

UNIVERSITY OF HELSINKI

# Perspectives of competitive position and future revival of the Finnish sawmilling industry

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Forest Products Marketing

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Tiivistelmä - Referat - Abstract  <p>Finnish sawmill industry's competitiveness has recently been poor due to the worsen economic situation, collapsed demand and the inactivity on the timber market. The sawmill industry has attempted to operate as domestic business by creating a long-term welfare for the Finnish society. However, this attempt requires, that the domestic sawmilling industry can operate in conditions, which is enabling profitable business. The market share of Finnish sawmill industry in Europe and the world is so small that it has no practical ability to determine the level of prices in international markets. Therefore it must adapt to the prevailing world market prices and demand fluctuations.</p> <p>Sawmill industry is in a turning point, which led to the examination of the current state and industry-related perspectives. The theoretical framework bases on McGahan (2004) book "How Industries Evolve". It is a descriptive framework for the trajectory of industry change. The descriptive framework is combined with Porter's "Diamond model" (1990), which he introduced in his book "The Competitive Advantage of Nations" (Porter 1990). The aim of the Diamond is to describe the business environment, where the Finnish sawmilling industry is operating in. Resource based view by Barney (Barney 1991) will describe the corporate environment and resources of the sawmilling companies. SWOT analysis was used to evaluate the results. The study was conducted as a qualitative work. Primarydata was acquired by expert interviews and secondarydata consists of the literature, publications and internet sources.</p> <p>According to the results in order to improve the competitiveness of Finnish sawmilling industry a common understanding needed of a number of related changes. Attempts to improve the competitiveness should be implemented so that all the factor conditions are effective and try to regenerate. When the factor conditions are functioning, there is demand for wood products, prices are adequate and wood markets operate in balance. It is noteworthy that it was the sawmill industry pays more than 70% of the income for private forest owners, which is ensuring employment for the rural localities and creating economic welfare. Globalization will also modify business environment of the Finnish sawmilling industry therefore the state as a legislator needs to influence the industry's changing needs. Political decisions should be encouraging the industry to create new production possibilities so that industry can maintain their competitiveness in relation to other competing countries. The use of forests and wood can respond to the many challenges in the future. Finnish sawmilling will be supporting the targets of the Finnish government as well as the EU's priority areas: sustainable development, climate change adaptation and welfare development of the rural areas.</p>			
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Tiivistelmä - Referat - Abstract  <p>Suomen sahateollisuuden kilpailukyky on viimeaikoina vallinneesta taloustilanteesta, kysynnän romahtamisesta ja puumarkkinoiden toimimattomuudesta johtuen ollut heikkoa. Sahateollisuuden pyrkimyksenä on ollut toimia kotimaisena toimialana luoden pitkäjänteisesti hyvinvointia maassamme. Tämä pyrkimys edellyttäisi, että sille luotaisiin kilpailukykyiset toimialaosuhteet, jotta kannattava toiminta olisi mahdollista. Suomen sahateollisuuden markkinaosuus Euroopassa ja maailmalla on kuitenkin niin pieni, että sillä ei ole käytännössä mahdollisuuksia määrätä hintatasoa kansainvälisillä markkinoilla, vaan sen on mukauduttava kulloinkin vallitseviin maailmanmarkkinahintoihin ja kysynnän vaihteluihin.</p> <p>Sahateollisuustoimiala on rakennemuutoksessa, jonka vuoksi sen nykytilan ja toimialaan liittyvien perustekijöiden tutkiminen on ajankohtaista. Tutkimuksen teoreettisena viitekehystenä toimii McGahan (2004) teoksen "How industries evolve" pohjalta muokattu toimialan kehityskulkua kuvaava kehys. Kehityskulkua kuvaava kehys on yhdistetty Porter (1990) teoksen kansakunnan edun perustekijöitä kuvaavaan timantti-malliin, joka havainnollistaa toimialan makroympäristöä. Resurssipohjainen malli (Barney 1991) puolestaan kuvaa alalla toimivien yritysten voimavaroja niiden kehityksen kannalta. Tulosten arviointimenetelmänä käytetään viitekehukseen liitettyä SWOT-analyysiä. Tutkimus toteutettiin kvalitatiivisena työnä. Primääridata hankittiin asiantuntijahaastatteluin ja sekundääridata koostuu alan kirjallisuudesta, ajankohtaisjulkaisuista sekä internet lähteistä.</p> <p>Tulosten mukaan sahateollisuuden kilpailukyvyn parantamiseksi tarvitaan yhteisymmärrystä useista alaan liittyvien perustekijöiden muutoksista. Pyrkimykset kilpailukyvyn parantamiseksi tulisi toteuttaa siten, että kaikki perustekijät ovat tehokkaita ja pyrkivät uudistumaan. Perustekijöiden ollessa tehokkaassa käytössä puutuotteille on kysyntää, puusta valmistetuista tuotteista saadaan markkinoilta riittävä hinta ja puumarkkinat toimivat tasapainossa. Huomionarvoista on, että juuri sahateollisuus maksaa yli 70 % metsänomistajien puunmyyntituloista huolehtien samalla maaseutupaikkakuntien työllistymisestä sekä niiden taloudellisesta hyvinvoinnista. Koska globalisaatio muokkaa myös sahateollisuuden toimintaympäristöä, on myöskin valtiollaan lainsäätäjän ominaisuudessa pyrittävä vaikuttamaan teollisuuden muuttuviin tarpeisiin. Poliittisten päätösten tulisi olla toimialaa kannustavia siten, että toimialalle voisi esimerkiksi syntyä uusia tuotantomahdollisuuksia tai aputoimialoja, jotta teollisuus voi siten suhteessa kilpailijamaihin säilyttää elinvoimaisuutensa. Metsiin ja puun käyttöön perustuvalla sahateollisuuden toimialalla pystytään vastaamaan moniin tulevaisuuden haasteisiin. Sahateollisuuden toiminta oikealla tavalla kannustettuna tukee siten Suomen valtiollaan, sekä myös EU:n painopistealueita: kestävä kehitys, ilmastonmuutokseen sopeutumista ja maaseudun hyvinvoinnin kehitystä.</p>		
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## **1. Background**

### **1.1 Introduction to Finnish sawmilling industry**

Finnish forest industry has in recent years been the subject of major changes and changes in are likely to continue. The relative share of forest industry out of total exports of Finland has been on the decline, but still the Finnish trade export value of about 17% comes from forest industry (in 2008) and its share of industrial output is about 15%. The share of forest industry and forestry in GDP 2007 was 5.9%. In 2008 Forest Industry employed directly about 58 000 (1990 to about 92 000) people and in Forestry worked about 24 000 people. Forestry and Forest Industries continued directly employ more than 80 000 employees and the whole forest cluster about 200000 employees. (Metsä- ja puutuoteteollisuuden... Metsäalan strateginen..., 2009)

Finnish manufacturers produce 15% of Europe's sawn timber. The significance of Finnish companies increases by the fact that about 60% of output is exported. For instance in 2008 these were around 6.0 million cubic meters sawn and planed softwood exported from Finland, which was 62% of the whole production. Finland is, however, the most important consumer country and at present, each Finn consumes almost one cubic metre of sawn timber annually. Elsewhere in Europe, per capita consumption is less than 0.3 cubic metres. (Sahateollisuus kamppailee....Metsäteollisuus ry., 2009)

The Finnish sawmilling industry has been losing market shares in recent years as production has grown especially in Germany, the countries of Eastern Europe and Russia. Finnish companies primarily compete against rivals from the coniferous forest belt, although China and Japan, for example, nowadays also produce corresponding products using logs imported mostly from Russia. Figure 1 presents the biggest producers of sawn softwood in the world 2008.

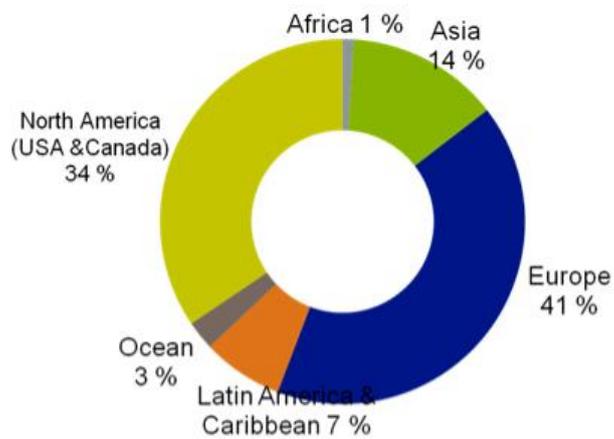


Figure 1. Biggest producers of sawn softwood in the world 2008  
(Pesonen, 2009)

The branch consists of three types of companies, which produced around 12.4 million cubic meters of sawnwood in 2007. There are three global main players in Finnish sawmilling industry. These players are producing about 50% of total sawnwood volume in Finland. In addition to these, are other, independent sawmilling companies, which produce around 43% and the remaining 7% are non-industrial, small-sized companies.

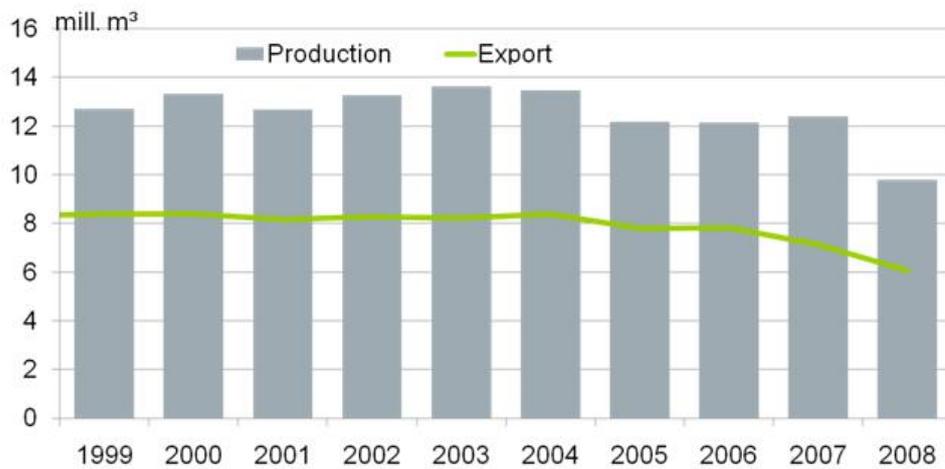


Figure 2. Production and Export of Finnish sawnwood  
(Pesonen, 2009)

Figure 2 illustrates the relation between the production and exports of Finnish sawnwood. The further processing of sawnwood is relatively more common among middle- sized domestic-companies than in integrates. The quantity of companies has been decreasing during this decade, because the production has been concentrating. The integrates have been reducing their production since 2000 in Finland, but the private owned sawmilling companies have been increasing their production. Bigger players have been investing capacity more or less also in Baltic countries and Russia.

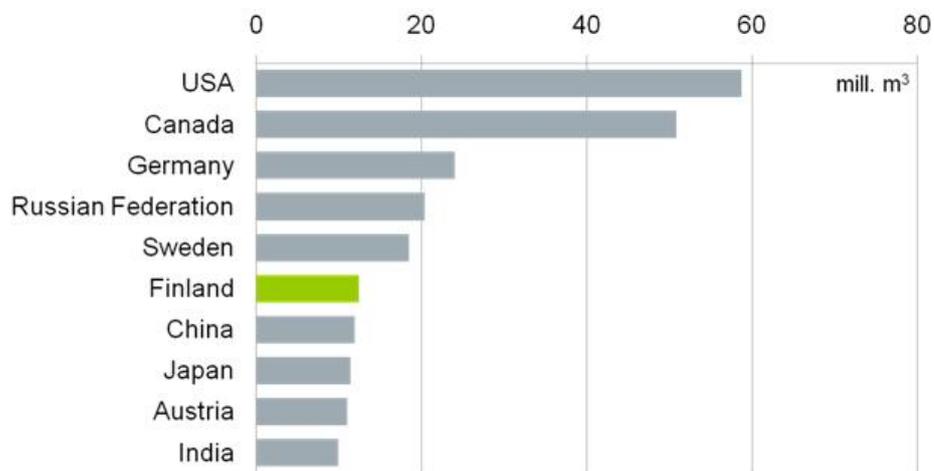


Figure 3. Major producer countries of sawn softwood 2007  
(Pesonen, 2009)

There has been oversupply in the European sawn whitewood markets since summer 2007. The phenomenon was a result of large amount of produced storm logs in Germany and collapsed demand in American building sector, where Germans have exported about 5 million m<sup>3</sup> annually. The surplus has been problematic not only in central Europe, but also in other market areas for example in Japan and North Africa. Also the very strong Euro has been a problem in countries, where dollar is the pricing currency. As figure 3 shows, Finland was the world's sixth biggest producer 2007.

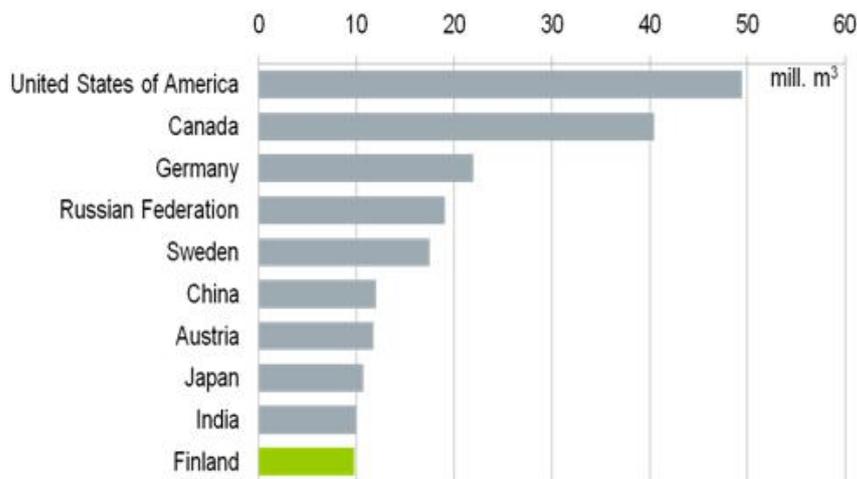


Figure 4. Major producer countries of sawn softwood 2008  
(Pesonen, 2009)

In 2008 about 31% of global sawn softwood was produced in North-America. Finland was the world's tenth biggest producer with 9.8 million cubic meter. In comparison to 2007, the position 2008 was lower due to reduced capacity by around 2,6 million cubic meter.

### **1.2 Globalization speeding up the development and market situation in recent years in Europe**

Globalization is likely to be one of the most important factors for change in the forest industry. In the last few years, a large number of company acquisitions and mergers have taken place in the forest industry all over the world. As a result, the forest industry companies have grown in size and the industry has become more consolidated.

The consolidation and internationalization processes have been relatively strong in the Finnish forest industry during the last ten years. Today, the three main companies cover a vast majority of paper capacity in Finland. The Finnish forest industry companies have acquired mills and subsidiaries abroad, mainly on the main markets in the Western Europe.

Globalization of the forest industry continues, also the Finnish companies are widening their scope outside Europe, for example, to the Russia and the fast-growing Asian markets. Figure 5 presents the turnover development of Finnish forest industry companies according to their location. This table shows that the share of turnover is increasing in foreign locations.

**Turnover of the Finnish forestry companies according to location**

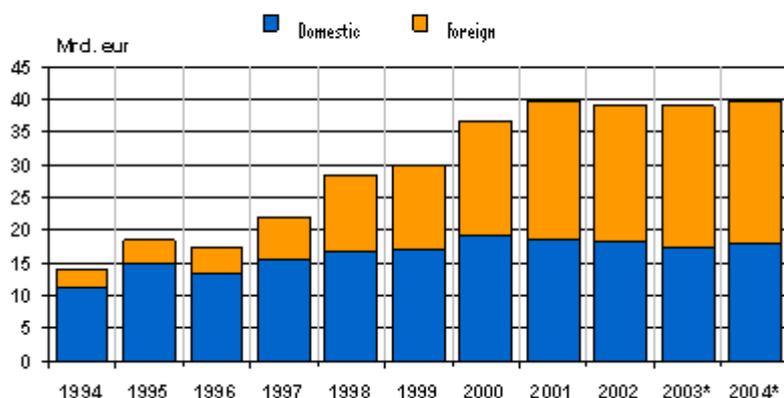


Figure 5. Turnover of the Finnish forest industry companies according to location (Hetemäki et al., 2006)

### 1.3 Need for development

Years before 2006 have been quite weak and the income flow in the companies hasn't enabled big investments for the branch. The sawmilling branch is in a turning point now. All the primary production costs in this sector have been increasing in a very short time. There has been predictions that Finland has been or is about to lose its advantage in using modern production technology comparing to other competitors in Central- Europe and Sweden due to the low investments in last years. Meanwhile in Sweden for example the company Holmen will invest a completely new Sawmill with capacity about 750 000 m<sup>3</sup>. Finland needs to be even more productive to reach the cost gap, which is caused e.g. by our distant location here in Scandinavia. (Ojanperä, 2007)

#### **1.4 Motivation of the study**

Recently there have been published few studies in terms of competitive performance in Finnish sawmilling industry. For example Lähtinen (2009) has been using resource-based view framework, in terms of the impacts of resource usage decisions on the financial performance of Finnish large- and medium-sized sawmills in the 2000s. The study consists of literature, firm-level financial accounting information and interview data analyzed with a literature review, a regression analysis and the multi-criteria decision analysis method. (Lähtinen, 2009)

Hetemäki and Hänninen have been researching issues in terms of the turning point in Finnish forestry sector. Upheavals of forest products, international markets, climate change, renewable energy supportive policy and society the economic structure and value changes have been affecting to the development of the Finnish forestry sector. The most promising and up to date topic for new business opportunity is heat and power production together with pellet production. Sawdust and wood chips sale as raw material for energy production would be an business opportunity for the sawmills. However, there are issues to clarify as co-operation possibilities in terms of common raw material procurement, production, marketing between and profit sharing within the sawmilling companies. (Hetemäki and Hänninen, 2009)

Rautanen (Rautanen 2009) has been studying the current state of the sawmilling industry in three future scenarios by using qualitative method. The current state description needed in order to estimate the starting point for the scenario. The scenarios describe three different types of future of its players in their way up to 2020. In the first scenario, the development of the sawmilling industry is limited, because of fierce pricing competition in products and activities are strongly suffering of market cyclicity. In the second scenario, part of the sawmill industry players have began to develop cooperation in the wood processing industry with the vertical integration effort. The products are highly processed and the market mainly at home and the surrounding areas.

The third and final scenario aims, that the sawmilling industry is seeking agility by horizontal integration activities in bio-energy cluster. Further processed goods have a larger role alongside the basic products and by allocating corporate resources effectively will be fought against market cyclicity. (Rautanen, 2009)

This thesis is a qualitative study, which focuses on the current state in Finnish sawmilling industry and describes the challenges the trajectory of Finnish sawmilling industry is about to face. More information will be needed to be able to recognize the developing possibilities and present suggestions to maintain the competitiveness in the branch as the business environment of the Finnish sawmill industry has changed notably since the 1990s. McGahan's model "Four trajectories" (McGahan 2004) will be presented in chapter 3 together with Diamond model (Porter 1990) and Resource based view (Barney 1991). It is mentionable, that McGahan's model has not been used in analyzing the Finnish sawmilling industry so far.

## **2. Purpose and implementation of the Study**

### **2.1 Purpose of the study**

The general purpose of this thesis is to elaborate practical viewpoint with the help of theoretical models in order to achieve a deeper understanding of the matter, how the Finnish sawmilling industry evolves. The study will be analyzing the current state and describe the determinants for the development of competitive advantage in Finnish sawmilling industry.

The following questions will be answered in this paper:

1. What are the present state and the issues, which have brought the need for renewal to develop the branch?
2. How different theoretical approaches are assessing the competitive position of the Finnish sawmilling industry
3. What are the Strengths, Weaknesses, Opportunities, and Threats affecting to the trajectory of the Finnish sawmilling industry?
4. Which are the perspectives for future development trends and business opportunities in changing the trajectory of Finnish sawmilling industry?

## 2.2 Implementation of the Study

The research will be implemented as presented in Figure 6. By gathering the secondary data the current state of the sawmilling industry will be described. Theoretical model's chosen are assessing the competitive position in evolving Finnish sawmilling industry. Specialists involved in sawmilling industry will be interviewed in order to determine the future trajectory of the Finnish sawmilling industry and identify main drivers for it's change. In the result chapter it is suggested, by adapting theoretical models, how the branch could maintain its competitiveness and meet the challenges while industry evolves.

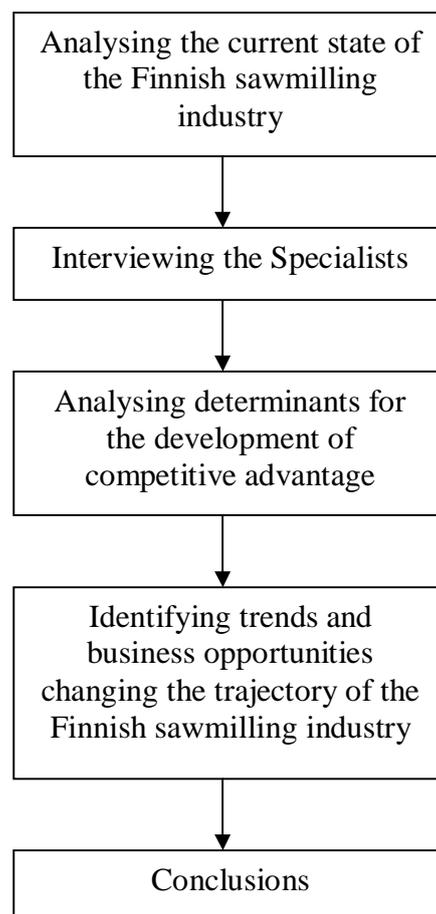


Figure 6. Implementation of the Study

### **3. Theoretical background**

#### **3.1 General**

The purpose of the chapter is to present theoretical approaches in order to create a linkage and comparison between them in relation to the environment where the Finnish sawmilling industry is operating in. The chapter consists partly of the Diamond model of Porter presented in Figure 7, which he introduced in his book “The Competitive Advantage of Nations” (Porter 1990). The aim of the Diamond is to describe the business environment, where the Finnish sawmilling industry is operating in. Resource based view by Barney (Barney 1991) will describe the corporate environment and resources of the sawmilling companies. McGahan’s model “Four trajectories” (McGahan 2004) will be used in combination with Diamond model and Resource based view in order to analyze the trajectory and future views of Finnish sawmilling industry.

The study also contains description of competitive and comparative advantages and a SWOT –analysis, where the main issues related to the study are gathered together. The purpose of the SWOT is to analyze the issues related to the change of the trajectory. PEST-analyses will be presented in relation to SWOT, although it is not implemented in this study. The aim of the chapter is to understand better the theoretical issues affecting to competitive position of the Finnish sawmilling industry in global competition.

## 3.2 The contents of the diamond model

### 3.2.1 Factor Conditions

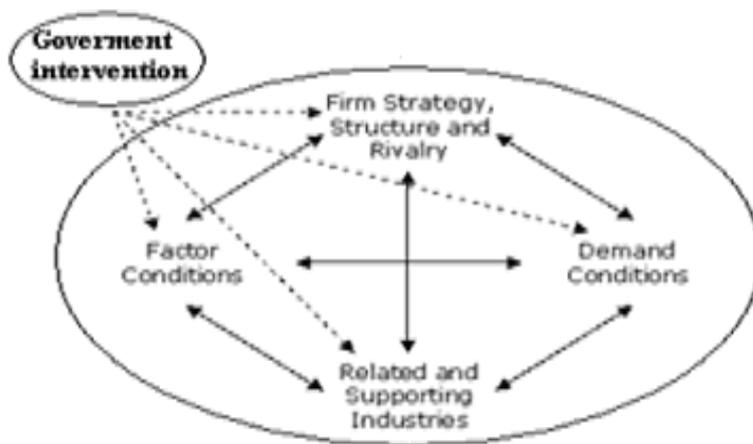


Figure 7. Diamond model (Porter 1990)

Factor conditions are covering such as natural resources as forest, land area, climate, physical infrastructure, labour, and other important issues as education in Universities and research centre's. A country will create its characteristically important factors such as skilled resources and technological base. It is essential, that the most part of the conditions have been given. The country can have also unique conditions, which can create and enable a long-term competitive advantage for the country. Local disadvantages in factors of production force innovation. Difficult conditions such as labour shortages or lack of raw materials force companies to develop new methods, which often leads to a national comparative advantage. In order to upkeep the national competitive advantage, requires continual efforts in developing factors of production. (Porter, 1990)

### **3.2.2 Demand Conditions**

The development in terms of domestic and global demand is a key issue for the company's successful business. Domestic demand conditions have impact on the direction in developing innovations and product's. According to Porter, home demand is determined by three major characteristics: their mixture (the mix of customers needs and wants), their scope and growth rate, and the mechanisms that transmit domestic preferences to foreign markets.

Porter states that, "a country can achieve national advantages in an industry or market segment, if home demand provides clearer and earlier signals of demand trends to domestic suppliers than to foreign competitors". Normally, home markets have a much higher influence on an organization's ability to recognize customers' needs than foreign markets do.

When the market for a particular product is larger locally than in foreign markets, the local firms pay more attention to that product than do foreign firms, leading to a competitive advantage when the local firms begin exporting the product. A more demanding local market leads to national advantage. A strong, trend-setting local market helps also local firms anticipate global trends. (Porter, 1990)

### **3.2.3 Related and Supporting Industries**

Internationally compatible related and supporting industries are affecting essentially to the competitive advantage. There are also other important issues like networking and innovating activity connected to the branch. When local supporting industries are competitive, firms enjoy more cost effective and innovative inputs. This effect can be strengthened when the suppliers themselves are strong global competitors. An internationally oriented, successful industry can improve advantages in other related or supporting industries.

Besides suppliers, related industries are important as well. These are industries that can use and coordinate particular activities in the value chain together, or that are concerned with complementary products. An example can be the woodworking and paper industry in Finland, which is not only successful with wooden- and paper products, but with related products and services such as wood working machinery, package design, etc. (Porter, 1990)

#### **3.2.4. Firm Strategy, Structure, and Rivalry**

According to Porter, the cultural matters are playing a significant role. Management structures, working morale, or interactions between companies are varying in different Nations. The phenomenon can provide advantages and disadvantages for the branch. One of the company's important objectives is the commitment to work among employees. Family-business based industries may behave differently than public stock companies. According to Porter, the domestic rivalry and search for competitive advantage within a nation can help provide organizations with bases for achieving such advantage on a more global scale.

Conditions locally are affecting the firm strategy. For instance, German firms are used to act hierarchically. A typical characteristic for an Italian company is that they are small and are run more like extended families. Such strategy and structure helps to determine in which types of industries a nation's firms will excel. (Porter, 1990)

In Porter's Five Forces model, low rivalry has made an industry attractive. While at a single point in time a firm prefers less rivalry, over the long run more local rivalry is better since it puts pressure on firms to innovate and improve. In fact, high local rivalry results in less global rivalry. Local rivalry forces firms to move beyond basic advantages that the home country may enjoy, such as low factor costs. (Porter, 1990)

### **3.2.5 Government intervention**

The role of government in Porter's Diamond Model is "acting as a catalyst and challenger; it is to encourage - or even push - companies to raise their aspirations and move to higher levels of competitive performance ...". They must encourage companies to raise their performance, stimulate early demand for advanced products, focus on specialized factor creation and to stimulate local rivalry by limiting direct cooperation and enforcing anti-trust regulations. (Porter, 1990)

According to Porter the government policy usually impacts to nation's competitive advantage both positively and negatively. Policy influences what is going to happen. Porter has noticed that there need to be relevant underlying circumstances in order to maintain the industry successful. He claims also, that governments, instead of controlling the national competitive advantage, can only influence it. Porter has created several issues, which are guiding government policy to improve the national competitiveness.

Porter argues in many ways that government policies influence different determinants of the diamond. It is important to recall that the determinants interact with each other and that no one determinant operates alone to provide a nation with significant or sustainable advantage. Policy areas can actually influence multiple determinants, some positively and others negatively. It is important for policy makers to consider how positive policy in one determinant area may eventually cause undesired impacts in another determinant area. This is not always the case, but as time progresses and industry evolve it is possible. A system is never stable. (Porter, 1990)

### 3.3 Understanding Competitive and Comparative advantage

#### 3.3.1 Competitive advantage

This study presents issues about competitive advantage in relation to Finnish sawmilling industry. Therefore, the term is worth of describing in this chapter. The competitive advantage is an advantage over competitors achieved by offering consumers greater value, either by means of lower prices or by providing greater benefits and service that justifies higher prices. Michael Porter presents four "generic" business strategies that can be adopted in order to gain competitive advantage. The four strategies relate to the extent to which the scope of businesses activities are narrow versus broad and the extent to which a business seeks to differentiate its products.

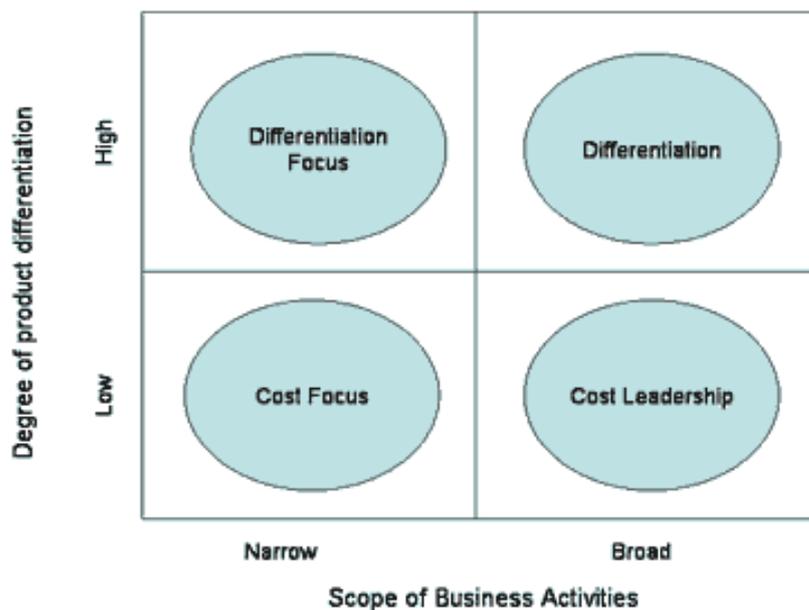


Figure 8. Four "generic" business strategies (Porter, 1980)

Differentiation strategy involves selecting one or more criteria used by buyers in a market - and then positioning the business uniquely to meet those criteria. This strategy is usually associated with charging a premium price for the product - often to reflect the higher production costs and extra value-added features provided for the consumer. Differentiation is about charging a premium price that more than covers the additional production costs, and about giving customers clear reasons to prefer the product over other, less differentiated products. (Porter, 1980, 1985)

With cost leadership strategy, the objective is to become the lowest-cost producer in the industry. Many market segments in the industry are supplied with the emphasis placed minimizing costs. If the achieved selling price can at least equal the average for the market, then the lowest-cost producer will get the best profits. This strategy is usually associated with large-scale businesses offering "standard" products like ordinary sawnwood with relatively little differentiation that are perfectly acceptable to the majority of customers. Occasionally, a low-cost leader will also discount its product to maximize sales, particularly if it has a significant cost advantage over the competition and, in doing so, it can further increase its market share. (Porter, 1980, 1985)

In the differentiation focus strategy, a business aims to differentiate within just one or a small number of target market segments. The special customer needs of the segment mean that there are opportunities to provide products that are clearly different from competitors who may be targeting a broader group of customers. The important issue for any business adopting this strategy is to ensure that customers really do have different needs and wants - in other words that there is a valid basis for differentiation - and that existing competitor products are not meeting those needs and wants. By cost focus strategy the business seeks a lower-cost advantage in just one or a small number of market segments. The product will be basic - perhaps a similar product to the higher-priced and featured market leader, but acceptable to sufficient consumers. (Porter, 1980, 1985)

To be able to get a competitive advantage, companies need to focus on company unique-resources available. Characteristically these resources are valuable, rare and not substitutable or easy to imitate. If a certain resources are rare and that not distributed across competing firms, it can give a temporary competitive advantage for a company. According to Porter (1990), the competitive advantage exists when a firm is able to sustain profits that exceed the average of the industry. Sustainable competitive advantage is an advantage that enables business to compete among competitors over a long period of time, which is usually the focal point of corporate strategy. (Porter, 1990)

Porter's notion of generic strategies has used rather lot in terms of researching of the strategies of especially woodworking enterprises. According to Lähtinen (2007) the results are showing, that concerning the choices made in sawmills nevertheless do not provide consensus on the strategic orientation, but present a wide variety covering cost leadership, differentiation and focus strategies as well as their diverse combinations. Because of the variation in raw material properties in the production process of a sawmill provides a wide variety of products suitable for several markets. Therefore sawmills are not concentrating on one competitive strategy type. For example, Lähtinen points out, that especially in smaller sized sawmills this multi-faceted approach is less likely to lead into business success, due to the lack of adequate resources needed in operating successfully on multiple arenas. (Lähtinen, 2007)

Porter's expression "stuck-in-the-middle" refers to the idea of incompatibility between costs and differentiation competitive strategies. Porter (1980, 1985) points out that companies which engages in each generic strategy but fails to implement any of them are "stuck-in-the-middle". Becoming "stuck-in-the-middle" is often an expression of a company's unwillingness to make choices in terms of how to compete. According to Porter this means clearly a lack in the strategy, which fails to place a distinct emphasis on either dimension. This concept has been used to refer to unsuccessful strategic combinations. (Porter 1980, 1985)

### **3.3.2 Comparative advantage**

The comparative advantage as a phenomenon means the ability of one country or region to produce a product at a reduced cost compared with another country or region. The nation with the lower cost structure has a comparative advantage over the other country. Often countries attempt to use trade law or trade monitoring bodies to allege price dumping or violations of expected labor practices that unfairly allow companies in that country to be low-cost producers and thus grab a comparative advantage. One company may also have a comparative advantage over others if its cost structure is lower. Following case is a simple example about comparative advantage.

### **3.3.3 Resource-based view and competitive advantage**

The resource-based view has been developed for explaining how organizations achieve sustainable competitive advantages. Resource-based view tries to explain why firms differ and how it matters. Resource-based theory treats firms as potential creators of value-added capabilities, and the underlying organizational competences involve viewing the assets and resources of the firm from a knowledge-based perspective. It focuses on the idea of costly-to-copy attributes of the firm as sources of business returns and the means to achieve superior performance and competitive advantage. (Barney, 1991)

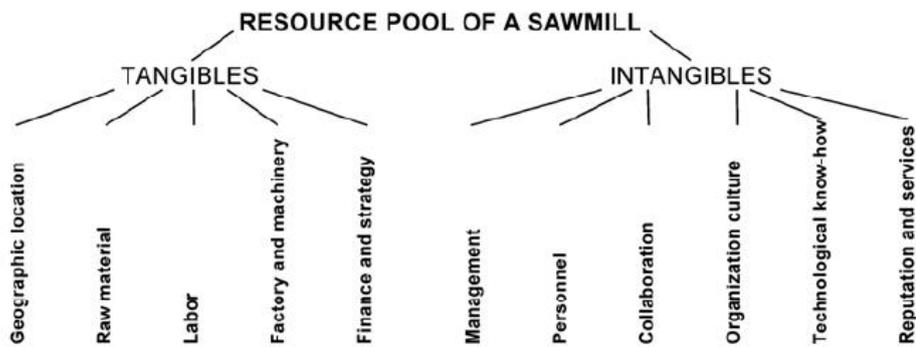


Figure 9. Resource pool of a sawmill (Lähtinen, 2009)

Figure 9 illustrates firm's resources, which consist both tangible and intangible assets, human and nonhuman that are possessed or controlled by the firm and that permit it to devise and apply value-enhancing strategies. Unique resources and capabilities are discussed under a variety of names, which are for example core competences, invisible assets, core capabilities, internal capabilities, embedded knowledge, corporate culture, and unique combinations of business experience. Resources and capabilities that are valuable, uncommon, poor to imitate and non-substitutable are presenting the firm's unique or core competencies and therefore present a lasting competitive advantage. Intangible resources are more likely than tangible resources to generate competitive advantage.

Specifically, intangible firm-specific resources such as knowledge permit firms to add up value to incoming factors of production. It represents competitive advantage for a firm. Such advantage is developed over time and cannot easily be imitated.

There are some studies made in terms of RBV, which are related on forest-based industry. For example Lahinen et al. (2008) has examined, within the resource-based view (RBV) framework, the impacts of resource usage decisions on the financial performance of Finnish large- and medium-sized (LM) sawmills during the 2000s. The data consists of literature, firm-level financial accounting information and interviews made and analysed with a literature review, a regression analysis and the multi-criteria decision analysis (MCDA) method. (Lahinen et al., 2008)

### **3.4 Industry evolution model**

#### **3.4.1 Industry follows a trajectory**

According to McGahan (2004), every industry follows a development path. The four categories outlined here are exhaustive and are radical, creative, intermediating and progressive.

What is important is that every industry follows just one of the trajectories. According to the McGahan (2004) the four categories presented in this chapter are mutually exclusive. This point is subtle because there are overlaps in some of the characteristics of each of the four trajectories. For example, under both progressive and intermediating change, core assets are not threatened and serve as a source of stability or under both radical and intermediating change, core activities are threatened with obsolescence. (McGahan, 2004)

According to McGahan (2004), shifts between models are rare. This is true because each model represents only the way in which change takes hold rather than the pace or specific character of the change. In the rare instances when a shift between models does occur, it is when a threat of obsolescence either crops up or goes away. (McGahan, 2004)

Structural change can be significant even when the industry does not face a threat of obsolescence. Industry change occurs at different intensities, in different ways and with different implications under the four trajectories. It is important to appreciate the potential magnitude of change even when the obsolescence of the industry's core activities and assets is not at stake. For example, due to the accumulated effect of many incremental changes in progressive change can be transforming. (McGahan, 2004)

### **3.4.2 The “four trajectories” describing industry change**

According to McGahan (2004), industries evolve as a result of obsolescence. She suggests there are two types of threats of obsolescence to the industry:

- A threat to the core activities; the recurring activities companies perform to attract and retain suppliers and buyers that have historically generated profits for the industry
- A threat to the core assets; the durable resources, including intangibles such as knowledge and brand capital, that have historically made the organization efficient at performing core activities, are failing to generate value.

The Four Trajectories of Industry Change is a model to describe how industries change (McGahan, 2004). According to McGahan intelligent investments within your organization can't be made unless you understand how your whole industry is changing. The need to understand change within the industry may seem obvious, but such knowledge is not always easy to get. According to McGahan the four major trajectories of industry change describe the different types of trajectories that tend to emerge. (McGahan, 2004)

Activities are actions performed within the industry under corporate direction with the intention of creating revenue or of managing costs for firms like; purchasing, operations, human-resource, management, distribution, marketing and selling. Activities tend to be integral to the relationships between the industry’s firms and their buyers or suppliers. They lack durability and are drivers of income-statement items on a company’s financial reports.

Assets are durable goods and services that are owned by the firms in the industry. Ownership exists only when a firm can claim the asset as tangible or intangible property. For example, a piece of equipment, a trademark, and a patent are all assets, but an employee’s skills and a new R&D initiative are not assets. Property, plant, equipment, cash, inventory, and accounts receivables clearly qualify as assets. Brand capital and intellectual property qualify as assets if they would retain their potential to create value even after they were not in use for a year. (McGahan, 2004)

An asset or activity is “core” if the profitability of the industry as a whole would be materially diminished by the eradication of the asset or activity for some significant period of time. In most cases, a year-long time horizon is sufficient for this evaluation. Thus, an activity or an asset qualifies as “core” if it could not be replaced within a year by some other asset or activity without damaging profitability.

<b>Core Activities</b>	<b>Core Assets</b>	<b>Trajectory</b>
<b>Threatened</b>	<b>Threatened</b>	<b>Radical</b>
<b>Not threatened</b>	<b>Threatened</b>	<b>Creative</b>
<b>Threatened</b>	<b>Not threatened</b>	<b>Intermediating</b>
<b>Not threatened</b>	<b>Not threatened</b>	<b>Progressive</b>

Figure 10. The combination of the two types of threats in combination with each of Four Trajectories of Industry Change.

As illustrated in figure 10, the combination of the two types of threats industries change together with each of Four Trajectories of Industry Change. McGahan suggests, that the industry change is radical, when core assets and core activities are both threatened with obsolescence. Companies must balance harvesting profits in the short term versus investing in activities that could create future profits in the long term.

The industry change is progressive, when neither core assets nor core activities are jeopardized. Company can innovate through interrelated products that create compounded demand and the industry change is creative, when core assets are under threat but core activities are stable.

Intermediating change means, that core assets retain their value, but core activities are under threat. Business should aggressively pursue short term profits while minimizing long-term commitments and contracts. (McGahan, 2004)

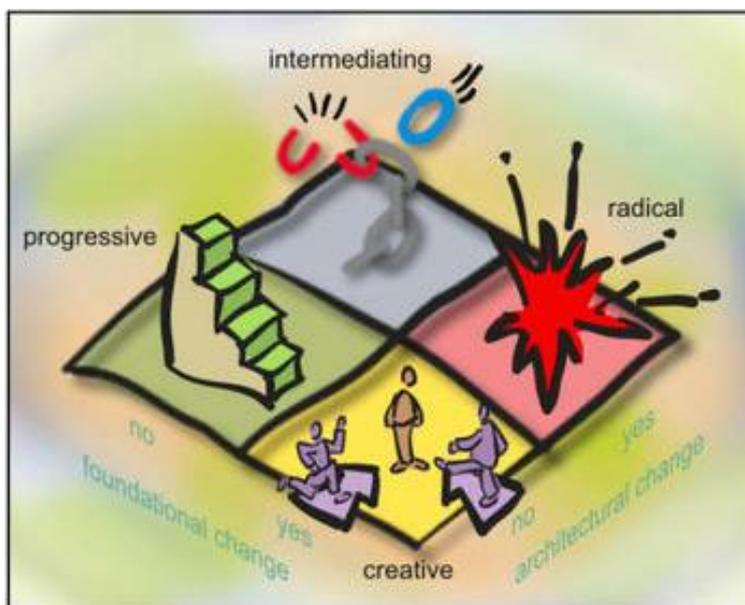


Figure 11. Four Trajectories of Industry Change illustrated (McGahan, 2004)

Progressive change involves no threat of obsolescence to core activities or core assets. McGahan argues that, coffee retailing, soft-drink bottling, long-haul trucking and sawnwood production all evolve on the progressive model. Because buyers and suppliers are largely satisfied and because rivals tend to pursue distinctive positions, the industry's leaders can innovate by building on established activities.

When an effort to innovate fails, the results are not devastating. Companies learn quickly about the failure using feedback from buyers and from suppliers and can retrench without more than a temporary hit to performance. (McGahan, 2004)

Although rare, it is possible for an industry to shift between evolutionary trajectories. The criteria for a shift lie in whether a new threat of obsolescence emerges or fades away. When a new threat emerges, then an industry is snapped onto a new route. The route depends on the nature of the threat (i.e., in whether architectural and/or foundational change is under way). When an old threat fades, the structure of the industry evolves by a different set of rules that depend on whether a residual architectural or foundational transformation continues. (McGahan, 2004)

Industries almost always start out on either a progressive or creative trajectory because the firms within the industry have a strong incentive to create a clear, dominant model for organizing activities in a way that allows them to capture value. Industries begin on a Creative rather than progressive path when core assets must be created before their commercialized value can be assessed. (McGahan, 2004)

In both progressive and creative industries, pressure may build up for change in the dominant model. As a result, the industry's approach to value creation may become threatened with obsolescence and an architectural change may occur as the industry is catapulted onto either a radical or intermediating path. Radical and intermediating transformation occur over long periods and threaten the competitive standing and profitability of established leaders. (McGahan, 2004)

After the restructuring of activities over time – on the order of decades – the threat of obsolescence may fade, marking a transition back to a progressive or creative path. A company that has survived from the beginning confronts renewed opportunity to secure competitive position although often at a smaller scale and often based on a very different approach.

Shifts between trajectories do not happen frequently. It can take decades for the trajectory of industry evolution on a single model to run its course. In fact, it is virtually unheard of for an industry to go through a transition between evolutionary trajectories more frequently than once in 10 years. (McGahan, 2004)

The rules in play under an evolutionary trajectory establish boundaries on effective strategies. Each trajectory carries strong implications about the kinds of innovation that lead to sustained superior performance. Developing a strategy that exploits the opportunity in industry evolution depends on understanding the phase of change under each trajectory. A company that recognizes a transformation early generally has access to a broader range of attractive options than a company that recognizes the evolutionary path late in the process of change. By innovating to take advantage of the specific character of the trajectory the firm can substantially improve its chances of achieving a superior return on investment over the long run. (McGahan, 2004)

### **3.5 Introducing the Framework of the study**

As illustrated in Figure 7, the Finnish sawmilling industry has core activities and cores assets, which are affecting to the trajectory changes in the branch. Depending on nature of these changes, they can be analysed by SWOT-analyses in order to reach perspectives about evolving trajectory and competitive advantage. Based on the perspectives there can be assessed, whether the future views of the trajectory are more positive or negative.

As illustrated in Figure 12, the Finnish sawmilling industry has core activities and cores assets, which are affecting to the trajectory changes in the branch. Depending on nature of these changes, they can be analysed by SWOT-analyses in order to reach perspectives about evolving trajectory and competitive advantage. Based on the perspectives there can be made conclusions, whether the future views of the trajectory are more positive or negative.

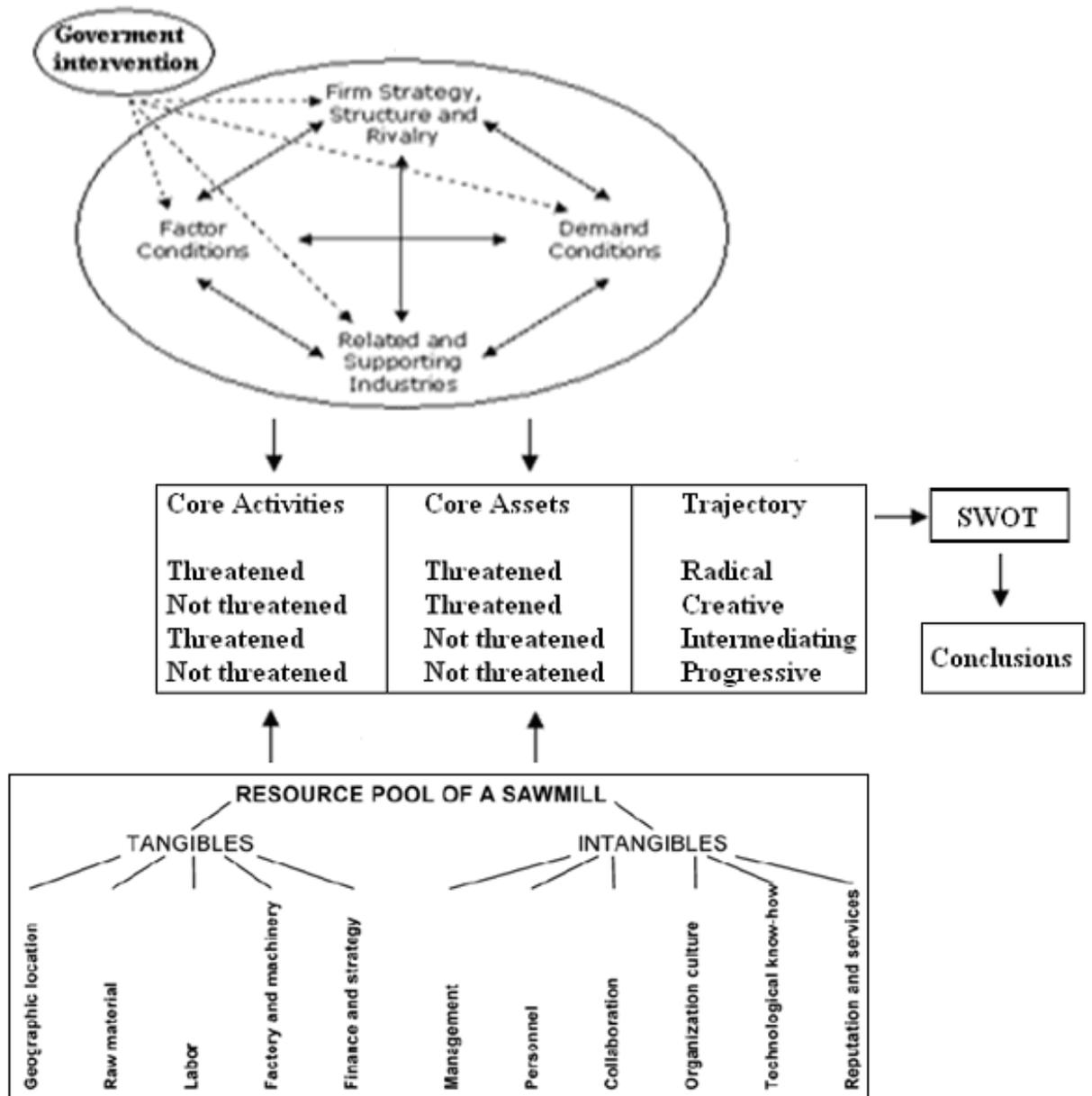


Figure 12. The Framework of the study

## **4. Data of the study**

### **4.1 Data**

The data of the study bases on primary and secondary data. The primary data was gathered by making altogether five theme interviews. The first of the respondents was a researcher of The Forest Research Institute and the second respondent was a representative of Finnish forest industry organisation. The rest three respondents were managerial representatives of integrated- and independent sawmilling industry. Three of the interviews were made by using telephone, due to the interviewees' busy schedules. The rest two of the interviews were made by visiting the respondents personally. The interviewees were asked for permission to record the interview.

Secondary data consists of presentations, reports, and publications published on the branch. The sources used in the study are trade publications, data banks, press releases and research reports. Secondary data is used to identify and study the current situation of the sawmill industry. Data were collected from different sources and very interesting is that a significant proportion of this incoming data is available on the Internet for electronic form. This will of course call into question the reliability of the data, since in principle anyone can publish on the Internet their own texts. Although the text seems convincing, it does not necessarily have gone through a scientific assessment. In case the verification is difficult to assess from individual sources, there must attempt to assess the sources of published entity.

## **4.2 Methods**

### **4.2.1 Theme interview**

The interview situation can be either an individual or a group interview. Individual interviews are the most commonly used method. Group interview can be used in addition to a couple of interviews (eg, family studies). A group interview is targeted to multiple interviewees at the same time. (Hirsjärvi and Hurme, 2000).

Generally, a theme interview is useful for researching and evaluating of experiences. At its best, a research made by the theme interview method may create a new theoretical framework through the interviewee's experience. Theme Interview is one form an interview between an open- and formular interview. It is a suitable research method when it is not known what kind of answers will be obtained and when the answers are based on an individual's own experience. A theme interview focuses on certain topics, and a typical feature is, that the interviewees have experiences of the same kind of situations. The interviewer do not follow accurate, detailed, pre-formulated questions, but broadly through the pre-decided themes. Open discussion about the topic gives people space, although the pre-decided topics are to be discussed.

The interview is like debate situation by going through pre-decided themes. The order for the statements in terms of themes is flexible, and not necessarily all the interviewees talk about all issues to the same extent. The researcher has an interview with them as short as possible the notes dealt with the themes, so he could focus on the discussion paper. Themes can be listed for example by making lines and draw up some additional questions or key words in the debate for the feedings. Theme of the interview should not therefore be a little strict in the strict order of presentation of issues including paper. (Hirsjärvi and Hurme 2000)

According to Vehkalahti (2008), the reliability describes exactly how things are measured. Hirsjärvi et al. (2005) are suggesting, that reliability in qualitative research can not be assessed as accurately than quantitative research. In qualitative research the reliability has had different interpretations, but the important thing is to try as closely as possible to describe the different phases of the research project.

There are issues like interview circumstances and locations where data will be collected, whereas the time spent on interviews, potential distractions and the researcher's own assessment interview situations, which should be declared by reporting. Particularly, the qualitative data classification and the classification criteria should be explain to the reader. Interpreting the results are the accuracy requirements important. Furthermore in terms of results, should be informed the basis on which the interpretations are presented and what conclusions are based. (Vehkalahti, 2008)

Vehkalahti (2008) notes, that the purpose of the validity is to reveal, whether measuring instrument will be measuring issues, which were originally to be measured. The validity of the research will be improved by using several methods. (Vehkalahti, 2008). According to Juslin and Lindström (1998) the high validity of the research can be achieved by using unbiased and relevant data to the characteristics being measured. Unclear formulations of questions can lead for instance to risk to achieve not relevant results and the measurement does not describe the issue correctly. (Juslin and Lindström, 1998)

#### **4.2.2 SWOT analysis**

In this study SWOT analysis will be used to judge future perspectives for the trajectory in the Finnish sawmilling industry. SWOT is an abbreviation for Strengths, Weaknesses, Opportunities and Threats. The analysis summarises the key issues, which are affecting to the environment, where the Finnish sawmilling industry is operating in. SWOT- analysis was devised by a business and management consultant Albert Humphrey.

The SWOT- analysis is an important tool for auditing the overall strategic position of a business and its environment. Once key strategic issues have been identified, they feed into business objectives, particularly marketing objectives. (Johnson and Scholes, 2002)

There are internal and external issues to be separated in SWOT analysis. Strengths and weaknesses are internal factors. For example, a strength could be your specialist marketing expertise. A weakness could be the lack of a new product. Opportunities and threats are external factors like, an opportunity could be a developing distribution channel such as the internet, or changing consumer lifestyles that potentially increase demand for a company's products. (Johnson and Scholes, 2002)

A threat could be a new competitor in an important existing market or a technological change that makes existing products potentially obsolete. SWOT analysis is used as a guide and not a prescription. Adding and weighting criteria to each factor increases the validity of the analysis. (Johnson and Scholes, 2002)

#### **4.2.3 PEST analysis**

PEST is a tool when a company is taking its business to another country or when it is entering the market. Since it shows the possibilities and legalities, which a company has in certain business areas. Due to limited domestic markets, the Finnish sawmilling industry has had to search international growth and expansion from abroad.

(West, et al., 2006)

The competitive power of the cluster is based on the interaction between the it's various sectors and businesses as a source of knowledge, skills, innovation and development. Thus, the forest cluster is one of the strongest concentrations of Finnish expertise. Research and education, which constitute a fundamental part of the cluster, are important for its innovative and developmental power. (Fleisher and Bensoussan, 2007)

#### **4.2.4 The difference and relationship between PEST and SWOT methods**

A PEST analysis most commonly measures a market as the SWOT analysis measures a business unit, a proposition or idea. Usually SWOT analysis measures a business unit or proposition, whereas a PEST analysis measures the market potential and situation, particularly indicating growth or decline, and thereby market attractiveness, business potential, and suitability of access - market potential. PEST analysis uses four perspectives, which are political, economic, social and technological. Perspectives give a logical structure, in this case organized by the PEST format, that helps understanding, presentation, discussion and decision-making. PEST analysis is a tool for marketing and business development assessment and decision-making and it creates proactive thinking, rather than relying on habitual or instinctive reactions. (West, et al., 2006)

PEST can include also other, such as environmental, ethical, legal or legislative factors. Usually these 'additional' factors are, however, actually contributory causes or detailed perspectives taking effect in the form of one or several of the original four main PEST factors. For example, ethical and environmental factors will always tend to produce an effect in at least one of the main four headings (political, economic, social, technological), but it will tend not to work the other way. (West, et al., 2006)

PEST assesses a market, including competitors, from the standpoint of a particular proposition or a business. SWOT is an assessment of a business or a proposition, whether own or a competitor's. Strategic planning is not necessarily a precise science, it is a matter of pragmatic choice as to what helps best to identify and explain the issues. PEST becomes more useful and relevant the larger and more complex the business or proposition, but even for a very small local businesses a PEST analysis can still throw up one or two very significant issues that might otherwise be missed. (West, et al., 2006)

The four quadrants in PEST vary in significance depending on the type of business, eg., social factors are more obviously relevant to consumer businesses or a B2B business close to the consumer-end of the supply chain, whereas political factors are more obviously relevant to a global munitions supplier or aerosol propellant manufacturer. All businesses benefit from a SWOT analysis, and all businesses benefit from completing a SWOT analysis of their main competitors, which interestingly can then provide some feed back into the economic aspects of the PEST analysis. (West, et al., 2006)

## **5. Results**

### **5.1 Perspectives of the core activities and assets affecting the trajectory of the Finnish sawmilling industry**

#### **5.1.1 Changes threatening core activities**

Wood products and timber industry are an international business that works for all the set of rules according to international trading post. Key issue is how to cope in an international competition, dictating products, price trends, which are defining the business opportunities for profitable activities. World market prices are the same for all players and enterprises have to operate efficiently and competitively in order to become successful and stay on the market. Finnish sawnwood presents about 10% at our main market in Central Europe. Advanced processing technologies, such as gluing have narrowed the scope of Finnish wood properties as competitive advantage of high quality raw material.

(Ranta, 2008)

Factor conditions are the inputs necessary to compete in an industry, such as labour, arable land, natural resources, capital and infrastructure. The most important factors for modern competition are created but not inherited, Thus, a nation's stock of factors at any particular time is less important than the rate at which they are created, upgraded, and made more specialised for particular industries. Porter States that continually invest in the creation of advanced and specialised factors often translate these investments into industrial success. Porter (1990) argues that a lack of resources often actually helps countries to become competitive.

Abundance generates waste and scarcity generates an innovative mindset. Such countries are forced to innovate to overcome their problem of scarce resources. The interview results are supporting Porter's statement, because for example Nordic countries have a short building season and high construction costs. These two things combined have created a need for pre-fabricated houses. (Porter, 1990)

### **5.1.2 Domestic raw material procurement for the sawmilling industry**

The raw material base in Finland in the pulp and paper industry is very demanding. About 90 percent of wood raw material is virgin fiber. Comparing to competitor countries, only Canada and the Swedish pulp and paper industry are on the same level. In Germany, the share of recycled paper raw material is much higher. Due to the large dependence on virgin fiber, price changes have a major impact on the cost structure of Finnish industry. In competitor countries the recycling of paper and market pulp as their raw material have been enjoying of competitive advantage due to the prices fall in recent years.

The representatives of sawmilling industry are claiming, that raw material prices of the have increased more than in the other key competitor countries. It is also notable, that Sweden and Canada have benefited recently from foreign exchange rate changes, however this has been a temporary advantage. Raw material price in sawmilling industry has increased from 2000 to 2008 by just under 4 per cent per year in Finland. In Sweden the increase was less than one percent and in Canada the raw material prices have declined of more than 3 percent. (Metsä- ja puutuoteteollisuuden.... Metsäalan strateginen..., 2009)

Pellervo Economic Research Institute (PTT) has researched price development of the wood raw material of Finland and its main European competitor countries since 1996. This study indicated that prices in Finland have been relatively more expensive compared to most of the competing countries throughout the review period.

Germany has been along with Finland also on a high price level. Areas of lower prices have situated in Estonia, Lithuania, The Czech Republic and also Sweden, although Sweden has a similar structure of the production and wood quality than Finland. Finnish current level of prices compared to competing countries by different lumber assortments described in the following table. (Metsä- ja puutuoteteollisuuden.... Metsäalan strateginen..., 2009)

Table 1: Cost comparison in terms of sawnwood production between Finland and competitor countries in February 2009 (Metsä- ja puutuoteteollisuuden.... Metsäalan strateginen..., 2009)

	Finland	Sweden	Norway	Germany	Austria	Estonia	Lithuania	Czech
Sprucelog	100	68	74	126	83	58	63	75
Pinelog	100	72	75		100	66	66	69
Spruce pulpwood	100	78			79	48	51	62
Pine pulpwood	100	90		133	97	60	63	75
Birch pulpwood	100	88				64	68	

Based on PTT analysis differences in price development for wood raw material are mainly due to differences in supply and demand structure, but also differences in added value of forest industry production explain the difference between the price of raw material. Variation during the period exists also, because of natural disasters. The raw material prices in sawmilling industry, have faced unusually large variation in the years 2007 and 2008. The phenomenon is due to strong demand fluctuations in terms of wood products, difficulties in access to raw material and difficult harvesting conditions. Lumber prices have fallen since 2008, because of a strong economic downturn. Wood markets in different countries operate independently of the other countries of the market. The demand of forest industry in every country, consists of the production of timber, which is met mainly own timber supply. (Metsä- ja puutuoteteollisuuden.... Metsäalan strateginen..., 2009)

Finnish forest industry has been lately suffering because of higher raw material costs. Despite this, the forest industry average profitability has not faced major differences between countries during 1996 - 2009, although the return on investment has been modest compared to recent years global competitors. Local differences can be found in particular sawmill industry. Factory or sawmill costs are influenced by long-distance transportation and high administrative costs. This expenditure is not in this calculation included, as the PTT report bases on roadside prices.

According to inventory reports related to domestic forestry resources, there will be sufficient round wood in Finnish forests, even if the Russian import end. Another question is how to secure the stable flow of raw material from the forest to the mills with the price the industry can manage to pay on global scale. (Metsä- ja puutuoteteollisuuden... Metsäalan strateginen..., 2009)

### **5.1.3 Geographical location challenging the cost structure**

In relation to other European competitor countries the high distribution costs are a particular weakness according to the interviewees. The Finnish production will always have additional costs because of its location. Transporting costs are assuming to grow in the future, which is caused by increasing price of energy, climate issues, without forgetting emissions control and increasing freight costs.

The stevedore strike in the beginning of 2010 did cut off export revenues while production and raw material costs continued to accumulate. Industrial action by the dockworkers was preventing deliveries of Finnish sawn timber as seasonal construction activity kicks off in spring. "The Transport Workers' Union AKT's actions were having a heavy impact on the sawmill industry, which had already experienced plenty of hardship because of the economic downturn. The sawmill industry's export revenues were in down turn as customers will only pay for delivered goods. This was an extremely tough but temporary situation for an industry just beginning to recover from the economic downturn.

### 5.1.4 Labour and education resources

The age structure in Finland is biased towards aging population. Change is primarily due to rising life expectation and fewer young people of working age. While the traditional timber production is becoming more technologically-oriented, problem can occur in the form of lack of highly skilled labour. All of the respondents were emphasising, that lack of skilled people can be an impediment to business development. Especially the representative of the sawmill industry was opinion, that the industry shall continue modernizing its image in order attract new students to the branch. If the timber products will be processed in the future even further, it means more investment in technology, but also increased need for labour, depending on the degree of processing. In Finland, the labour costs are high comparing to competitor countries, which could inhibit the development of processing activities.

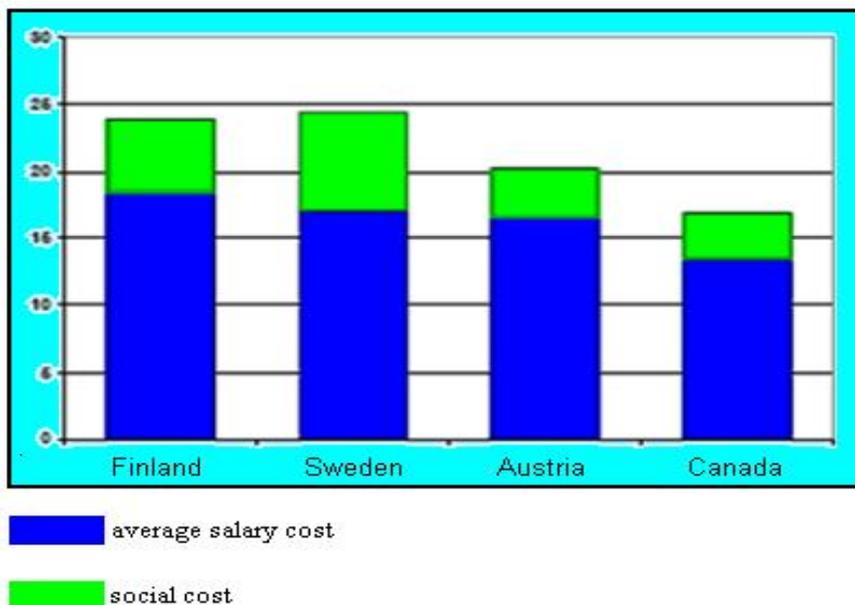


Figure 13. Cost comparison in terms of labour costs between Finland and competitor countries 2008 (Indufor, 2009)

In 2008 the average salary including social costs in Finland was about 24 euros per hour. In other competitor countries like Sweden the amount was also about 24, in Austria around 20 euros and in Canada around 18 per hour. The labor cost from 2000 to 2008 increased from an average of more than 3 percent annually in Finland. In competitor countries such a high level of price increase has not happened.

In Sweden and Austria, the price of labor input has grown an average of about 2 percent annually and in Germany about 1 percent per year in the same time of period. In Canada the price of labor input has dropped from 2000 to 2008 of just under percent per year. (Metsä- ja puutuoteteollisuuden.... Metsäalan strateginen..., 2009)

## **5.2 Changes threatening core assets**

### **5.2.1 Demand Conditions**

Demand conditions play an important role in the creation of a nation's competitive industries. Firms often succeed in industries where the presence of particularly sophisticated and demanding customers forces them to sharpen their performance at home market. Public firms often gain competitive advantage in industries where the home demand anticipates foreign demand and therefore gives local companies a clearer or earlier insight of emerging buyer needs.

As discussed in the chapter 1.3, the Finnish sawmilling industry is in a turning point at the moment. All the primary production costs in this sector have been increasing in a very short time. The business environment of the Finnish sawmill industry has changed notably since the 1990s, which has reflected in the cost competitiveness and income structure of the firms. The sawlog demand and prices have increased because of the growth in sawnwood production capacity, especially in Eastern European countries and Russia.

In Western Europe, the upswing in forest conservation and the production of bioenergy have diversified the use of forest resources and decreased the supply of saw logs. Since raw material costs have accounted for over 50% of the total costs in the Finnish sawmill industry in the 2000s (StatFin 2008), the development of sawlog prices is reflected directly in the operational preconditions of sawmills.

As illustrated in Figure 14, the proportion of exports of the total sawnwood production of Finnish sawmills has varied between 56% and 75% since the 1990s. In the beginning of the 2000s, the sawmills located in Finland manufactured close to 12% of the total European sawnwood production, while in the past couple of years the share has dropped down to 9–10%. In the international markets, sawnwood prices have fluctuated strongly due to business cycles that have occurred in the general economy and especially in the construction sector. Simultaneously with these changes, the overcapacity of sawnwood production has aggravated the excess supply problem in Europe and affected adversely sawnwood prices. Due to the current downswing in the global economy, in the near future, improvement of the unfavourable market situation of the sawmill industry is not expected to occur. (Lähtinen et al., 2008)

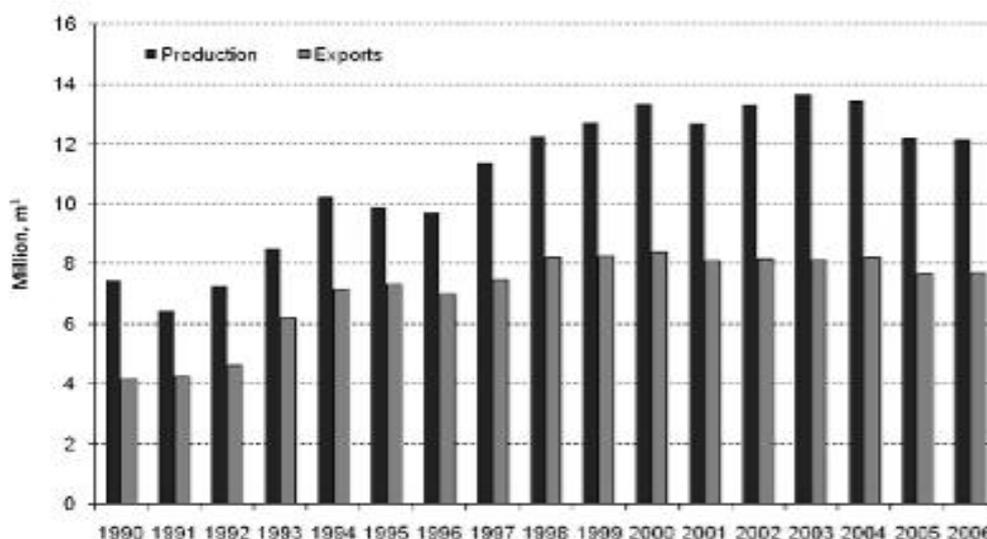


Figure 14. Total production volume and exports of the Finnish sawmill industry from the 1990s (Lähtinen et al., 2008)

In addition to the increased competition among sawnwood producers, the market penetration of oriented strand board (OSB) and engineered wood products has slowed down the growth of structural sawnwood consumption in Japan and Western Europe. The proportion of Japan and Western Europe comprises over 60% of the exports of sawmills located in Finland. In recent years, the Finnish sawnwood exports to Japan have been composed of both pine and spruce sawnwood while, for example, the foreign trade to Britain comprises mostly pine sawnwood and exports to Germany mainly sawnwood made of spruce. (Lähtinen et al., 2008)

At the firm level, the purpose of strategic decisions is to create value with production and marketing by matching the firm's resources and capabilities to the opportunities that arise in the business environment. In the global markets, woodworking firms must be cost competitive but also innovative, creative and capable of combining new knowledge in order to sustain their competitiveness. Especially for the sawmills located in higher cost-level countries in Europe and North America, the ability to create value by manufacturing special products and providing customer services of good quality have been emphasized as important strategic choice and crucial to business success in the 2000s. However, empirical evidence of those linkages between the strategic choices and business success in woodworking firms is in a large extent still lacking.

### **5.2.2 Domestic demand trends**

According to managerial representatives of integrated- and independent sawmilling industry, the sawnwood demand in Finland has been increasing. The domestic consumption of total sawn timber production is about 40 percent of the total production volume. Renovation sector has collapsed due to a deep recession in the world economy, which affects much of the Finnish export-driven sawnwood demand. According to the researcher of The Forest Research Institute, the importance of housing renovating will be increasing as the sector is getting in downturn. At the same time, the structural adjustments of domestic raw material in relation with the situation pulp and paper industry moves to cheaper sources of fiber raw material.

The economic slowdown is reflecting to the customer structure and lower spending gamblers have had eliminated from the distribution chain. In development of distribution chain are the large buyers more powerfull, states the representative of Finnish forest industry organisation. In particular, the large do-it-yourself chains favor the increase, in which case the order of sawn timber sizes will be higher.

	2007	2015	2020
paper	11,3	7,9	6,6
paperboard	3,1	2,9	2,9
pulp	12,9	9	7,5
sawnwood	12,4	10	10
plywood	1,4	1,4	1,5
fibre-and particleboard	0,5	0,4	0,4

Figure 15. Total production volume of the Finnish forest industry in 2007 with estimates for 2015 and 2020 (million tons and cubic meters) (Hetemäki and Hänninen, 2009)

According to Statistics Finland granted the number of building permits has continued their dramatic fall. Between January-February 2009, residential building permits were granted 40 percent fewer than last year at the same time. Residential buildings is estimated to fall this year to 14 000 housing, which is less than the worst of the 1990s years.

Construction and repair of the aid granted by Finnish Government has only indirect affect the consumption of sawn timber. Stimulus package of the Finnish Government is speeding up mainly in public construction projects, which use less wood than the as private houses sector, who is important customer for the domestic sawmilling industry.

Share of the domestic use of sawnwood production was 43% in 2007. It is a fact that the population in Finland is expected to grow only slightly, so the domestic lumber consumption will be no longer increasing significantly. Wood is used in many single-family constructions. The use of wood would be the greatest opportunity in increasing apartment and public building as it has been in Sweden. (Metsäteollisuuden tuotanto...Metsäteollisuus ry., 2009)

According to Hetemäki and Hänninen even a small change in lumber use per capita could lead to remarkable change in the total consumption volume. Finland's example shows, that consumption can increase the use of sawnwood even quickly during the short period. Since the beginning of the 1990s increased the sawnwood consumption per capital from 0.6 cubic meters up to about one cubic meter in Finland. If the European consumption of sawn softwood increases per 0.15 to 0.20 cubic meters between 2007 - 2020, the consumption of 106 million to increase 140 million cubic meters. However, this rate of growth of consumption probably also would raise the saw log the price in Europe. (Hetemäki and Hänninen, 2009)

### **5.2.3 Global demand trends**

Traditionally the sawmill industry in Finland is characterised by a strong sensitivity to economic fluctuations. The consumption of sawnwood clearly depends on economical issues in building sector, carpentry- and packaging industry. To these issues also the growth of population and income the people has available to consume, have a strong effect. The effects of cultural matters are clearly seen when comparing the consumption of wooden products per capita in different countries. (Alajoutsijärvi, et al., 2002)

About 2/3 of Finnish wood industry exports are aimed at the European market. In Europe about half of the sawnwood consumption will be used by the building sector, when in North- America the share is about 70% and in Japan even 80%. One respondent presented, that the building trend in West Europe will increase quite slowly and the branch will pay more attention to renovating matters. This will change the global demand trend in the future. Compared to Western Europe the rebuilding development is increasing clearly faster in Eastern Europe. This is due to the fast growth of economy in new EU- countries. It is estimated that in Japan the building sector will not grow quantitatively, because the population is becoming older and therefore the number of inhabitants will not increase. (Hetemäki et al., 2006)

The real market demand and the strengthening of the recovery is expected, however, only 2012, or thereabouts. According to Rautanen it is expected, that the due to the better economic situation also the interest rate of wood products is growing, which is partly due to the good environmental image of wood. The results of the interview made in this study will be supporting the opinion by Rautanen. However, the development of successful lobbying is slow due to the conservative stone and concrete industry. The construction of cultural conservatism stifles businesses to bring new products for construction. (Rautanen, 2009)

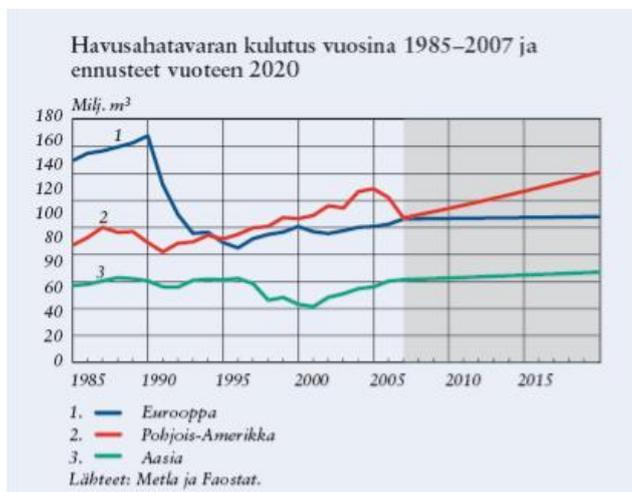


Figure 16. Consumption of coniferous sawn timber between 1985- 2007 and the estimated until 2020

Coniferous sawntimber consumption has estimated to continue in the way it has been in recent years until 2020. As figure 16 presents the softwood consumption growth has been estimated to be 8% from 2007 to 2020. From the Finnish perspective market are regions and countries in Europe, Asia and North America and the homeland the most attractive ones.

Market areas like North Africa, Middle Eastern and Asian countries are of interest to larger companies. Particularly the Middle East and North Africa, are promising demand regions, due to the traditional residential construction activities related to the Bulk materials, which fit for the Finnish market. North American lumber consumption is growing faster than elsewhere, due to the cultural matters in terms of building and population growth. Customers' purchasing power is, however, also very dependent on the global economic situation and the cyclical nature. The political development of the regions has an effect on demand as well.

According to scenarios by Rautanen (2009), sawn timber prices might continue to fall due to fierce competition European producers. Customers may use this as an advantage, and are not interested in or committed to develop relations with the producers, because there will always be someone to whom the customer may supply the timber at lower prices. (Rautanen, 2009)

Rautanen presents a scenario where by 2020, the Finnish sawmill industry has gone through a market in the face of a few cycles, and might not be able to do much about improving the state. The industry might be still struggling with the high costs, which might delay important investments of production facilities to research and product development. Sawn timber price has hardly evolved positively, but rather decreased compared to ten years ago. The price development has affected the East European low-cost lumber. The development of sawn timber prices might be affected by reductions in the supply chain and increase its operators. Larger operators have more bargaining power in price. Major international do-it-yourself chains and construction companies are increasingly affecting in the timber market and trade flows between countries. (Rautanen, 2009)

Consumption of wood products reviews includes a lot of uncertainty, so consumption can also increase more than estimated. Figure 17 estimates the development for European building sector 2004 – 2011. The estimates are based on the assumption that the use of wood per capita do not just grow in the future. Many of the social change factors such as an aging building stock and renovation needs in many European countries will create

opportunities for the use of wood. Furthermore climate change actions can increase the use of wood in the future Europe significantly. (Eurooppalaisen puutuote... Metsäteollisuus ry., 2009)

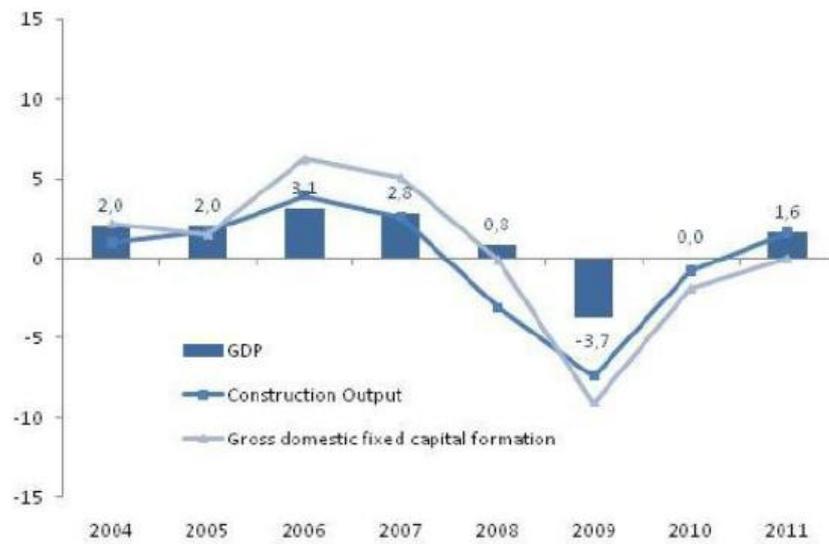


Figure 17. Estimate for the development of European building sector 2004 – 2011 (Kylävainio, 2009)

## **5.3 Perspectives in improving the competitiveness of Finnish sawmilling industry**

### **5.3.1 Bioenergy- a new business opportunity for the sawmills**

Energy derived from biomass, which is organic material such as wood, plants, or animal wastes is called as bioenergy. It can be used to generate electricity, produce heat, and also for the production of biofuels. Biofuels are fuels made out of biomass and used instead of traditional fossil fuels. Usually biofuels are used for transport and heating applications as well.

Biomass is the fourth largest energy source after oil, coal and gas in the world. According to the estimations the annual use of biomass for energy purposes is corresponding around 11 % primary energy consumption on world scale. Over 80 % of biomass use for energy purposes takes place in developing countries, where the share of it out of total energy consumption is about 30%. In comparison, the share in industrialized countries is around 3%. In Finland, the share of biomass in total energy consumption by 20% is the highest in comparison to other industrialized countries. The most remarkable rawmaterial source for the biofuels are the by-products like sawdust, bark and waste liquids. (Energia Suomessa, 2004)

The most of the utilizing technology for the biomass is commercially available. Despite the fact, there will be need more improvement in terms of cost efficiency during the next 5 – 10 years. The potential for electricity and the heat production by using biomass is very high. On global scale the role of the biomass in energy production will become high, although it is heavily depending on political actions. The amount of the energy produced by biomass has been increasing annually about 10% 1999-2003. The tendency assumed to keep increasing 6-10% annually until 2010. Europe has the leading position in terms of R&D of Biomass. There would be room for improvement in coordinating the technology networks and co-operating between other countries within the European Union. (European Commission, 2005)

Independent Finnish sawmilling industry has announced its interest to participate into Bioelectricity production. The managing director of Finnish Sawmills, Jukka-Pekka Ranta (2007), points that the total volume of bioelectricity produced by sawmills could rise up to 400 Megawatts. To investigate the matter the Finnish saw millers have been visiting in the Middle-Europe to see how the production of electricity and heat is combined together. However, bigger forest industry integrators have been afraid that burning wood might rise pulpwood price development. However, the raw material; sawdust, bark and waste wood is already available by the mills. The results of the theme interview shows that technology is available, but the companies need to know how the political issues support their investments and how the tariff is settled. From sawmillers point of view, the tariff should vary according to market situation. According to respondents the investments for the bio energy production are expensive, therefore co-operation between other companies would be needed. (Raunio, 2007)

Tightening goals in terms of climate politics are putting more pressures on price increasing for fossil energy sources. The demand for wood for energy production purposes is increasing in the future. Therefore, sawmills would be able to diversify their income sources also by selling chips, pellets and sawdust for energy purposes in the future. There has been discussion in terms of setting a feed-in tariff, which would enable for sawmills to produce electricity along with heat. Also strongly increasing international demand for pellets will bring possibilities for sawmilling industry.

The most remarkable barrier for the development of Bioenergy markets is the pricing policy for electricity produced by renewable energy sources. The prices of bio electricity varies in different countries. Tariffs are depending on source of the electricity, technology used and the size of the producing plant. Also the continuous changes in national political actions between local parties in different countries are getting the long term investments more complicated. (European Commission, 2005)

The most remarkable by-product is the black liquor containing wooden particles. Debarking leftovers are traditionally utilized by sawmills for producing energy for decades, burning the bark and other wood residues in steam boilers. Sawmills used to deliver raw material also for municipal heating plants. By improving the competitiveness of production methods should aimed at developing more efficient. Best results are achieved by a production processes in combining effectively industrial possibilities of wood raw materials and for energy supply. The forest industry wood residues on the energy content would be possible to increase the number of TWh / a by using the waste heat of drying. (Energia Suomessa, 2004)

The share of the renewable energy within European Union has been aimed to be 38% until 2020 argues Dan Asplund. He claims, that the taxation of oil should be increased to the same level in Europe as it tend to be in Nordic countries. According to Asplund, especially smaller electricity producers, like the Finnish sawmilling industry, needs investment supports. Asplund presents, that the Feed-in tariff is the most natural way to enable the business opportunity for the sawmills. (Haltia, 2008)

According to Asplund it is essential to increase the renewable energy production by 9,5 %, which is not possible without bioenergy. Water power would be the most cost-effective way to produce energy, however it will need active discussion and decision making from politicians. (Haltia, 2008)

### 5.3.2 Promoting the use of timber

Discussion about carbon capture related to use of timber has been very up to date topic and clearly improves the image of wood in building. Depending on the type of product manufactured and of the disposal method used at the end of its service life, the carbon will remain “locked up” in the product for many decades. According to the respondents the topic will clearly bring advantage for the promoting the use of Nordic timber and is clearly one issue to be taken into account in forest products marketing. (<http://www.puuinfo.fi>, 2007)

The consumption of coniferous sawnwood in Finland is about 0.95m<sup>3</sup> per capita at the moment. As figure 20 shows, the quantity is one of the highest in the world. That has been reached mainly by making important promoting campaigns. Puuinfo is one of the most important organizations in promoting among timber branch in Finland.

Netherland	0,15	Norway	0,63
Spain	0,13	France	0,17
Ireland	0,39	Sweden	0,54
UK	0,16	Germany	0,24
Italy	0,13	<b>Finland</b>	<b>0,95</b>
Austria	0,64	Switzerland	0,23
Japan	0,23	Denmark	0,39
Canada	0,62	USA	0,35

Figure 18: Consumption of coniferous sawnwood m<sup>3</sup>/capita 2006 (Aravuo, 2007)

The use of sawnwood in different countries is more or less culture specific. Finns have a long tradition in using wood as a building material. In Scandinavian countries the use of sawnwood is clearly higher than in other EU countries. Promoting wooden products has

brought good results for example in UK and France. This tendency should be kept on going and expanding also to other countries. The ecological acceptance of wood is high, which promotes its popularity as a building material. Other issues related to the matter are environmental and life cyclical aspects of the wooden products. There are also possibilities to increase the use of wood in public building sector. (Heino, 2005)

In 2008 in northern London, in a suburb of Hackney, a 9-storey wooden building was completed, which is at the moment the world's highest. At the beginning the house was designed to be build up out of concrete, but it turned to wood, because more inexpensive total cost. The storey apartment building is built without concrete or steel, just cross-laminated panels of PEFC-certified Austrian Spruce. Australian Timber development Association has calculated that the 9 storey residential building could store 181 tonnes of carbon when completed. Furthermore by not using traditional concrete methods could save a further 125 tonnes from entering the atmosphere during the construction process.

Sweden has advanced in the field of timber construction with a sense of purpose, where more than 20% of all new multi- storey buildings are built out of wood and the use of timber is still growing. Sweden has also begun to produce various kinds of wooden products, for example, cross-laminated panels as well as the country's own consumption and particularly for export markets. Swedes develop a modern timber building in the determination of a successful export sector. It might turn to a threat that Sweden will take the greatest benefits of building in terms of wood export potential in Russia. (Eduskunta, 2009)

Slow progress of the use of wood in construction of wood in Finland is an obvious reflection of an attitude problem. Market has been dominated by timber companies focused on paper production. However, wood has been used in only about 40% of the paper industry's needs. High-rise construction is in turn dominated the use of precast concrete elements. Timber construction has been considered old-fashioned material. Properly treated wood may take up to a material, even hundreds of years. Wood can also be used in new and innovative ways to enhance the aesthetic environment. (Eduskunta, 2009)

## **5.4 Analysing the changes and nature of the trajectory in the Finnish sawmilling industry**

### **5.4.1 Domestic rivalry**

Wood products industry in conjunction with forestry makes a significant proportion of revenue in several Finnish municipalities. Therefore, possible problems of sawmills are also reflected in local economies in Finland. The wood used by industry, from the sparsely populated areas. Private forest share is nearly 90 percent and timber sales revenue remains a big part of precisely the area where the forests are located. (Peltola, 2005)

The domestic sawmill industry is operating export orientated. However, the domestic market is very important, because nearly half of timber production will remain at the domestic market. About 85 percent of companies keep the homeland as main market area. As earlier mentioned, the use of the timber in Finland per capita consumption is one of the world largest. Demand for timber products in Finland affects major industry-specific situation. These are the sectors like households, construction, joinery industry and a timber industry. Almost half of the sales volume sawmilling industry has been aimed to other companies, one quarter of wholesale and retail trade, and a little less than a quarter to households. (Toimialaraportti, 2007)

Most of the domestic demand of timber products is reflected in the development of construction. About 80 percent of the sawn timber will be used directly or indirectly to the construction. The significance of renovation building, in which in the turnover of bigger building companies began increase in comparison to new construction in 2007, may facilitate the increasing demand in the sawnwood industry in the native country in the future. The demand for the products of the renovation used by the smaller building companies will increase probably when bigger construction firms will come more strongly along to the renovation market.

The decrease of building costs also probably speeds up renovation. However, the cost of the building does not necessarily have a direct affect to the number building, because there were built also much before the recession. Much more are affecting the general views of the economy and the availability of the financing. (Rautanen, 2009)

#### **5.4.2 Supporting export promotion**

During the recent years, there have been made many promoting programs in terms of building of wood and wood industry. During the period 2003-2004 was prepared for the period 2004-2010 extensive promotion about building of wood, which was approved by Government on 17.3.2005. Latest, in cooperation the Finnish Ministry of Employment and the Economy, Forest Industries Federation, Finnish Sawmills and Carpentry Association's collaboration made international growth-oriented development as well as marketing and international business development programs. Tekes – the Finnish Funding Agency for Technology and Innovation has launched a business workshop for forest industry. Despite, the large number of programs the real sector investments in product development has been limited. From Tekes' annual 500 million financing only about 1%, or about 5 million has been aimed in building of wood or wood-oriented development projects. Agriculture and Forestry Ministry has been funding each year by 50.000 Euros the Modern wooden town program, coordinated by the University of Oulu. (Eduskunta, 2009)

Although wood has increased steadily as a raw material in the production of single-family houses, and Finland has been successful exporter of wooden houses, many opportunities have been unexploited. Building of wooden multi-storey houses in Finland is low. It is a residential construction prevailing in the United States and Canada, and very significant, for example, in Scotland and Sweden, and the fast-growing central European countries. In France, building codes require a certain amount of wood use per square meter of building construction. Finnish exports have hampered the construction of standards for different countries. Finland is not successful in spite of the excellent wooden furniture manufacturer in Denmark and Northern Italian way. (Eduskunta, 2009)

### **5.4.3 Enabling new business formation**

According to Stefan Sundman, Energy director from Finnish Forest Industry Association, the planned feed in tariff will be setback Finland's objectives for renewable energy propagation. "Among other things, wind power, biogas, electricity and wood energy has been proposed large-scale subsidies. Fundraising has been proposed to make additional tax, or feed-in tariffs. This means that the Finnish driver of a functioning forest bio-energy will have to pay 30 percent of electricity in relation to this significant additional tax on high. This equation does not work, Sundman evaluated". Sundman pointed out that the forest industry produces 70 percent of Finland's renewable energy, but the additional taxes would undermine substantially the sanctioning of industrial opportunities in the future to invest in renewable energy projects.

According to Sundman, the thriving forest industry in Finland has been able to take a significant part of the increase of renewable energy targets by increasing the use of forest residues and the strengthening of industrial by-products, the use of new technology. Sundman points out that, additional costs, like taxes are not possible to add on final prices the forest products industry, because the price of the products will be determined on global markets.

Finland should introduce the market-driven system of guaranteed price for renewable energy for electricity, the Ministry of Economic Development working group set up to present. Proposals for wind power and bio-gas generated electricity. The final report of the feed-in tariff or guaranteed price level defined administratively. In preparation for further work and the Economy to find out how the tariff level of definition could be achieved through competition.

Forest energy for electricity feed-in tariff is not at this stage is presented. Support forest for energy, however, envisages: Economy now finds in one of Agriculture and Forestry with the Ministry, what form of support forest energy for electricity would be: feed-in tariff or a system which supports the production of forest chips. According to Petteri Kuuva the feed-in tariff system is not necessarily optimal in terms of forest energy. The experts were part of the opinion that such a feed can drain to the stumpage prices and it does not go to where it should go. (Uusiutuvalle energialla tuotetulle...Metsälehdin Metsäuutiset, 2009)

Furthermore, it seems that a lot depends on the need for feed-in price of emission allowances. “When the allowance price reaches close to 30 euros per tonne of carbon dioxide, wood chips for energy use will be sufficient. Problems comes when the allowance price is low, then it will take some support in order to provide sufficient wood chips”. (Uusiutuvalle energialla tuotetulle...Metsälehdin Metsäuutiset, 2009)

According to Minister of Industry Mauri Pekkarinen, the final report of the working group will provide a good basis for a bill to complete the preparatory work. Pekkarinen's goal is that a bill to come into force spring 2010. Working group points out, that the feed in tariff causes only a small additional cost to electricity to the consumer. (Uusiutuvalle energialla tuotetulle...Metsälehdessä Metsä uutiset, 2009)

#### 5.4.4 The sawlog supply and fragmentation of domestic private forest owners structure

As the Figure 19 presents, the private forest owners have 65 % of forests areas in Finland. Forestry is based on the way of private forest farms, their silviculture and timber supply, what is often called the family forest economy. Recently has again arisen discussion to fragmentation of forest ownership. Farm size reduction and forest owners' municipal change in structure may alter the future of forestry in the operating environment. The economic structure of the population has changed from rural to urban areas since the 1960s. Farmers share of forest estate owners has fallen, the number of outside forest estate living has increased. Current forest ownership is usually transferred to the next generation, mostly within the family. Only one owner out of ten has purchased the forests from the open market. (Korpilahti, 2009)

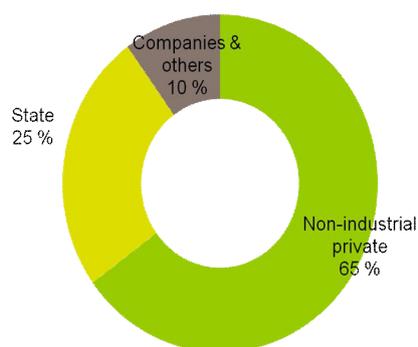


Figure 19: Forest owners and the ownership structure in Finland 2009 (Pesonen, 2009)

In comparison to Finland the ownership structure of forest land in Sweden differs. Private owners hold 51 % of total forest area. The share of the State, municipalities and communities hold 19 %, the Church 6 % and large forest companies 24 %. As in Finland, the structure of a large share of private forestland affects the procurement of timber. Many of the private forest owners in Sweden are organised in forest owners associations, which act for the benefit of the members in issues like forest management, economic services and on the timber market. A market price for timber is established between the different actors, forest owners associations, sawmilling companies and forest industry companies where sawmilling companies due to their size have less power compared with forest owners associations. Historically, the price of the raw material was decided upon on an annual basis with little modifications over the year between forest owners associations and forest industry organisations in Sweden. (Nord, 2005)

Lately there has been discussion also in terms of the problems related to timber trade and the background in a fragmented forest ownership. Majority of Finnish forest owners are retired, communities of heirs and city employees working in occupations. Growing part of the forest owners have aged and the interests of people who manage their property by saving, rather than actively making timber trade. Furthermore, the number of farmers is decreasing. When the economic importance of forest owners is decreasing, and interest in the sale of the wood decreases, the sales volumes of the current wood preservation can be really a struggle. (Metsänomistuksen pirstoutuminen...Metsälehdessä Metsä uutiset, 2008)

The fragmentation causes several problems for wood procurement. According to interviewee represented by independent sawmill industry the smaller forest areas are causing more additional costs for example for harvesting companies like by harvesting and transporting machinery. Both interviewees of Finnish forest industry organisation and the managerial representatives of sawmilling industry were emphasizing the issue, that the decisions in terms forestry politics might affect to the sales behaviour of the Finnish private forest owners.

Forest owners, according to the respondents, might be speculating for the next decisions related to the roundwood market's, which may affect to their sales activity negatively and procurement of roundwood may get stuck. The sawmilling industry requires long term decisions from the government in order to maintain stable situation for rawmaterial procurement.

#### **5.4.5 Energy taxation and competitiveness of Finnish forest industry**

Finnish Government announced to improve the competitiveness of the forestry industry in terms of energy taxation, and to support development projects in the wood bioenergy. Renewed taxation will be to be introduced early in 2011. "Energy prices are providing the Finnish forest industry a competitive advantage. This competitive advantage to conserve energy in the development of a tax cutting", said Finance Minister Jyrki Katainen.

These steps to initiate funding specifically earmarked for either the 2010 budget, or it may be to allocate the available appropriations. Total above-mentioned activities to promote the competitiveness of the forestry sector is already used in the next year approximately 60-80 million. The aim for the Finnish Government is to support the growth of woodworking industry by large development projects in areas like wood marketing and international business, and increase product development.

Increasing energy prices and change in terms of energy costs per unit in recent years has been lower in comparison to the main competitor countries, which have been an competitive advantage for our country. However, the planned removal of the KELA-payment by 2011, paid by employers, (The Social Insurance Institution of Finland) might cause energy-related tax increase, if implemented, the price of a net upward to an estimated 50-100 million. Currently, the forest industry paid taxes on energy of approximately 80 million, which is 3-4 per cent energy costs and about 0.4 percent of total costs. (Indufor, 2009)

However, reliable and comparable information in terms of cross-country comparisons and conclusions is difficult to get by a major industry. Tax policies vary competitor countries and significantly different repayment schemes exist, including in Finland.

## **6. Discussion of results**

### **6.1 Background**

The Finnish sawmilling industry with entire forest cluster is now facing the largest technological and market changes in its history. However, this study estimates that the sawmilling sector can innovate and create new opportunities for growth similar to the earlier turning points. This view is based on the fact that the wood consumption is a global shortage and the fact wood-based products that contribute to many environmental and energy problems solution.

Finnish sawmilling industry needs to focus on a market oriented approach where the demand and expectations of the customer will be met in the first place. Also personal and direct relations combined with an efficient distribution are the core activities. This will lead in a broad engagement along the solid wood supply chain from forest to a finished house including sawmilling, bio energy, builder's merchant, wood building component manufacturing and wooden frame house production. (Nord, 2005)

Finnish forest sector's success bases on knowledge, technology and existence of a strong forest cluster. However, a strong increase of research inputs is needed in the forest sector in all areas. Such a change has already started moving. The public sector has a role in maintaining, building the infrastructure and furthermore in education, which are enabling the survival for the Finnish production in international competition. The trajectories of industry change are typically unfolding over decades. Fighting the industry change is almost always too costly to be worthwhile. Rather organizations should reconfigure themselves for lower revenue growth and develop the ability to move activities and resources out of the old businesses.

As public demand increases for more attention to be paid to global sustainability, demand for renewable resources like wood will increase at the expense of non-renewable substitutes like plastic and concrete. Although it is true that emerging world economies continue to ramp up their production of wood products, the future will show increased demand for these products from countries with managed forests and standards for accountability. Finland is one of the few wood producing nations in the world that presently can claim to have such standards.

## **6.2 Core activities in the Finnish sawmilling industry**

According to the previous studies and data received by interviews, an issue like the geographical location is turning to a threat for the Finnish sawmilling and will be affecting to marketing, selling, distribution for wooden products due to distant location. This is due to the matter, that there will be more capacity in the competitor countries locating closer to traditional target markets of the Finnish sawmilling industry. Since raw material accounts for a large share of total production cost, a larger production would be inflicted with higher marginal costs. Market changes have to be taken into account, and as customers are growing, demanding both larger volumes and distribution to different regions, a larger production unit might have an advantage.

Furthermore, sales and marketing activities in contrast to substitutes require financial strength which could be gained from a larger turnover. Rawmaterial availability depends mostly on the age distribution of the total forest area and the forest owners' strategies regarding their forest resources. The share of transportation cost of the total rawmaterial cost limits is the distance from where a sawmill can be supplied. On the other hand, since the variation in quality of forest stands within the supply area, a sawmill may be able to fairly accurately predict the long-term quality of input raw material. These characteristics affect the implementation of product market strategies and have to be considered by a sawmilling company in relation the external environment. (Nord, 2005)

Sawmills did suffer from lack supply of logs during 2009. The record-high rawmaterial prices, which occurred in 2007, still affected price expectations. In December's 2009 increased sales activity lead to a slight improvement in this situation, although annual purchase volumes of pine and spruce logs were down 29% from the level achieved in 2008, while pulpwood purchases reduced by about half. In 2009 the sawmill industry managed to procure less than half of its raw materials in comparison to 2008 and has already been forced to limit production, therefore, 30-50% of normal years. The capacity of the Finnish sawmill industry will be reduced out of 12 million to 7-8 million cubic meters in 2010.

Five conducted interviews were supporting the presumption that the woodworking industry needs to create new business concepts, to be able to operate competitively on the market. By having a wide engagement in the rawmaterial procurement, the sawmilling industry might not become dependent of any single customer or market segment and thereby the branch has the possibility to even out fluctuations in individual sectors of the chain. The challenges in terms of the core activities like stable raw material procurement problems must be solved, but also the production development in order to meet better customer requirements in already existing and also potential new market areas.

Although the labour intensity in the modern timber industry is less than 10%, the domestic cost development in comparison to competitor countries cannot increase. Production activities in the sawmilling industry follow a kind of dominant design and can be considered a dominant branch recipe. Almost all actors in the industry have a clear picture of the required processes and their layout. Making production activities valuable, rare, imperfectly imitable resource, it must be related to raw material and market segmentation, only then it is possible to advocate that production processes is a strategic resource. Production processes are also related to size of the production and in part to location.

Downstream activities show similar features as the basic production processes but are more closely related to market characteristics and ownership judgements. That is, downstream activities are exercised following a perceived need from customers and an outspoken drive from owners to pursue that need creating value for customers and improving advantage of the company (Porter, 1980).

R & D activities are not improving immediately the competitive advantage, because the industry needs to cope few crucial near years. There is no time to wait for new product's as they require by 5-15 years development. R & D activities, however, are important. Companies need to secure their profitability and obtain sufficient information from the market for new product development areas.

Industry representatives feel that there should be more attention into the competitive conditions of the Finnish sawmilling industry by both government and forest owner's side. The government is expected to improve competitive conditions, which might include export promotion and export trade finance risk associated with an increase in funds, as well as setting the feed in tariff. One of the challenging long-term objectives of the entire forest industry will be the fragmentation of the forest ownership in Finland. This might need new financial instruments and creation of new legislation in order to turn it as an attractive option for the forest owners.

### **6.3 Core assets in Finnish sawmilling industry**

The resource-based view advocates identification and creation of strategic resources that enhances a sustained competitive advantage. The strategic resources can be also understood as "core assets". By analysing core assets, a firm may identify those that make a disproportional large contribution to competitive advantage, and are able to distinguish away those not being important. The identification and analyses of resources aims at distinguish those that are, valuable, rare, imperfectly imitable and substitutable. By conducting this analysis, a firm may leverage the resource into gaining a sustainable competitive advantage as in the saw milling industry there are a number of resources that have been seen as important. (eg Porter 1980, Barney 1991, Nord 2005)

Availability of roundwood is not only important but a prerequisite for the production and delivery of customer value for the sawmilling industry. Two dominant species; spruce and pine, are used for different end-use applications. The classification of quality is specified as "defects" such as knots, annual ring width and resin pockets. The quality of a saw log is affected by climate, management regimes, location thus changes over time. The quality of saw logs, and correspondingly sawn timber products, has in general been perceived of being higher in Scandinavia. (Nord, 2005)

Location of the production units has effects on many levels in a company. The matter can be a policy choice, from historical reasons, closeness to raw material inputs or dominant market segments. In the sawmilling industry it is usually connected to historical reasons and was related to availability of raw material, transportation of raw material, and power generation for the production processes. Furthermore, location can also affect to domestic market segmentation.

Thus, location affects and is affected by availability and quality of raw material in combination with the differentiated demands from market segments. The specifics of sawmilling production is the divergent product flow, resulting in a large number of products that should meet the very dispersed product requirements from historically fragmented market segments. Hence, the possible quality and volume of sawnwood products affects the market segmentation and is thus affected by location. (Nord, 2005)

Technological developments of processes and correspondingly products have been incremental, that is, the processes have improved in small steps. Tendency has led in an increased automation, less employees in production, improved production runnability and accuracy. The share of demanded products of total raw material volume is thus important and in combination with raw material's large share of total production costs, and a world market price of standard products has to be considered analysing whether raw material enables the strategy implemented. (Nord, 2005)

The production processes should be configured in such a way that an optimization of raw material; availability and quality, to the final products creating customer value, is achieved at the lowest cost. Modernisation of the processes or internal flows or adding a new machine most often adds costs, and these added costs must induce an increased customer value in the form of increased revenue, sales volumes or creation of long-term customer relations to support long-term profitability. The increase in integrated planing capacity in the Finnish sawmilling industry has grown remarkably. The phenomenon is not straightforward, if it is market sensing or the traditional nature of the industry if someone installs planing capacity others will be imitating. The concept at the sawmill level has been quite similar over the years and changes in the production processes are almost perfectly imitable with little gain in competitive advantage. Porter argues that, "competition becomes a series of races down identical paths that no one can win" (Porter, 1996).

According to representative of independent sawmilling industry, the structure of the ownership is an important pre-condition for the development of a business. The experience, insight, intelligence, judgment and relationship of the entrepreneurs set the direction for how the company shall, will and can act in the external market place, and of the allocation and alignment of internal resources enhancing company direction. The owners are the ultimate link that the management of a company can turn to for investments, redirection of strategy and changes in organization. The owners and their perception of business logic in the industry sometimes determine the faith of a company more than the operations and activities of the company themselves. In the Finnish saw milling industry there are three types of ownership structure, which are also included in this study.

As earlier mentioned, there are three global main players in Finnish sawmilling industry. These players are producing about 50% of total sawnwood volume in Finland. In addition to these, are other, independent sawmilling companies, which produce around 43% and the remaining 7% are non-industrial, small-sized companies. These ownerships differ in many aspects, where one is the perception of what is the core business of the company or corporation. Ownership structure can be a resource enabling the implementation of the product strategy sought. (Nord, 2005)

In essence, the description of different core assets in sawmilling industry concludes following. Raw material is a prerequisite for the industry to conduct business, but not the sole attribute creating competitive advantage. Though valuable, raw material is neither rare nor imperfectly imitable, and it is substitutable. However, rawmaterial is an important asset in creating a sustained competitive advantage. (Barney, 1991)

Location of production facilities is often of historical nature in the saw milling industry and has to be managed accordingly. That is, what was historically an optimal location may not be the same in today's competitive environment. Due to the high transportation costs of raw material, location has a clear relation with raw material, i.e., the availability and quality of the raw material affects what type of products optimally should be produced. A new plant can be erected in an advantageous location, and other locations may be as optimal as the present. This indicates that location is not a single source for the creation of a value-adding strategy aiming for a competitive advantage. (Porter, 1980)

Ownership has a direct effect on the implementation of strategies. As such it may be inappropriate to define ownership as a structural resource similar to raw material or location, but instead view ownership as a structural resource. In that respect ownership will have a direct influence on the allocation of strategic resources based on the dominant business logic that is apparent among owners. Combining the above resources with linkages it can be argued that raw material has affected and sometimes is affecting the location, but also the production processes, size of these and subsequent downstream activities. The implementation of these resources is affected by ownership. (Nord, 2005)

## **7. Conclusions of business strengths, weaknesses, opportunities and threats in the Finnish sawmilling industry**

The purpose of this analysis is to describe SWOT - analysis in the Finnish sawmilling industry. This analysis presents strengths, weaknesses, opportunities and threats related to trajectories of sawmilling industry and determinants of the competitive advantage. Table 2 summarizes SWOT-analysis of the Finnish sawmilling industry

Table 2. Summary table of SWOT-analysis of the Finnish sawmilling industry (adopted from Wang et al., 2008 and findings of this study)

<p><b>STRENGTHS</b></p> <ul style="list-style-type: none"> <li>• Efficient organizations: flexible, informal, market segment oriented, online product availability, service, integrated flow of raw material</li> <li>• Good image and reliability, and well designed promotion programmes such as Wood for Good</li> <li>• Improving product development: importance of PD and customer orientation is increasing; skills in reactive product development</li> <li>• Good development atmosphere (industry – research –public bodies)</li> <li>• Sustainable forestry and environmental certification schemes (Chains of Custody)</li> <li>• Good production knowledge: sawmilling and wood procurement technology, planning, quality control, management systems, and automation; skilled workers</li> <li>• Skills in special and tailor made products and solutions, but among a minor part of the companies</li> <li>• R&amp;D skills in technical issues</li> </ul>	<p><b>WEAKNESSES</b></p> <ul style="list-style-type: none"> <li>• Fragmented and traditional industry structure which sometimes is inflexible and obsolescent</li> <li>• Problems in the supply chain due to long lead time for delivery, insufficient coordination, and large share of timber sold indirectly through intermediaries</li> <li>• Defensive, sometimes unstructured product development</li> <li>• Lack of market information, including insufficient cooperation with architects and designers, and other members of supply chain</li> <li>• Minor collaboration</li> <li>• Too strong integration to pulp and paper industries while integrates closing capacity</li> <li>• Low marketing knowhow among the value chains (understanding of customer expectations)</li> <li>• Too little diversity in the companies: gender, ethnicity, age; this may limit recruitment of talent</li> <li>• Low capacity in end user focused product development</li> <li>• Lack of innovative spirit</li> </ul>
<p><b>OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>• Economic recession would be short and export markets and prices of the products in turn to a slight increase in 2010</li> <li>• The development trend of the use of wood products in building and other end- uses in would increase more</li> <li>• Exports of the timber products would start to increase to the growing markets (Asia)</li> <li>• The euro exchange rate would weaken significantly for several for the year against the U.S. and Canadian dollar or Swedish Crown</li> <li>• In wood industry would be invested significantly to new products, services to communication</li> <li>• Searching for items that can be imported into a more more out in the wood and the good ecological properties</li> <li>• Part of the By-product flow out of the sawmilling products are aimed to bioenergy production, which enables less dependence of the Pulp Industry</li> <li>• Communication will be important with the citizens in order to create a more positive image of wood</li> </ul>	<p><b>THREATS</b></p> <ul style="list-style-type: none"> <li>• Legislation regulating the building possibilities for Apartment houses</li> <li>• Over Supply in Europe due to East European cheaper sawnwood</li> <li>• Price competition on the markets will tighten</li> <li>• New investments in other competing countries (Sweden, Germany)</li> <li>• The recession will continue longer than expected.</li> <li>• Export demand and product prices over the past few years would remain on lower level</li> <li>• Rising log prices that are inflexible to changes in the end product markets</li> <li>• Demand for wood products would weaken against other building materials, such as cement, steel, aluminium in the European market</li> <li>• Timber products exports would drop significantly in Japan and North Africa</li> <li>• The euro exchange rate strengthened significantly, and for several for the year against the U.S. and Canadian dollar and the Swedish crown</li> </ul>

Strengths and on the side of opportunities, the global growth in relation to demand for sawn timber will support Finnish sawmills in operating. But is the case in practice? The question is, above all, how to retain its competitiveness particularly in the European export markets. Finland's most important competitor countries are Sweden, Russia, Germany and Austria. Germany and Russia in recent years have sharply increased their exports of sawn softwood.

The role of wood products as environmentally friendly products is on the rise. The question of the role of wood products is how the local governments in target market countries can remove restrictions on the use of wood in construction which would encourage consumers to buy wood products and increase their consumption in the light of climate change.

In order to enhance the profitability Finnish sawmilling industry has been searching growth in emerging markets and consolidating in mature markets. Managing more efficiently supply chain and improving the operating efficiency is important; also the uncompetitive capacity needs to be shut down. Companies also have to restructure their product portfolio to fit the needs of customers and invest in R&D to come up with new innovations in products and in production technologies. Environmental awareness presents an opportunity of a lifetime for the wood working industry. However, to capitalise in the whole industry should stand together in promoting wood as a reliable and environmentally friendly material.

From weaknesses and threats point of view, especially residential building out of wood has been at a high level during the 2000. Multi-storey building and development of Finnish legislation has not been on the same level with other competitor countries. The building of residential housing has slowed down compared with a year ago. This has resulted in an over supply of constructional grade timber. It might really turn to a threat, if the Finnish legislation does not create new possibilities for the wooden multi-storey buildings.

Because the renovating building in old EU - countries and new housing starts in new Eastern countries will increase also Sweden and Germany are preparing to increase their sawmilling capacity, the location is also an advantage for them.

In 2006 the demand for sawnwood in export markets started to increase. The demand was on a good level and the prices were increasing quite rapidly. This boom lasted to the summer 2007, after which the development for sawn timber prices has been negative. Since then sales activities are concentrated mainly in the domestic market, while Eastern Europe is competing with cheaper sawnwood, at least in Europe. There might be a threat, that Finnish sawmilling industry is now turning too domestic orientated.

Other threats would be political decisions related to taxation and energy politics, especially when thinking about the bio energy development for sawmilling industry. At the moment there need to be taken care of forest, because in the last years more forest have been harvested due to forest taxation change. Otherwise, it might turn into a threat in the future. Also Finland has to strengthen its educational activities in forest sector to attract new talent. (Aravuo, 2007)

In conclusion, the final reason that our sawmill industry is destined for resurrection is the value of our timber products in comparison with those in other parts of the world. Our trees grow too slowly to compete in terms of fiber volume with producers in the southern hemisphere that are able to turn over mature crops on fifteen to twenty year rotations. The Finnish, relatively slow growing timber gives us an opportunity to reinvent our industry and to strengthen our position as a world leader in the field. Every discussion about the future of forestry seems to come back to getting increased value out of our forests and naturally this study makes no exception. As an conclusion of the study can be assessed, that the nature of the change related to Finnish sawmilling industry based McGahan theory will be intermediating change. In this model the core assets are retaining their value, but some core activities are under threat. (McGahan, 2004)

There are needs for further research for the Finnish sawmilling industry. The most up to date topics in public media at the moment are clearly bio energy and issues related to climate change. The Finnish sawmilling industry has two customer interfaces which are the consumers buying the forest products and private forest owner's selling the raw material for the sawmilling industry. It would be worthwhile to clarify the image of wooden product's and the public debate affects to the timber sales behaviour of forest owner's and the importance of public debate affect in relation to customer's willingness buying wooden product's. Also according to the interviewees of this study there would be also need for further research related to topic "demand trends of further processed timber and aging population" or "demand trends of wooden products related to climate change and aging population".

The Finnish sawmilling industry requires management of active changes. Otherwise there might occur a risk the industry cannot or dare not change, because of risks related to global changes in operating environment. Renewal for the industry is essential without forgetting political issues and legislation related to the development. There certainly will be global business opportunities in the future for the Finnish sawmilling industry, but the trajectory has to be adjusted into the challenges of globalisation, which is speeding up the development.

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## **Appendix**

### **Questionnaire for theme interview**

1. Define the current state of Finnish sawmill industry's competitiveness in comparison to other European competitors?
2. Define the key competitive advantages of Finnish sawmill industry's in relation to other European competitors? Which factors clearly qualify as competitive advantages or weaknesses?
3. Define the most important firm-specific resources for the sawmill companies?
4. Define factors, which have affected the competitiveness of the Finnish sawmilling industry during the last ten years?
5. Has the customer demand changed for wood products in the last ten years in Finland? Why?
6. What kind of domestic political decisions might improve the competitiveness of Finnish sawmilling industry? Which kind of factors should have a priority?
7. Suggestions to increase the level of the private forest owner's log trade?
8. Define factors that might hamper or contribute to the development of the market by-product of sawmills in the near future?
9. How would you characterize the domestic companies' opportunities for cooperation, for example by-products processing or business activities?