am further responsible for the corporate governance.
- I travel a lot and work all over the world. A lot in Malaysia, France and Australia.

Question 2:

- What are your main target markets?

Answer 2:

- Europe, Asia, US and Australia.

Question 3:

- Which customer segment do you serve?

Answer 3:

- We serve publishers in European, Asian, US and Australian. Half of our customers are traditional publishers but also commercial and newspaper producers as well as advertisers.
- We further serve book publishers, book paper can be produced on newsprint machines. The book industry recovers a lot.

Competition

Question 4:

- Who do you consider your main competitors?

Answer 4:

- In Europe we are the strongest player.
- Lots of smaller competitors have divested already, large players often try to run on lower capacities, like us.

Question 5:

- How are you able to stay competitive? Competitive advantage?

Answer 5:

- We focus a lot on cost cutting and plan to diversify our portfolio owing to the declining nature of the graphic paper industry, our core business.
- We try to gain scale efficiencies and need to stay cost efficient and employ the right people.

Question 6:

- Are there any specific location or cluster advantages of Norwegian firms?

Answer 6:

- There are location bound disadvantages for Norway. The transportation is costly since we use a lot of overseas shipping. Additionally, trucks in Norway are not allowed to load as much as in neighbouring countries and the rest of Europe, which results in additional costs.
- There are no specific advantages. The availability of fiber used to be one but this changed since the costs in Norway around maintenance and labor raised.

Strategy

Question 7:

- Do you invest a lot in R&D? Main reasons?

Answer 7:

- Yes, we do, we want to diversify our product portfolio alot and by 2020 we want to have 25% of the revenues to gain from products that do not exist yet.
- Firstly, this is about bioenergy, pallets and tissues. The tissue markets are very local owing to the bulkiness of the products.
- However, we cannot produce board, the machines we have now would be too costly to adapt since board requires smaller ones. The market is also saturated.
- R&D takes place in the facilities all over the world, an employee of our HQ coordinates this. For example, for biogas, the facilities need to be very large, so only 3 of our facilities can research in this area.

Question 8:

- Has your product portfolio changed or shifted since the company was founded?

Answer 8:

- See pdfs.

Question 9:

- How about your target group?

Answer 9:

- See pdfs.

Decline

Question 10:

- Do you consider the woodworking/ wood processing industry to be in a decline phase? Or parts of it?

Answer 10:

- The graphic paper segment is in decline, the rest is not. In Norway, there are three graphic paper segments: Newsprint, Magazines and fine paper, which is for example copy paper.
- The decline started with 2008, the financial crises. In Asia it is about to start now and will probably be in decline in three years. This is the cyclical decline.
- Another cause for the decline is the digitalization as substitutes, the structural decline.
- Most important is that advertising has moved from print to digital media. It is surprising that the TV advertising has not been impacted yet. In the

US, around 78% of the revenue of publishers comes from advertising, in Europe it is around 50% compared to the sales earnings.

Question 11:

- Has there been any disruptive technology from within or outside the industry that changed the landscape?

Answer 11:

- The electronic portables have disrupted the industry significantly.

Question 12:

- Broad product portfolio or specialization on core products?

Answer 12:

- We serve broad segments but operate in a narrow part of the value chain. The goal is to diversify and broaden it.

Question 13:

- What resources and capabilities within the company do you feel are the most important?

Answer 13:

- Management and labor are the most important resources.
- About our costs, 25% are energy costs, 25% is fiber, labor, transportation contribute to the rest.

Question 14:

- Have prices changed? Both for the raw material you are charged for and the prices you charge your consumers? Why?

Answer 14:

- Raw material costs have recently increased, especially in Norway. Mainly salaries and maintenance. Also energy costs and wood costs have increased.
- The margin has been squeezed a lot.

Question 15:

- Do you use low costs when competing?

Answer 15:

- Yes, we try to keep prices low to increase competitiveness.

Future Prospect

Question 16:

- Please give us a realistic view about revenue/ profitability development in the future.

Answer 16:

- We want to be the one harvesting the cash flow in this declining industry. Our mills will be kept competitive with around 80% capacity and stay profitable as long as possible.
- We try to survive the negative numbers, which are mainly accounting issues. We further increase the leverage to sustain the declining industry.
- An advantage of a declining industry is that no competition enters the market and invests. The transparency is high and a certain demand to satisfy still exists.

Question 17:

- What are the spendings on research and development/ Degree of Governmental or European funding?

Answer 17:

- Not really, the government does not support our industry. We do not have guaranteed returns.
- Environmental restrictions are much higher than in neighbouring markets. The government does not plan to adapt.
- Only regarding the energy, the government supports.

10.1.6 Interview Protocol 6 with **Borregaard**, conducted the 15.03.2017

Participants: Dag Arthur Aasbø, SVP Organisation and Public Affairs
Philipp Braun, Student BI
Sigurd Ytterstad, Student BI

General Information

Question 1:

- Tell us about your position, and your responsibilities within the company.

Answer 1:

- SVP and member of management team.

Question 2:

- What are your main target markets?

Answer 2:

- Around 95% of our products are exported. The most important region is Europe with Germany as the most important country.

- Around 26% goes to each Asia and America. We have plants in the US, that is where most products for the US are produced. In Asia we do not have plants but use overseas shipment.
- We do not supply to the Scandinavian market.

Question 3:

- Which customer segment do you serve?

Answer 3:

- We produce different products to many markets and for many occasions.

Competition

Question 4:

- Who do you consider your main competitors?

Answer 4:

- There are no competitors in Norway, we are a niche player so don't face much competition. Especially in the cellulose there are five players competing in the entire market. In lignin industry, we are by far the biggest company in the world, around 60% of the entire value.
- Performance

Question 5:

- How are you able to stay competitive? Competitive advantage? When began to diversify that much?

Answer 5:

- It's the combination of our knowledge. We have three core competences, R&D, Marketing and Production and we have a competitive advantage in all three. We have, in terms of production, the largest product portfolio. In terms of sales and marketing, we have deep insights worldwide, many other players sell through agents and don't get the insights. We have 18 sales employees who consult about the products in detail and about the market development.

Question 6:

- Are there any specific location or cluster advantages of Norwegian firms?
    - Why is Borregaard part of NPPA?

Answer 6:

- In the beginning, more than 100 years ago, we had the advantage of access to energy, raw material and cheap labor. Today, labor is expensive but still

skilled, so it is okay. Energy costs are about average and wood costs are above average.

- Because we are a niche player and too different, we do not benefit too much from NPPA and clusters. However, some knowledge about machinery and the industry can be beneficial. The only thing we have in common with other members is the raw material. Our common interest is increasing the efficiency of wood supply. We are still concerned that the industry and the interest in Norway is shrinking.

Strategy

Question 7:

- Do you invest a lot in R&D? Main reasons? Degree of Governmental or European funding?

Answer 7:

- We spend 5% of our revenues in R&D, so yes. Competitors have a spending of around 1-2%, typical for commodity businesses. We rather belong to the chemical industry, it is more typical to have around 3-5% spendings.

Question 8:

- Has your product portfolio changed or shifted since the company was founded?

Answer 8:

- We have changed gradually over decades. Firstly, we produced pulp and paper. During the 1920's we focused more on textile industries, in the 40s, bioethanol was a new product. In the early 1990's we reorganized the company to much more market oriented business areas from a production oriented organization. We have many organization for the lignin business and acquired competitors to increase economy of scale to have enough money to invest in R&D. We also have a specialized sales force to distribute lignin and cellulose products.
- We also market our vanillin as a green and sustainable product, so we can charge a premium for that.

Question 9:

- How about your target group?

Answer 9:

- According to answer 8.

Decline

Question 10:

- Do you consider the woodworking/ wood processing industry to be in a decline phase? Or parts of it?

Answer 10:

- We strongly observe megatrends. One is population growth, so more of our products are needed. Another one is a growing middle class with a higher standard of living, so more spendings on clothes, cars etc. Another megatrend is globalisation, bigger cities and infrastructures are built. Finally, more efficient farming can be observed as well as a demand for more environmental friendly products. So, the graphic paper industry is indeed in a decline phase but this doesn't affect us since the megatrends are in our favor.

Question 11:

- Has there been any disruptive technology from within or outside the industry that changed the landscape?

Answer 11:

- Automatization and digitization are both interesting to look at here. We started early with robotics and still improving it. Many other companies burn lignin, a side product, to gain energy but we use it and modify it.
- We are also developing a technique to break down fiber into sugar, which can be used for many different further uses.

Question 12:

- Broad product portfolio or specialization on core products?

Answer 12:

- We have numerous products aiming at many different customer segments.
- Our main area is performance chemicals, which are lignin based products. We aim for a variety of application, the largest one is construction. We supply the cement industry, bricks. We further supply the agricultural markets, also feed additives, pesticides, soil conditioner. In addition, our products include industrial binders or acid batteries, the oil industry, mining industry and textile industry.
- We further produce specialty cellulose, which is highly modified cellulose, we don't use it for pulp or paper but for, for example the constructing and

building industry. It is further used as food additives, detergents, cosmetics.

- We further produce second generation or advanced bioethanol.
- Lastly, we have a vanillin segment as a substitute for vanilla. We are the only producer of wood based vanillin.
- Currently, we are about to launch further modified cellulose, called micro fibril cellulose.
- 50% of our revenues comes from the lignin sector. The cellulose business is the second largest is much more volatile compared to lignin, earnings are varying a lot. Vanillin and bioethanol are much smaller.

Question 13:

- What resources and capabilities within the company do you feel are the most important?

Answer 13:

- The knowledge and the market insights we have on a global scale.

Question 14:

- Have prices changed? Both for the raw material you are charged for and the prices you charge your consumers? Why?

Answer 14:

- Prices remained fairly stable.

Question 15:

- Do you use low costs when competing?

Answer 15:

- This is more important for commodity industries, for example in the graphic paper industry, the company with the lowest prices normally wins, which is based on access to the cheapest raw material. We operate in niches and highlight the benefits and advantages of our products rather than using low-price strategies.

Future Prospect

Question 16:

- Please give us a realistic view about revenue/ profitability development in the future.

Answer 16:

- We will grow in three pillars, firstly specializing our portfolio even more and inventing more advanced and specialized products to increase our

margin. Secondly, we will increase capacity, especially in lignin. We are about to build a new factory in US together with a local pure lignin player. Within a five years horizon, we will increase the lignin capacity by 40%. We do research on producing lignin without cellulose, so that it is not a side product anymore and we become more flexible. Thirdly, we plan on developing further new products and processes to address new markets.

- We further get an R&D support for investing in a new business area, around 250 million Euros. In Norway it is important to have a industry based on knowledge, competence and advance, more than on commodities.

10.1.7 Interview Protocol 7 with **Vafos Pulp AS**, conducted the 16.03.2017

Participants: Helge Myren, Sales Manager
Philipp Braun, Student BI
Sigurd Ytterstad, Student BI

General Information

Question 1:

- Tell us about your position, and your responsibilities within the company.

Answer 1:

- Sales Manager, since we are a small organization and have many overlaps, I am also included in production planning and logistics in terms of transportation. I am located in my own home at Nesoddtangen. In the 70s, Vafos had their own sales office in Oslo, and later Hellefoss was also brought into the Vafos family. Vafos brought their sales office back to Hokksund, I and did not want to go to Kragerø, resulting in me having a home office since 2008. Since Vafos only is responsible for production, I manage to perform all customer interaction from home.

Question 2:

- What are your main target markets?

Answer 2:

- In the 70s there were around 20 paper mills in Norway, high demand for newspaper from the U.S., further they started producing secondary fiber, demand went down and in the 90s. As a result Vafos switched from

making newsprint to board production and today board is a dominating application for our pulp. Main market in Germany as primary market, but 95% exported to Europe as a whole. Minor part in Scandinavia.

Question 3:

- Which customer segment do you serve?

Answer 3:

- Board mills mainly in Europe. Main customer is German.

Competition

Question 4:

- Who do you consider your main competitors?

Answer 4:

- Some competitors from Norway, lot in the past represented by Rygene and others. One competitor in Croatia, Spain, Sweden, but also from the production of CTMP where FollaCell is represented. Our way of producing is not well known in the east as they do most focus on buying CTMP, and do not have the product knowledge on what we are offering.

Question 5:

- How are you able to stay competitive? Competitive advantage? When began to diversify that much?

Answer 5:

- Stone groundwood pulp can be considered a competitive advantage. But first of all it is a cheap product to produce, as we are utilizing the timber more than our competitors. A second aspect is that we do not add any chemicals in our products which lower the price. It is an ideal product for board. Easy access to wood and good electricity prices.

Question 6:

- Are there any specific location or cluster advantages of Norwegian firms?
    - Why is Vafos part of NPPA?

Answer 6:

- No, do not see any obvious advantages. Stable suppliers, stable country, but that is also the case for Sweden and Spain. Most of our customer buy products within a certain quality range, and then price is most important.

Strategy

Question 7:

- Do you invest a lot in R&D? Main reasons? Degree of Governmental or European funding?

Answer 7:

- Yes, we have invested and the quality have been improved. Most investment have been aimed to reduce costs, so production equipment has been crucial. Further, we aim to reduce the peoples operating at every shift, and at the moment 3 or 4 people are responsible.
- The government makes it possible to give some support on the environmental side, and stricter regulations. Always nice to get some support when making investments. The government from my point of view have a too strict policy and too many regulations that is unfavourable for us.

Question 8:

- Has your product portfolio changed or shifted since the company was founded?

Answer 8:

- From newsprint to board in the middle of the 80s.

Question 9:

- How about your target group?

Answer 9:

- It changed accordingly.

Decline

Question 10:

- Do you consider the woodworking/ wood processing industry to be in a decline phase? Or parts of it?

Answer 10:

- Newsprint is for sure going down, but there are still demand for graphic papers. But we can not produce due to specification in our production, including bleaching after ISO80. We can only reach until 70. The actual board industry is more or less stable and actually increasing. We lost our main customer to FollaCell which really affected our operations (50% of production). We stopped the production and went bankrupt in 2013. Got new owners and increased production up to 4 shifts. Demand is currently good and the currency is in our favour, as the NOK has been down and electricity prices have been stable.

Question 11:

- Has there been any disruptive technology from within or outside the industry that changed the landscape?

Answer 11:

- We had TMP pulp produced from wood chips, but we are using timber lopes being squeezed down in the rotating grounding stone (old fashion way of doing it). TMP is from chips or CTMP is a development of our products. On the other hand, it is also more expensive to produce - brings more quality to the customer. Our customers are stable and satisfied with the quality, and we are actually able to attract new customers (Germany). Attracted by the combination of price and quality.

Question 12:

- Broad product portfolio or specialization on core products?

Answer 12:

- Very narrow.

Question 13:

- What resources and capabilities within the company do you feel are the most important?

Answer 13:

- The frame conditions that we are operating in are the most important - energy and wood. Small organization and short lines. For our paper mill, flexibility is crucial and for sure an advantage but most of our competitors can do the same.

Question 14:

- Have prices changed? Both for the raw material you are charged for and the prices you charge your consumers? Why?

Answer 14:

- Prices remained the same.

Question 15:

- Do you use low costs when competing?

Answer 15:

- When we went bankrupted a combination of currency and electricity lead to the bankruptcy were the main reason. Further, the fact that we lost our main customer to Folla was also crucial. Last two years have been really good.

Future Prospect

Question 16:

- Please give us a realistic view about revenue/ profitability development in the future.

Answer 16:

- Half a year ago, I would be very uncertain, but just now I am more optimistic. Found a new market in Turkey, prices are low, gives us some margin, looks promising. Difficult to say how long this will last. For the industry as a whole is difficult to predict as the industry is relatively small and not many producers left.

10.1.8 Interview Protocol 8 with **Norske Skogindustrier AS**, conducted the 20.03.2017

Participants: Carsten Dybevig, VP of Communication, Chairman of NPPA

Philipp Braun, Student BI

Sigurd Ytterstad, Student BI

General Information

Question 1:

- Tell us about your position, and your responsibilities within the company.

Answer 1:

- Political Communication, externally and internally at Norske Skog, the biggest Pulp and Paper Company in Norway
- Chairman of the Board of the Pulp and Paper Association, discussing the political agenda in Norway and impact the ramification for the industry.

Question 2:

- What are your main target markets?

Answer 2:

- We deliver to 85 countries, mainly Europe, North America and Australasia. We also sell to India and South-East Asia, some dispersed countries in Africa and South America.

Question 3:

- Which customer segment do you serve?

Answer 3:

- We serve mainly publishing houses.

Competition

Question 4:

- Who do you consider your main competitors?

Answer 4:

- Today, there are around 900 mills, in some years, it might be only half of it.

Question 5:

- How are you able to stay competitive? Competitive advantage? When began to diversify?

Answer 5:

- The quality and efficiency of our mills and the fact that our two mills in Norway are C02 neutral, so the goal for 2050 to be C02 neutral, is already reached. Most competitors use coal as an energy source and might never be C02 neutral.
- Our technology is superior but this is an advantage that doesn't last for long, competitors will catch up.
- We use thermos-mechanical pulp, which is cheaper than ordinary pulp. We reduced the percentage of more expensive pulp from 20% to 5% during the last 25 years, the challenge was to increase the strength of TMP. TMP requires only half of the timber to get the same amount as needed for pulp and also requires less energy during its production.
- Advantages we have is that we have a global competence and knowledge, we can gather knowledge from all our mills from all around the world.

Question 6:

- Are there any specific location or cluster advantages of Norwegian firms?
    - Why is Norske Skog part of NPPA?

Answer 6:

- Eastern European competitors are threatening, they do not need to follow as strict environmental rules, this is a competitive disadvantage for us.
- Even compared to Sweden and Finland, our regulations are disadvantageous. We are not allowed to use the size of the trucks they do.
- The cluster is important

Strategy

Question 7:

- Do you invest a lot in R&D? Main reasons? Degree of Governmental or European funding?

Answer 7:

- Around 2-2.5% of our revenues, the average of a competitor with comparable product mix invests around 1%.
- The governmental support differs from country to country, in Australia, the government supports us a lot, the same in France, in Norway only the Energy, ENOVA, is supported. However, ENOVA will spend most of its funding on new technologies instead of energy efficiency, which will result in a much smaller financial support for us. We know that around 80% of that money will be wasted on conducting research on products that won't work out.

Question 8:

- Has your product portfolio changed or shifted since the company was founded? Do you diversify your portfolio?

Answer 8:

- We are stuck with our machines, we need to maximize the profit as long as we can. Rebuilding the machines requires a huge investment, hurts the internal rate of return. So we had to look into that for every machine around the world.

Question 9:

- How about your target group?

Answer 9:

- Not so far.

Decline

Question 10:

- Do you consider the woodworking/ wood processing industry to be in a decline phase? Or parts of it?

Answer 10:

- Yes, since 2007. Nevertheless, many companies invested further into higher capacities and didn't absorb the fact that the market is declining. In addition, other big players, also these who have pulp and paper as a side product, haven't lowered their capacity.

- In the US, the decline started around 2002, five years before it started in Europe, Australia started three years ago with a 20% drop. Asia will start now. The decline is driven by publishing houses, who lower their distribution rates.
- The major reason for the decline in the graphic paper industry is the change in consumer patterns and the preference for electronic media. However, publishing companies gain much less money from electronic media so some publishers start focusing more on print again. Advertisement is also much more profitable for printed versions. In the US, companies switch back to paper, in my opinion, paper will become more accepted again at some point in the near future.
- The book market, on the other hand, is in no decline so far but we cannot produce books without redefining the machines, which would be too costly.

Strategy

Question 11:

- Has there been any disruptive technology from within or outside the industry that changed the landscape?

Answer 11:

- The digitalization, which influenced consumer patterns.
- Robotics and automatization strongly affected the efficiency.

Question 12:

- Broad product portfolio or specialization on core products?

Answer 12:

- Rather narrow.

Question 13:

- What resources and capabilities within the company do you feel are the most important?

Answer 13:

- The global knowledge

Question 14:

- Have prices changed? Both for the raw material you are charged for and the prices you charge your consumers? Why?

Answer 14:

- Not significantly.

Question 15:

- Do you use low costs when competing?

Answer 15:

- It is a declining industry, so there is a big fight for margins. They differ a lot from country to country. It is completely driven by supply and demand.
- The quality of most players is almost similar, so cost efficiency is the key to success in our industry.

Future Prospect

Question 16:

- Please give us a realistic view about revenue/ profitability development in the future.

Answer 16:

- In 2025, around 25% of our profit will come from other products. At the same time we try to maximize the profits from our current machines as long as possible, this is also explained in the annual report.
- We will continue to rely on the FX rate, which is important for us.
- Many players already divested, we expect that many more will do so.
- We will benefit from the future EU fund's spending on our industry.
- The goal for 2050 is to double the value while ensuring zero C02 emission. Substituting plastic products, also considering the destruction of the ocean owing to the plastic was.
- We do not try to fight the electronic industry, we simply try to adapt to the new circumstances.
- In terms of biodiesel a lot of research is conducted on how to effectively produce it. So far, too much timber is needed and more energy is used to produce the product than it actually offers afterwards.

10.1.9 Interview Protocol 9 with **Vajda Papir AS**, conducted the 21.03.2017

Participants: Per Andreas Rønsberg, Managing Director
Sigurd Ytterstad, Student BI
Philipp Braun, Student BI

General Information

Question 1:

- Tell us about your position, and your responsibilities within the company.

Answer 1:

- I started here in 2015 as a Finance Manager and still support the finance and accounting departments. The company was bought by Vajda because of its proximity to important markets and the possibility to produce paper from scratch.

Question 2:

- What are your main target markets?

Answer 2:

- We produce the completely finished products, ICA is our main customer. We buy the plastic wrapping, the board and deliver complete pallets. If we are short of paper, we even buy paper or pulp from other companies, mainly Italy, Poland or Germany.
- We supply around 70% in Sweden, 10% in Denmark, 20% in Norway (Norges Gruppen).

Question 3:

- Which customer segment do you serve?

Answer 3:

- Supermarkets and retailers mainly.

Competition

Question 4:

- Who do you consider your main competitors?

Answer 4:

- Currently, we are number 2 in toilet paper in Scandinavia, Metzer and SEA are the main competitors. These customers have slightly different portfolios. In the south of Europe, the capacity is high, the prices rather low but the transportation costs make northern European countries decide not to buy from Italy.
- Our market share, especially in our main market Sweden, is almost too big. Our toilet paper is the biggest retail product in Sweden, it's bigger than Coca Cola in volume. ICA is responsible for around 50% in Sweden and we supply 50% of ICA's products. ICA further grows fast.
- During the 1970s, many companies were acquired and the number of companies shrunk significantly.
- Many companies simply convert paper and pulp to the finished products, we have the advantage of being able to also produce the paper.

Question 5:

- How are you able to stay competitive? Competitive advantage?

Answer 5:

- Customer proximity is very important, you can't buy toilet paper or tissues from China and expect economies of scale, transport is way too expensive. We are close to the markets with the highest per capita consumption after the US. Even buying everything from Slovakia or Hungary is too expensive for supermarkets
- We are the last tissue mill in Norway, which is equivalent to the only one. This provides us with special economic opportunities.
- Even though labor is expensive in Norway, the knowledge is much more advanced and was forwarded through many generations. We further have low energy costs thanks to ENOVA and the water we use is free because we own this part of the river.
- We stick to the environmental standards and fulfill all the requirements.

Question 6:

- Are there any specific location or cluster advantages of Norwegian firms?
    - Why is Vajda part of NPPA?

Answer 6:

- Location-wise, we have the advantage that we have enough space to expand, we could cut down forests around our factory and build further facilities.
- We haven't benefitted too much from it, we focused, since 2013, on a start-up approach, with a new management team and losses until next year. For example with Hellefoss, we have an arrangement that we can borrow pulp or employees from each other.
- ENOVA is an essential support.
- A good approach would be for example having a national investment bank that offers risky loans to companies in our industry. In Sweden or Finland, a lot of private capital is used.

Strategy

Question 7:

- Do you invest a lot in R&D? Main reasons? Degree of Governmental or European funding?

Answer 7:

- Not particularly in the formal R&D but rather development, we increased the capacity by 25% recently. We continuously try to improve our quality.
- Swedish or Hungarian companies receive much more funding compared to us.

Question 8:

- Has your product portfolio changed or shifted since the company was founded? Do you diversify your portfolio?

Answer 8:

- We started with the so called bible paper, which is a very type of book paper.
- After we switched to tissue paper, which has to be crimped instead of stretched like book or magazine paper.

Question 9:

- How about your target group?

Answer 9:

- According to Answer 8.

Decline

Question 10:

- Do you consider the woodworking/ wood processing industry to be in a decline phase? Or parts of it?

Answer 10:

- Parts of it but not our industry, we produce a product that has no substitutes. Substituting toilet paper is impossible. The use of toilet paper is increasing, especially in Sweden, one of our main markets, because of the immigration. We can also vary with the number of layers. Kitchen towels can be a bit easier substituted. Swedes use double the amount of Norwegians and US Americans use double the amount of Swedes. In general, tissues and packaging have the best future opportunities.
- The graphic paper industry has powerful substitutes owing to the digitalization.

Question 11:

- Has there been any disruptive technology from within or outside the industry that changed the landscape?

Answer 11:

- No.

Question 12:

- Broad product portfolio or specialization on core products?

Answer 12:

- We try to keep it as small as possible to gain the highest efficiency: kitchen paper towels, toilet paper and tissues. The partnerships with Disney and Marvel apply rather to the Eastern markets, which are served by the Hungarian headquarter.

Question 13:

- What resources and capabilities within the company do you feel are the most important?

Answer 13:

- The knowledge of the employees on the production lines even more than the management.

Question 14:

- Have prices changed? Both for the raw material you are charged for and the prices you charge your consumers? Why?

Answer 14:

- They are sometimes volatile and depend a lot on the exchange rates. Prices for ICA are linked to pulp prices and other raw materials.

Question 15:

- Do you use low costs when competing?

Answer 15:

- Yes, we focus on low prices and good quality.

Future Prospect

Question 16:

- Please give us a realistic view about revenue/ profitability development in the future.

Answer 16:

- One small goal is to enter the men's industry, to perhaps use paper towels in the garage or for similar use.
- We plan to employ new sales staff to push for a higher market share in Norway. We further want to address hotels, sport clubs etc more because of its high growth potential.

- We currently run at 100% capacity on all converting lines and it's still not enough. So we again want to upgrade the production line to increase for another 25%.
- We think about building a new factory some time, in which case we might need some financing support from the government.
- In general, the pulp and paper industry will do better but magazine and book industry will perform worse.
- Diapers are another area with enormous potential. Many pulp producers start producing pulp that can be used for diapers, since the 3rd world will develop a high demand. Our machines are not modifiable for that purpose though.

10.1.10 Interview Protocol 10 with **Hunton Fiber**, conducted the 27.03.2017

Participants: Arne Jebsen, CEO
Philipp Braun, Student BI
Sigurd Ytterstad, Student BI

General Information

Question 1:

- Tell us about your position, and your responsibilities within the company?

Answer 1:

- I have worked as the operating director/ CEO since 2009, and is responsible for the daily activities at the factory. Previously worked as marketing director from 1997-2009. During the last years I have also been the main shareholder.

Question 2:

- What are your main target markets?

Answer 2:

- We are operating in the construction market, with a focus on the Scandinavian countries like Norway, Sweden, Denmark and Finland. 90% of our products are sold to these countries.

Question 3:

- Which customer segment do you serve?

Answer 3:

- We operate with what we define as heavy building materials, which are products used by entrepreneurs, construction clients and private customers (smaller extent). In Sweden and Finland it is more common to sell directly to these, but in Norway on the other hand we usually sell through distribution chains like Maxbo and Byggmakker.
- Hunton had a 50% share in Byggma group, but sold our shares in 1999. Byggma went from a sales company to a company acquiring companies.

Competition

Question 4:

- Who do you consider your main competitors?

Answer 4:

- We have to divide this into three segments: first, you have fiberboards which are the largest area for us where we compete with 2 other competitors in Scandinavia. Second, within construction we are also providing beams where you have a range of different competitors. Third, isolation is categorized with two major competitors.

Question 5:

- How are you able to stay competitive? Competitive advantage?
    - Talked to Marit Foss who represents NPPA which is lobbying on behalf of the industry. To what extent do you think the Norwegian state government facilitate for a competitive domestic industry? What should be done?

Answer 5:

- Within our industry, it is a combination of being effective in production in terms of automatisation to avoid mistakes. Our sales force is also crucial, as it is necessary to communicate with our customers what solutions should be produced to satisfy the customer needs, as is it possible to perform adjustments. Isolation is used to complement our products to deliver complete systems to our customers. Documentation has become more important recently in recent years, and our construction clients want to make sure that everything is in order. Then it is easier for them, as we can document complete systems instead of relying on several different suppliers to provide materials and documentation. Customers are also willing to pay a premium for our products and systems. On the other hand, the construction industry can be seen as rigid and contractors are not

changing suppliers just over night. A house should stand for 60 years, and the construction clients should make sure of that. If that is not the case, it will impact the legitimacy of the construction client which again will impact us.

Question 6:

- Are there any specific location or cluster advantages of Norwegian firms?
    - Why is Hunton part of NPPA?

Answer 6:

- During the 70s and 80s it could be seen as a disadvantage, but in recent years from my point of view it has actually turned into an advantage. Customers want local material, environmental friendly material but also the increased automation and robotisation as productivity is improved and less people are needed in the process. Labour costs which previously was an achilles heel, is not that costly anymore. We can actually produce cheaper in Norway than in other countries, due to the frame conditions that are provided like exchange rates, electricity prices, access to wood (wood prices favourable since a lot of sawmills have to charge lower prices as there are less paper factories to supply). The trend has changed from a disadvantage to an advantage.
- We have now seen to a greater extent that clusters are forming and something we are part of. As businesses in the industry have shut their operations down, the remaining businesses have kind of had enough with themselves and did not want to share knowledge with competitors. This has also changed in recent years as it is better to cooperate with other domestic companies and then try to compete against the Swedish and Finnish companies instead of each other.

- We are part of NPPA because we have a person that works for our rights and regulations, since we have politicians who are making it difficult for us through different regulations. The fact that Norske Skog is also part of the same association and have been struggling recently, has been in our favour since the state government as a result have tried to helped all of us operating in that industry. Always better to be together, specially when some of the members are struggling. Norwegian state government change who's in charge rapidly, and between parties there are differences in how

focused they are in domestic industries. From my point of view it is not crucial that the state government facilitate us heavily with subsidies. What is on the other hand crucial, is that we operate under the same frames as our competitors in Finland and Sweden which I think is the case at the moment. Norwegian kroner is good, electricity is cheap, but we also pay property tax which is not favourable.

- Politicians come and go, so I am more focused towards what we as a company can do with our cards. You do not have any guarantee from state government. Even with poor regulation, you can still be competitive as you are smarter and more effective as your competitors.

Strategy

Question 7:

- Do you invest a lot in R&D? Main reasons? Degree of Governmental or European funding?

Answer 7:

- Automation has been on the agenda for the last 20 years now. We are constantly improving our production to make it more efficient and to spend time on the right customers. We also have an independent department with 3 permanent positions where we collaborate with innovation Norway. In percentage is about 2.5 % of gross profit and want to aim for 4-5%. Within the Norwegian wood processing industry, there are many players who does not earn 4-5% of gross profit so it is a requirement to be profitable when investing in R&D.

Question 8:

- Has your product portfolio changed or shifted since the company was founded?

Answer 8:

- During the last 20 years, we have now a broader portfolio to stand on more feet.

Question 9:

- How about your target group?

Answer 9:

- The target group was previously categorised by more steps between us and the end customer, where today it is now fewer steps.

Decline

Question 10:

- Do you consider the woodworking/ wood processing industry to be in a decline phase? Or parts of it?

Answer 10:

- We are growing, and is increasing our capacity. The problem has been the paper and packaging producers and their operations, and when they have collapsed it looks like the whole industry is struggling which is not the case for our point of view. The environment trend has now strengthened our position, and everybody is constantly improving their product portfolio. I hope that the decline phase is over.

Question 11:

- Has there been any disruptive technology from within or outside the industry that changed the landscape?

Answer 11:

- Internet has made it horrible for paper producers. Apart from that, robotisation and automation has improved productivity and the usage of Norwegian competence. Now you can actually run a factory with only 5 peoples running the operations.

Question 12:

- What resources and capabilities within the company do you feel are the most important?

Answer 12:

- Production and sales is our main components and support processes like logistics and economy. If we are good and effective in our production and sell our goods effectively we will deliver goods results regardless of regulations. Having the right competence is also of great importance and something that we are constantly focus to improve for our employees. We have a growth strategy and a green strategy which makes us attractive as an employer, so for the last five years people have applied heavily to work for us.
- Competences and the human resources are the most important. Everyone can set up a factory, but having the right competence to run the factory is more demanding. With the right competence it is also more likely to use the equipment right, invest in the right machinery and not make many

mistakes. You don't have a chance to compete in Norway without the right competence.

Question 13:

- Have prices changed? Both for the raw material you are charged for and the prices you charge your consumers? Why?

Answer 13:

- The prices have been volatile the last 20 years, but as it is today prices on raw material is in our favour due to what we talked about earlier. We are operating in an industry with major customers who can negotiate on price. We have gone from selling products to selling solutions and to add a premium because of that. In most cases we are more expensive than our competitors.

Future Prospect

Question 14:

- Please give us a realistic view about revenue/ profitability development in the future.

Answer 14:

- I am optimistic due to the green shift, and our products are more environmental friendly than our competitors. The end customer is now more knowledgeable and have more purchasing power, and is something that will be in our favour and attractive.
- The industry as a whole is similar to what I talked about earlier. Think we will see new growth due to the green shift, as wood processing is the greenest product you can have. Politicians is concerned about local materials and green products. In 10 years I am convinced that the industry will be larger than it is today.

10.1.11 Interview Protocol 11 with **Nordic Paper AS**, conducted the 25.04.2017

Participants: Terje Dagfinn Unneberg, Line Manager PM4
Kenneth Bostrøm, Area Sales Director
Philipp Braun, Student BI
Sigurd Ytterstad, Student BI

General Information

Question 1:

- Tell us about your position, and your responsibilities within the company.

Answer 1:

- Kenneth: Area Sales Director, responsible for Southern Europe and North- and South America
- Terje: Line Manager for PM4, I am technically responsible for the paper machine.

Question 2:

- What are your main target markets?

Answer 2:

- We are supplying to more than 50 countries worldwide. All area sales managers sell the entire product portfolio to their respective markets.

Question 3:

- Which customer segment do you serve?

Answer 3:

- We sell B2B, we sell to distributors or converters who convert it into sheets or smaller reels for example to sell it to the end customer.

Competition

Question 4:

- Who do you consider your main competitors?

Answer 4:

- Within the greaseproof paper, we are the market leader without many competitors, perhaps 3 or 4 other ones. But many other paper mills try to convert their production so that they can produce greaseproof paper. Two of our direct competitors are in Finland, two in France
- It is very costly though to convert the machines for competitors and you still need a specific know-how. Setting up a new greaseproof machine might never happen, it costs billions of NOK.

Question 5:

- How are you able to stay competitive? Competitive advantage?

Answer 5:

- We stay competitive because greaseproof paper is our expertise, we produce it for more than 100 years. We are further staying very close to the customers and their preferences, try to react to their needs.

Question 6:

- Are there any specific location or cluster advantages of Norwegian firms?

- Why is Nordic Paper part of NPPA?

Answer 6:

- We are very close to our ingredients, good quality timber.
- There are no real advantages being located in Norway compared to Sweden for example.
- Concerning NPPA, there are no advantages.

Strategy

Question 7:

- Do you invest a lot in R&D? Main reasons? Degree of Governmental or European funding?

Answer 7:

- Not really anymore. Finding new use for the products we produce is the easiest and cheapest way to improve and innovate. We depend highly on the feedback from customers and if our machines allow adjustments to the customers' needs, we do that.
- We don't receive governmental funding.

Question 8:

- Has your product portfolio changed or shifted since the company was founded?

Answer 8:

- A lot, yes. Originally we only produced greaseproof paper. Soon, we came up with new ideas for product development. Some time ago we focused mainly on east European markets that collapsed at some point, so that we had to be innovative to use our capacity.

Question 9:

- How about your target group?

Answer 9:

- It remained B2B and expanded with our extended portfolio some time ago.

Decline

Question 10:

- Do you consider the woodworking/ wood processing industry to be in a decline phase? Or parts of it?

Answer 10:

- Not our industry, we face a small growth year by year. Packaging is growing around 3-5% yearly. Compared to newsprint or magazine paper industries.
- We are in a small niche within a niche so the decline does not affect us.

Question 11:

- Has there been any disruptive technology from within or outside the industry that changed the landscape?

Answer 11:

- Teflon was supposed to be a disruptive technology many years ago, in the beginning this product took market shares away from us but soon it showed that the product was not useful.

Question 12:

- Broad product portfolio or specialization on core products?

Answer 12:

- Rather specialized one.

Question 13:

- What resources and capabilities within the company do you feel are the most important?

Answer 13:

- It's a combined effort of marketing and a good quality product.
- The expertise of the machines, how to increase production and safe costs. The machines are up to 100 years old and still among the newest ones in the industry.

Question 14:

- Have prices changed? Both for the raw material you are charged for and the prices you charge your consumers? Why?

Answer 14:

- There is an established world price for pulp, we are a small player so have a low negotiation power.

Question 15:

- Do you use low costs when competing?

Answer 15:

- If we see an increase in demand we try to increase the prices, generally we do not use low price strategies to avoid price wars, which nobody would benefit from.

Future Prospect

Question 16:

- Please give us a realistic view about revenue/ profitability development in the future.

Answer 16:

- We will continue to see an increase in demand for our products around 2-5% depending on the segment. The focus on hygiene increases, almost all of our products serve the food sector so this focus benefits us.
- We only use natural ingredients for our products, which customers value and trust. Several ministries investigate the use of chemicals in food packaging, which further benefits us.
- Regarding the newsprint area, Skogn for example faces challenges because of the decreasing demand. Companies within these sectors need to convert their machines and produce different products. Packaging is in a high growth phase, which could be focused instead.

10.1.12 Interview Protocol 12 with **Peterson Packaging AS**, conducted the 26.04.2017

Participants: Tommy Prøitz, Sales Director
Philipp Braun, Student BI
Sigurd Ytterstad, Student BI

General Information

Question 1:

- Tell us about your position, and your responsibilities within the company.

Answer 1:

- Sales director and responsible for commercial activities, and have been in the company since 2001, and had this position since 2007. Responsible for sales in Sarpsborg, Sykkylven and Tech.

Question 2:

- What are your main target markets?

Answer 2:

- Food for factory in Sarpsborg, and industry for the factory in Sykkylven. We don't export at all, only domestic sales, so that Swedish factories are serving the Swedish market. But of course, if one factory struggle with seasonal fluctuations the other factories help. The rationale behind this decision is the transportation cost which is very high. In terms of market share in Norway, we cover 40% of the market.

Question 3:

- Which customer segment do you serve?

Answer 3:

- Only businesses.

Competition

Question 4:

- Who do you consider your main competitors?

Answer 4:

- Glomma Papp which has roughly 20% and another company which has about 40% and some import of course. Glomma solely supply Norway.

Question 5:

- How are you able to stay competitive? Competitive advantage?

Answer 5:

- I would say it is the same for all factories, namely operational excellence, customer support, create a partnership with the customer and then being able to create value in that partnership by lowering costs, improving quality and logistics. Customers are very loyal because it is challenging to switch packaging suppliers.

Question 6:

- Are there any specific location or cluster advantages of Norwegian firms?
    - Why is Peterson part of NPPA?

Answer 6:

- Customer proximity is crucial, as they require us to be highly flexible. Overseas suppliers both in terms of language, time and everything, Norwegian customers prefer domestic suppliers. Often customers have campaigns that they was not expecting. Our largest customers are Bama, Mills, Orkla, TIne, Ekornes and so on.

- Don't have any specific cluster advantages by being located in Norway. We are part of DNE, which is a different bransjeforening that we are part of where we share information with customers and other companies. This is more important than being of Treforedlingens Bransjeforening, as they are mostly concerned about paper. Paper is only raw material for us. We get supplied with paper from Sweden, Poland and Germany. We used to produce paper in both Moss and Ranheim, but we were bankrupted in 2012 due to owners ability to investment sufficiently. Both factories were old, and owner were not thinking long term and did not see how it would be possible to survive due to the lack of investments in the past.
- The ownership today is way better, as we got Belgian owners representing a large MNC (VPA Packaging group). Spend 25 million euros so far to maintain our operational excellence.
- We have kind of a diverse customer portfolio, with small and medium sized companies given us high margins, whereas the larger customers provide us with low margins.

Strategy

Question 7:

- Do you invest a lot in R&D? Main reasons? Degree of Governmental or European funding?

Answer 7:

- No, we have a lot of customers (1500 customers only for the Sarpsborg factory), and we have 20000 different articles, so we are working on portfolio level with the customers, constantly trying to reduce the prices by using different types of raw paper. Making boxes to lower transportation costs so we improve productivity and production costs.
- No governmental support.

Question 8:

- Has your product portfolio changed or shifted since the company was founded?

Answer 8:

- There have not been any massive changes for us rather than giving up on paper production in Moss and Ranheim. What we see today is that we are changing more and more to recycled paper due to the weak Norwegian kroner.

- When negotiating with customers everything comes down to price. Some customers ask if we are FFC-certified, which we are, but also BRC

Question 9:

- How about your target group?

Answer 9:

- No.

Decline

Question 10:

- Do you consider the woodworking/ wood processing industry to be in a decline phase? Or parts of it?

Answer 10:

- No, it's absolutely the opposite as demand grow with 2% per year and there are several reasons why: more focus on food waste, smaller packages which benefit us. Norwegian population is growing, and a change going on from plastics to the products that we are offering.

Question 11:

- Has there been any disruptive technology from within or outside the industry that changed the landscape?

Answer 11:

- Change going on these days from "flexon" to digital print. This improves productivity and less preparing for the machines for the different orders from the customers. New machines has to be invested so we are taking one by one, and you need owners that are willing to invest.

Question 12:

- Broad product portfolio or specialization on core products?

Answer 12:

- Broad portfolio - 20.000 articles

Question 13:

- What resources and capabilities within the company do you feel are the most important?

Answer 13:

- Operational excellence - to be more cost effective.

Question 14:

- Have prices changed? Both for the raw material you are charged for and the prices you charge your consumers? Why?

Answer 14:

- Kraftliner and testliner are used, and they have changed a lot. summer 2015 the weak norwegian krone affected the price heavily. Needed to compensate by raising the prices as a result of paper constituting 50% of the costs. Also seen this now in 2017 that the krone is affected which again affects our operations.

Question 15:

- Do you use low costs when competing?

Answer 15:

- We have different ways to sell our products - so that price is used in some cases.

Future Prospect

Question 16:

- Please give us a realistic view about revenue/ profitability development in the future.

Answer 16:

- Very optimistic for Peterson. The demand for our products are growing even further, so for packaging this would be successful if companies are willing to invest enough. For the paper side, it would be very challenging.

10.1.13 Interview Protocol with **NPPA**, conducted the 07.02.2017

Participants: Marit Foss, Managing Director
Philipp Braun, Student BI
Sigurd Ytterstad, Student BI

General Information

Question 1:

- What is your role at the Norwegian Pulp and Paper Association?

Answer 1:

- I am in charge of the Pulp and Paper Industry in Norway as a Managing Director. The Industry consists of 12 member companies or member mills and our organization is responsible for political and lobbying issues. We do not deal too much with strategies or product portfolios of members, rather with law and environmental frameworks.

- Additionally, I work as an Assistant Director at the Federation of Norwegian Industry, dealing with climate change, energy and environmental issues.

Question 2:

- What are the export ratio of Norwegian Pulp and Paper companies and which countries are targeted?

Answer 2:

- In average it is around 95%, some companies export 100%, other smaller ones only 50%. Germany and UK are the largest export markets, Europe in general. Some companies, such as Borregaard even export ingredients for the textile industry to China.

Question 3:

- Have you observed any change in strategies during recent years due to crisis or changes in demand or legal frameworks?

Answer 3:

- In general, the digitalization caused a very sharp decline in the graphic paper industry, including newspapers, magazines and related advertising revenues since around 2008. Also the very strong Norwegian currency around 2002 made it difficult to export. The capacity of many mills decreased and many mills had to close to rebalance demand and supply. The market volume simply shrunk a lot for graphic papers. Some mills were rebuilt to produce different products, like pulp or tissues and hygiene papers. The strategy can be described as a shift in the product portfolio away from graphic papers. Norske Skog, for example, closed two of their four mills.

Question 4:

- Did many companies leave or enter the market during recent years?

Answer 4:

- A Swedish company, Sodra, chose to close down their mill in Norway and rebuilt it in Sweden instead due to difficulties regarding the Norwegian Green Certificate.
- Besides that, mostly smaller mills closed.
- One German/ Austrian company, Mayr-Melnhof, bought the mill a year after Sodra closed. They have a very efficient production line.

- In Drammen, a tissue mill, which was owned by a Swedish company, was bought by a Hungarian company. The labor cost is not significant in the Pulp and Paper Industry, this is why the Hungarian company could do so. The main share of the costs is the wood itself, transportation and energy. Raw materials account for around 30% of the costs, transportation 20% of the costs, energy another 20% of the costs. The transport of the wood is much more costly than finished products. Statistics Norway might give insights into statistics, codes 17.1/ 17.11/ 17.12.

Competition

Question 5:

- Is Norway importing a lot of wood, are local companies competing with foreign exporters?

Answer 5:

- Not anymore, Norway has been a net importer before 2011 and became a net exporter afterwards. The local demand is mainly covered by Norwegian companies. Companies try to apply the value chain inside of Norway, produce as much added value as possible before exporting.

Question 6:

- Which location advantages do Norwegian companies have?

Answer 6:

- Norway is close to the European market compared to Chinese competitors. Many mills close to the coast can use boats as shipping means. Companies are generally located very close to the forests, compared to Chinese competitors.

Question 7:

- Regarding R&D, are there any clusters in Norway?

Answer 7:

- There is a paper and fiber institute in Trondheim, used by a Swedish research institute. It is used a lot by various Norwegian companies.
- In general, it is hard for the companies to share technology or R&D investment because the various mills mostly produce different products.

Decline

Question 8:

- Besides the graphic papers, which other sub industries of the Wood industry is in decline?

Answer 8:

- It is mainly the graphic paper industry. Packaging for example is increasing slightly. Sanitary and household is also slightly increasing.

Question 9:

- Regarding the graphic paper industry, was the decline predictable?

Answer 9:

- None of the companies really predicted the rise of the digitalization, companies were unprepared due to its disruptive character.

Question 10:

- Has there been previous decline phases? And how did companies react?

Answer 10:

- Yes, related to oil prices in the 70s and the banking crisis in the 80s, the financial crisis in 2007/2008 so consumers stopped using many wood based products to safe. Income was mostly spent on necessities.
- It is very difficult to switch from one day to another what you produce, it normally takes months or years. Mostly companies closed down factories temporarily.
- Norske Skog now plans to let 25% of their revenues come from other products than graphic paper to diversify and respond to the decline. They add biogas and micro cellulose to their portfolio.

Question 11:

- Has there been any sort of disruptive innovation or technology from within the industry to increase efficiency and profitability?

Answer 11:

- Norway is a very expensive country, so companies always strive to be efficient, mainly with respect to how to use energy efficiently. There were no disruptive technologies, which, for example, could have been exported.

Question 12:

- Does the government support or subsidize the industry?

Answer 12:

- Joint research projects are common with the research council of Norway. The NOVA fund further provide support. The industry has also exemptions from certain taxes, like the energy tax. Recently, since 2014 companies again have to pay a minimum share of the taxes.

Question 13:

- Could the government improve its support?

Answer 13:

- Yes. There should be equal conditions with at least Sweden and Finland. In Finland, the transportation vehicles are way larger and therefore more efficient. In Norway, larger trucks are tried.
- Norway implemented a lot of systems to prevent climate change, charging companies for CO2 emission and certain chemicals used, for example. Chinese competitors currently do not face these costs.

Question 14:

- How broad are the product portfolios of the companies? Rather broad or narrow?

Answer 14:

- Borregaard is very special, no other company like it in Norway, in Sweden and Finland, there are comparable companies. Most companies specialize on one or few core products

Question 15:

- How do Norwegian companies stay competitive?

Answer 15:

- They produce it smarter, more efficient, try to decrease costs anywhere they can. They use automation and robots wherever they can. The quality of Norwegian wood and the products is another advantage.

Question 16:

- Have prices changed during or after crisis?

Answer 16:

- That is too close to the market, you need to address the companies.

Question 17:

- Do Norwegian companies try to differentiate their products themselves?

Answer 17:

- The forest is 100% certified regarding PFC and FFC certificates. Products are fairly and legally and sustainably harvested. Many customers rely on these guarantees.

Question 18:

- How easy and time consuming was it for companies to divest?

Answer 18:

- It takes a few years to close the site and sell equipment.

Future Prospect

Question 19:

- Can you estimate the future in terms of revenues and general development

Answer 19:

- You find this in the roadmap I gave you. We want to get rid of climate change emissions, want to double the added value from pulp and paper until 2050.

Question 20:

- Do you expect any further decline?

Answer 20:

- No disruptive technology is expected. There is rather a large potential, many secondary products, based on lignin and nano cellulose and such can be used for different products. It is valuable because of its sustainable nature. The pulp and paper industry has big chances to be a key player in the bioeconomy. FDI will also greatly appreciated.

Question 21:

- So do you expect companies to diversify further or aim at niche markets?

Answer 21:

- Companies will try to use all the side streams and the entire timber to create different products to make the most out of the raw material. Norske Skog for example uses their sludge to make biogas.
- It will be interesting to ask the companies directly.

Question 22:

- Will there be any change in government spendings?

Answer 22:

- 10 different ministers agreed on a bioeconomy strategy.

Question 23:

- What percentage of the entire wood working industry does pulp and paper account for?

Answer 24:

- The saw mills account for the largest share with the highest added value. Pulp and paper is on rank two.