Dissertationes Forestales 89

Assessing the resource usage decisions and financial performance in Finnish sawmills within the resource-based view framework

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Academic dissertation

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Title of dissertation: Assessing the resource usage decisions and financial performance in Finnish sawmills within the resource-based view framework

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ABSTRACT

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The business environment of Finnish sawmills has changed notably since the 1990s due to the internationalization of operations and increased competition from the emerging producer countries. Especially for the sawmills in higher cost-level countries, the ability to create value with special products and providing customer services have been emphasized as crucial to business success towards the present date. Still, empirical evidence of those linkages between the strategic choices and the competitiveness of woodworking firms is largely lacking.

The purpose of the study is to examine, 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 in the 2000s. The study materials comprise literature, firm-level financial accounting information and interview data analysed with a literature review, a regression analysis and the multi-criteria decision analysis (MCDA) method.

According to the results, resources associated with access to raw material, reputation and services, collaboration and technological know-how have affected the financial performance of LM sawmills the most during the current decade. Reputation, services and collaboration have the highest strategic potential while the strategic capacity of raw material and technological know-how in enhancing the competitiveness of LM sawmills is more ambiguous. The resource valuations of the managers and the actual influence the resources have had on LM sawmills' financial performance have not corresponded in all cases. Some of the managers' least valued resources have actually been strategic resources for sawmills and vice versa.

The results indicate that, when seeking solutions to enhance sawmills' competitiveness, managers should also take into account the less conventional resources in the strategic planning processes of the firms. Compared with this study, the results could be generalized in the future by gathering interview data from a larger sample and by increasing the number of accounting periods in performance measurements. In addition, since the challenges of the global business environment are similar for all woodworking companies operating in the higher cost-level areas, new research information could also be acquired by gathering comparable homogenous firm-level data from several countries.

Keywords: resource-based view, financial performance, sawmill industry, multi-criteria decision-making methods, resource assessment with multi-criteria decision-making methods, resource usage in the sawmill industry.

TIIVISTELMÄ

Lähtinen, K. 2009. Resurssienkäyttöpäätösten ja liiketoimintamenestyksen mittaus suomalaisilla sahoilla resurssilähtöisen viitekehyksen avulla. 40 s. Dissertationes Forestales 89. Available at http://www.metla.fi/dissertationes/df89.htm

Suomalaisten sahojen toimintaympäristö on muuttunut merkittävästi 1990-luvulta alkaen kansainvälistymisen ja uusien tuotantomaiden markkinoille tulon myötä. Korkean kustannustason maissa toimivien sahojen kilpailukyvylle on nähty erityisen tärkeäksi kyetä nostamaan hyödykkeiden arvonlisää esimerkiksi tarjoamalla erikoistuotteita ja palveluita. Empiiriset tutkimustulokset sahojen strategisten valintojen ja liiketoimintamenestyksen välisistä yhteyksistä ovat kuitenkin vähäisiä.

Tutkimuksen tavoitteena oli selvittää resurssilähtöisen teorian (resource-based view) avulla, miten aineellisten ja aineettomien tuotannontekijöiden käyttö on kuluvalla vuosikymmenellä vaikuttanut suomalaisten suurten ja keskisuurten sahojen liiketoimintamenestykseen. Tutkimusaineistoina käytettiin kirjallisuutta, yrityskohtaisia tilinpäätöstietoja ja haastatteluaineistoa. Aineistoja analysoitiin kirjallisuustarkastelun, regressioanalyysin ja päätöstukimenetelmän avulla.

Tutkimustulosten mukaan sahojen liiketoimintamenestykseen ovat kuluvalla vuosikymmenellä vaikuttaneet eniten raaka-aineeseen, maineeseen ja palveluihin, teknologiseen osaamiseen sekä yhteistyöhön liittyvät tekijät. Maineen, palveluiden sekä yhteistyön strateginen merkitys on ollut raaka-ainetta ja teknologista osaamista yksiselitteisempi. Suurten ja keskisuurten sahojen johtajien näkemykset ja tilinpäätöstunnuslukuihin perustuvat tulokset liiketoiminnalle tärkeistä resursseista eivät ole kaikilta osin yhteneviä. Tulosten mukaan osa johtajien vähiten arvostamista tuotannontekijöistä voidaan tulkita strategisiksi resursseiksi ja päinvastoin.

Sahojen strategisessa suunnittelussa tulisi ottaa huomioon sahateollisuudessa yleisesti tärkeinä pidettyjen tuotannontekijöiden rinnalla myös sahateollisuudessa harvemmin esille nostetut resurssit ja niihin liittyvät liiketoiminnan edistämismahdollisuudet. Tähän tutkimukseen verrattuna tulosten yleistettävyyttä voitaisiin jatkossa parantaa keräämällä haastatteluaineisto laajemmasta yritysjoukosta ja käyttämällä liiketoimintamenestyksen mittaukseen useampia tilikausia. Koska globaalin toimintaympäristön haasteet ovat samankaltaiset kaikille korkean kustannustason maissa toimiville sahoille, saataisiin uutta tutkimustietoa myös keräämällä vertailukelpoista aineistoa eri maissa toimivilta yrityksiltä.

Asiasanat: resurssilähtöinen teoria, liiketaloudellinen menestys, sahateollisuus, monitavoitteiset päätöksentekomenetelmät, monitavoitteisten päätöksentekomenetelmien käyttö resurssien mittauksessa, resurssien käyttö sahateollisuudessa.

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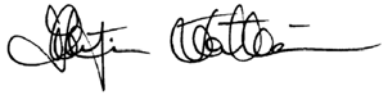
Joensuu, May 2009

Katja Lähtinen



LIST OF ORIGINAL ARTICLES

In addition to this summary, the dissertation comprises the following separate articles. In the text, the articles are referred to by Roman numerals as follows:

I Lähtinen, K. 2007. Linking resource-based view with business economics of woodworking industry: Earlier findings and future insights. Silva Fennica 41(1):149–165.

II Lähtinen, K. & Toppinen, A. 2008. Financial performance in Finnish large- and medium-sized sawmills: The effects of value-added creation and cost-efficiency seeking. Journal of Forest Economics 14(4):289–305.

III Lähtinen, K., Haara, A., Leskinen, P. & Toppinen, A. 2008. Assessing the relative importance of tangible and intangible resources: Empirical results from the forest industry. Forest Science 54(6):607–616.

IV Lähtinen, K., Toppinen, A., Leskinen, P. & Haara, A. 2009. Resource usage decisions and business success: A case study of Finnish large- and medium-sized sawmills. Journal of Forest Products Business Research 6(3):1–18.

Contributions of the authors to the articles.

	I	II	III	IV
Original idea	KL	AT, KL	KL	KL
Study design	KL	KL	KL, PL, AH	KL
Data collection	KL	KL	KL, AT	KL, AT
Data analysis	KL	KL	AH, PL	AH, KL
Manuscript preparation	KL	KL, AT	KL, PL, AT, AH	KL, AT, PL

KL, Katja Lähtinen; AT, Anne Toppinen; AH, Arto Haara; PL, Pekka Leskinen.

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1 INTRODUCTION

The Finnish sawmill industry comprises both multinational enterprises listed on the stock exchanges and smaller, non-integrated firms. Since especially the non-integrated sawmills are often located outside the urban centres, their operational conditions are closely linked to the economical, biological and social sustainability of the whole Finnish forestry sector supporting the livelihood of the county's rural areas. In addition, private forestry is affected significantly by the vitality of the sawmill industry, as sawnwood producers pay approximately two-thirds of the stumpage income received by the non-industrial private forest owners (NIPF) in Finland. The non-integrated sawmills that do not usually own forests acquire the raw material either from NIPFs, from roundwood exports or by trading the dimensions needed with other sawmills.

The non-integrated sawmills represent approximately a quarter of the annual Finnish sawnwood production, which in 2000–2006 varied between 12.1 (in 2006) and 13.6 (in 2003) million m^3 (Finnish Sawmills Association 2008, StatFin 2008). In the same period, approximately 40% of the total workforce (8000–9000 p.a.) was working in the non-integrated sawmills (Aravuo 2002, 2007, StatFin 2008).

The business environment of the Finnish sawmill industry has changed notably since the 1990s, which is reflected in the cost competitiveness and income structure of the firms. The saw log 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 (e.g., Finnish Forest Research Institute 2007). In addition, the drastic increase in roundwood export tariffs introduced by Russia in 2007 and the plans to make further increases have affected the raw material costs of the Finnish sawmill industry (Pirhonen et al. 2008). 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 saw log prices is reflected directly in the operational preconditions of sawmills.

The proportion of exports of the total sawnwood production of Finnish sawmills has been between 56% and 75% since the 1990s (Figure 1). In the beginning of the 2000s, the sawmills located in Finland manufactured close to 12% of the total European lumber production, while in the past couple of years it has dropped down to 9–10% (FAO 2008). 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 (e.g., Finnish Forest Research Institute 2005). Due to the current downswing in the global economy, in the near future, enhancement of the unfavourable market situation of the sawmill industry is not expected to occur (Finnish Forest Research Institute 2008).

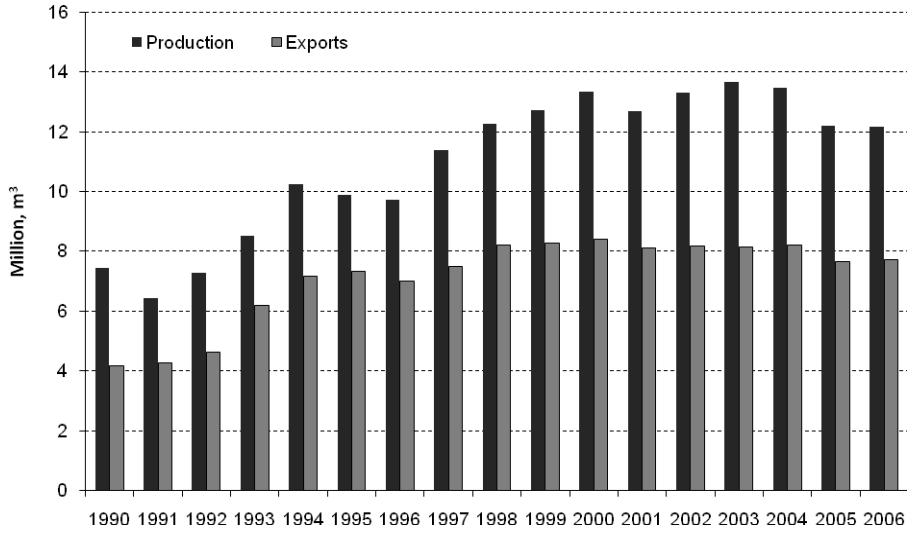

Figure 1. Total production volume and exports of the Finnish sawmill industry from the 1990s.

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 lumber consumption in Japan and Western Europe (e.g., Finnish Forest Research Institute 2005). The proportion of Japan and Western Europe comprises over 60% of the exports of sawmills located in Finland (Finnish Forest Research Institute 2008). 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 (Finnish Forest Research Institute 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 (Grant 2005). 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 (Korhonen 2006). 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 choices and crucial to business success in the 2000s (e.g., Hansen et al. 2002, Smith et al. 2004, Toivonen et al. 2005, Hansen et al. 2006). However, empirical evidence of those linkages between the strategic choices and business success in woodworking firms is to a large extent still lacking.

2 PURPOSE AND STRUCTURE OF THE RESEARCH

The overall purpose of the study is to examine how the tangible and intangible resources that are internal to sawmills have affected their financial performance in the

internationalized business environment during the current decade. The study has been implemented in the subsequent sub-studies I–IV, of which each has provided new research information for the next sub-study. The specific aims of the sub-studies are the following:

Sub-study I: to map the gaps in the existing empirical business economic research information of woodworking industries, to scrutinize the possibilities of employing the RBV in evaluating the factors of competitiveness of woodworking firms and to introduce a tentative methodological framework suitable for analysing empirically the links between firm-level resource usage decisions and firm-level business success. In addition, in the later phases of the study, the results of the literature review are used to operationalize sawmill resources.

Sub-study II: to examine the impacts of value-added creation and cost-efficiency seeking on sawmills' short- and long-term financial performance and to scrutinize the usefulness of financial statement information in predicting the factors of competitiveness of sawmills assumed by the RBV.

Sub-study III: to assess within the RBV framework the relative importance of different tangible and intangible resources for business operations of sawmills during the current decade.

Sub-study IV: to evaluate within the RBV framework the impacts of tangible and intangible resource usage decisions on the financial performance of sawmills in the global business environment.

3 THEORETICAL FRAMEWORK

The evolution of the resource-based view (RBV) originates from Penrose's pioneering idea presented in the 1950s in her book 'The theory of the growth of the firm', where a firm is described as a pool of resources that should be organized into their best uses in order to create grounds for firm success (Penrose 1995). Despite some studies in the 1970s approaching the firm-specific resources (Rubin 1973) and capabilities (Richardson 1972), the actual theoretical advance of the RBV started in the 1980s with the works of Wernerfelt (1984), Barney (1986) and Dierickx and Cool (1989). The development of the RBV sped up at the beginning of the 1990s (e.g., Barney 1991, Conner 1991, Grant 1991) and since then it has gained much attention in strategic management literature. In the 2000s, the RBV has become one of the most widely used theoretical frameworks in the strategic management studies (Newbert 2007).

The RBV (e.g., Wernerfelt 1984, Barney 1986, 1991, 2001, Conner 1991) is based on the thought that tangible and intangible firm-level resources and the capability to coordinate those assets or inputs of production in a strategically successful way (Helfat and Peteraf 2003) form the grounds for competitiveness in the dynamic business environment (Brown and Blackmon 2005). The role of company managers is crucial to firm-level competitiveness, since their perceptions of the environmental circumstances dictate the selection of resources (Fahy 2002) to be exploited, developed and protected (Dierickx and Cool 1989). In addition, in structuring the firm-level resource portfolio, managers should also be able to make successful decisions on strategic resource divestments (Sirmon et al. 2007).

Financial performance measures are used as the indicators to assess the success of a firm in achieving stated strategies, objectives and critical success factors (Hass et al. 2005).

The competitive advantage of a firm is defined as the degree to which it outperforms its competitors in the performance measures chosen to be benchmarked (Villalonga 2004). In order to create a competitive advantage, firms should focus on those firm-specific resources that are valuable, rare, imperfectly imitable and not substitutable (VRIN) (Barney 1986, 1991, Grant 1991).

A temporary competitive advantage is built on the resources that add value to a company and that are not heterogeneously distributed across competing firms. In order to create a sustained competitive advantage, a firm must also possess imperfectly mobile resources (e.g., Mata et al. 1995). The application of financial statement information in assessing the drivers of the competitive advantage assumed by the RBV is not entirely straightforward, since the existing accounting and reporting systems do not recognize in the financial statements the whole value of the intangible resources and capabilities possessed by firms (e.g., Powell 2003).

The empirical application of the RBV in the analysis of firm-level competitiveness requires paying special attention to the study design and data quality (Armstrong and Shimizu 2007). In order to understand the heterogeneity of the resource pools of companies, detailed fieldwork-based firm-level information should be gathered instead of using industry aggregate data (Rouse and Daellenbach 1999, Silverman 1999). In addition, the firm-level resources measured should also be application-specific and operationalized at a sufficiently detailed level (Silverman 1999) and research methods should be extended and combined in the analyses (Rouse and Daellenbach 1999, 2002) by including case study methodologies and qualitative methods abreast with traditional quantitative approaches (Lockett and Thompson 2001, Armstrong and Shimizu 2007). Compared with the booming theoretical literature on the RBV, its empirical applications (e.g., Andersen and Kheam 1998, Fahy 2002, Schroeder et al. 2002, Camelo-Ordaz et al. 2003, Galbreath 2005, Newbert et al. 2008) have been far scarcer.

So far, outside this research, the few empirical studies made on forest-based industry that are at least at some level linked to the RBV entail the work of Siitonen (2003), Korhonen and Niemelä (2004, 2005), Bull and Ferguson (2006), Korhonen (2006) and Bonsi et al. (2008). This study makes a contribution to the existing research information by presenting both a methodological choice and an empirical application that facilitate the quantitative assessment of the relative importance of resources and the impacts they have on the financial performance. These issues have been entirely lacking in the previous studies made with linkages to forest industries.

4 MATERIALS AND METHODS

The materials of the study comprise literature (sub-studies I, II, III and IV), firm-level financial accounting information of 2000–2004 (sub-study II), 2002–2006 and 2004–2006 (sub-study IV) and firm-level interview data gathered in 2007 (sub-studies III and IV). The methods of the study comprise a literature review (sub-study I) on the RBV research and empirical woodworking industry studies, a regression analysis of the performance determinants (sub-studies II and IV) and a multi-criteria decision analysis (MCDA) method (sub-studies III and IV) on the relative importance of the resources in the sawmill industry. The linkages of the materials and study methodologies between sub-studies I to IV are illustrated in Figure 2.

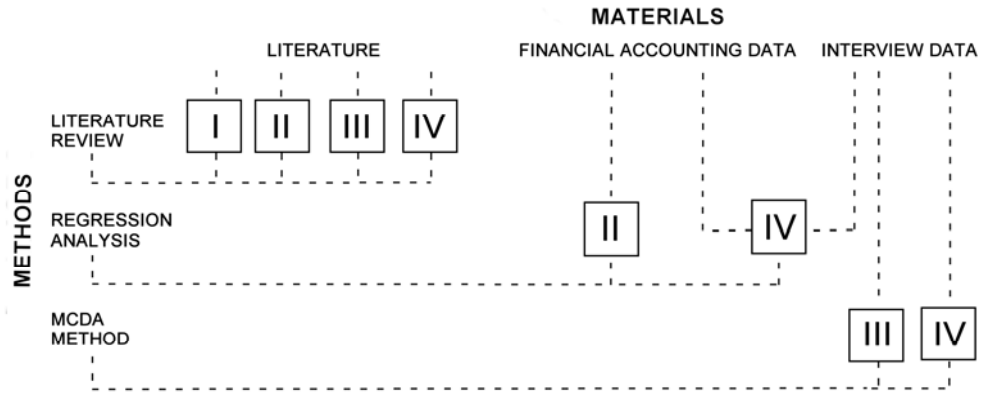

Figure 2. Data and methodology linkages between sub-studies I to IV.

In order to control the possible effects of firm size and ownership structure on the results of sub-studies II, III and IV, the data concern merely large- and medium-sized, non-integrated sawmills (LM sawmills) that are not in the possession of multinational forest industry corporations and are located in Finland. In non-integrated sawmills, sawnwood manufacturing is the core business, while in large, multinational forest industry companies, it is often subordinate to producing high-quality chips for pulp and paper mills (e.g., Kallio 2001).

The selection of the sample companies was based on the reports of Balance Consulting (2005) regarding Finnish firms that operate in the sawmilling, planing and impregnation of wood (NACE class DD.20.10) (European Commission 2008). In the reports of Balance Consulting, the sawnwood manufacturers were categorized as large- and medium-sized sawmills in terms of their financial and employment figures. In addition, the list of 27 LM sawmills based on Balance Consulting's reports was supplemented with sawmill expert views. As a result of the two-phased selection procedure, the study sample composed 33 large- and medium-sized, non-integrated sawmills. The results of the sub-studies are based on information from 27 sawmills (sub-study II), 19 sawmills (sub-study III) and 16 sawmills (sub-study IV).

Literature of the RBV theory and empirical findings that have been made of the competitiveness of woodworking firms since the 1990s form the grounds for sub-study I. In order to be able to direct the research questions of sub-studies II, III and IV to the most relevant issues, special attention was paid to finding the gaps in the existing research results of the factors of competitiveness and business performance measurements in the woodworking industries. In addition, it was crucial to search for management literature that is particularly relevant from the perspective of the empirical application of the RBV in the context of woodworking industries. The existing literature on the resource classifications made within the RBV and the empirical woodworking industry studies scrutinized in sub-study I (Tables 1 and 2) form the grounds for the operationalizations of the sawmill resources that were employed in gathering the interview data that were used in sub-studies III and IV.

Table 1. Tangible resource classifications within the RBV (adapted from Barney 1991, Fernández et al. 2000, Galbreath 2005, Grant 2005) and linkages to the factors of production in woodworking industries (WWI).

Tangible resource cited in the RBV literature	Tangible factor of production cited in the WWI literature	Author(s) of the WWI literature
Geographic location	Proximity of forest cluster branches	Porter (1998)
Raw material	Wood quality and dimensions	Kivinen et al. (2005)
	Wood price and availability	Zhou and Buongiorno (2005)
Labour	Availability of educated and trained labour	Vlosky et al. (1998)
	Labour productivity	Roos et al. (2001)
Plant	Production unit sizes	Roos et al. (2001)
Machinery	Process automation	Sinclair and Cohen (1992)
	Fibre usage efficiency	Lee et al. (1999)
	Production technology levels	Nyrud and Baardsen (2003)
	Appropriate production technologies	Bull and Ferguson (2006)
Financial capital	Allocation of scarce financial resources to alternative needs	Cohen and Sinclair (1990)

The empirical resource assessments of the sub-studies III and IV are grounded on 5 tangible and 6 intangible resource classes (Figure 3) that were formed by using the RBV and the empirical woodworking industry literature in sub-study I. Compared to Tables 1 and 2, in sub-studies III and IV changes were made to resource classifications in order to make the names and contents of the classes more applicable for an empirical resource assessment. First, the resource classes named 'financial capital' in Table 1 and 'organizational capital', 'technological capital' and 'relational capital' in Table 2 have been renamed 'finance and strategy', 'organization culture', 'technological know-how' and 'reputation and services'. Second, two previously separate resource classes in Table 1 named 'plant' and 'machinery' have now been combined into one resource class named 'factory and machinery'. Third, human capital in Table 2 has been reclassified into three separate resource classes called 'management', 'personnel' and 'collaboration'.

As a result of the changes made to the resource classifications introduced in sub-study I, the five tangible resource classes used in the empirical resource assessments in sub-studies III and IV were geographic location; raw material; labour; factory and machinery; finance and strategy. The corresponding intangible resource classes were management; personnel; collaboration; organization culture; technological know-how; reputation and services. In addition, each of the main resource classes comprised three sub-resources, which were used as multiple and finer-grade indicators of the main class resources (see, e.g., Armstrong and Shimitzu 2007).

In sub-study II, both the short- and long-term financial performance of 27 LM sawmills was measured with annual financial ratios of 5 fiscal periods (2000–2004). Thus, the data were composed of a panel of 135 observations. The financial ratios employed assess liquidity (current ratio), solvency (equity ratio, %), profitability (ROI, %) and growth (turnover growth, %). Liquidity describes a firm's financial adequacy in the short-term. Compared with liquidity, solvency comprises a longer timescale by assessing the company's sufficiency of equity in regard to the requirements set by financiers and regulations. Profitability illustrates the return received on the capital invested in the company. Growth, as such, is not a measure of success but a certain kind of indicator of

competitiveness (Laitinen 2000), since a positive trend in revenue growth with contemporaneous good financial performance indicates positive future business success.

Table 2. Intangible resource classifications within the RBV (adapted from Fernández et al. 2000, Galbreath 2005) and linkages to the factors of production in woodworking industries (WWI).

Intangible resource cited in the RBV literature	Intangible factor of production cited in the WWI literature	Author(s) of the WWI literature
HUMAN CAPITAL – CAPABILITIES		
Manager expertise	Business and production management skills	Vlosky et al. (1998)
	Leadership and management skills	Michael and Leschinsky (2003)
	Ability to define the scope of business and innovation capabilities	Hovgaard and Hansen (2004)
	Capability to bring new and innovative knowledge into processes and products	Van Horne et al. (2006)
Employee know-how	Expertise in manufacturing	Vlosky et al. (1998)
	Judgment and control of technology for adding production value and flexibility	Lee et al. (1999)
	Ideas for innovations	Hovgaard and Hansen (2004)
External relationships	Buyer–seller relationship forms	Simpson and Wren (1997)
	Vertical collaboration in manufacturing	Syme and Duke (1994)
	Information flow between firms and between firms and public organizations	Van Horne et al. (2006)
ORGANIZATIONAL CAPITAL		
Databases	Product and customer databases	Toivonen (1999)
Organization routines	Governance structure	Bull and Ferguson (2005)
	Marketing structures and functions	Niemelä (1993)
Corporate culture	Learning culture	Bull and Ferguson (2005)
Co-operation agreements	Joint venture arrangements	Nyrud and Bergseng (2002)
	Contracts with wood suppliers	Helstad (2006)
Norms and guidelines		----
TECHNOLOGICAL CAPITAL		
Secret technology	Improvements in raw material utilization, computer-aided manufacturing, machinery customizing	Hovgaard and Hansen (2004)
Patents and trademarks	Timber treatment methods	Yang et al. (2004)
	Engineered wood products	Davis and Claisse (2000)
Designs	Timber component building systems	Bergström and Stehn (2005)
Industrial models and drawings, copyrights		----
RELATIONAL CAPITAL		
Operational reputation	Customer services	Niemelä and Smith (1997)
	Reliability of deliveries	Toivonen et al. (2005)
Product reputation	Product quality	Bush et al. (1991)
	Product-related services	Toivonen et. al (2005)
Brands	Green labelling	Niemelä and Smith (1997)
	Certification labelling	Owari et al. (2006)
	Quality assurance labels	Kozak and Maness (2001)
Long-term relationships	Close personal customer relationships	Idassi et al. (1994)
	Establishing close and long-term relationships with suppliers	Helstad (2006)
Commercial name		----

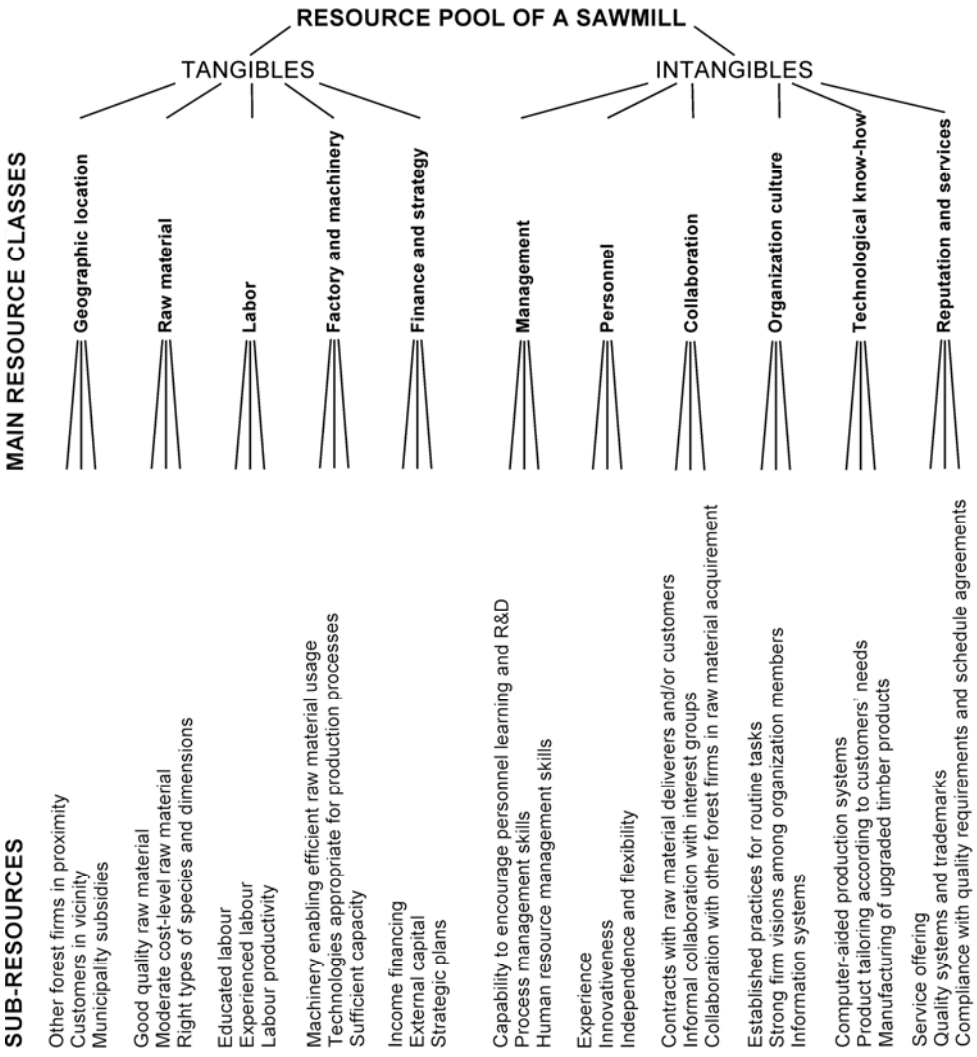

Figure 3. Tangible and intangible resource classes employed in the empirical resource assessments in sub-studies III and IV.

In sub-study IV, the focus was on the average long-term financial performance measured with profitability (ROI, %) and growth (for both measures, the average of the period of 2004–2006). In addition, a multi-dimensional performance measure (the average of the years 2002–2006) measured with growth (turnover growth, %), profitability (ROI, %), cash flow (net result, %), liquidity (current ratio), solvency (equity ratio, %) and obligations (payback period of debts in years) described the average short- and long-term financial performance of each LM sawmill compared with a sample of sawmills (n=100) and within Finnish firms (n=12,000) representing various business branches (Balance Consulting 2006). A detailed description of the calculus of the financial performance measures is in Annex 1.

Firm-level interview data were used in sub-studies III and IV for resource usage assessments. In the interviews, the chief executives or other upper-level managers responsible for implementing the firm-level strategic decisions made pairwise comparisons of the relative importance of a group of tangible and intangible resources for business operations in the 2000s of the sawmills they represent. The interview data were gathered with structured questionnaires (Annex 2) during on-site visits to the LM sawmills in January–March 2007. The original study sample comprised 33 LM sawmills of which 19 delivered completely fulfilled structured questionnaires.

A regression analysis was employed in sub-studies II and IV to model the effects of production orientation (sub-study II) and strategic resource usage decisions (sub-study IV) on the financial performance of LM sawmills. In sub-study II, linear mixed regression models were employed to assess the effects of value-added creation and cost-efficiency seeking on LM sawmills' short- and long-term financial performance in 2000–2004. In sub-study IV, the effects of the resource usage choices on the long-term financial performance of LM sawmills in 2004–2006 were modelled with a standard multiple linear regression analysis.

The MCDA method (see, e.g., Leskinen and Kangas 1998, Kangas et al. 2000, Leskinen and Kangas 2005) was employed in sub-studies III and IV to evaluate statistically the resource comparisons that were made by LM sawmills' representatives in the structured interviews. By employing the MCDA technique, the relative value of each tangible and intangible resource class for LM sawmills' business operations in the 2000s was received as compared with other tangible and intangible resources included in the comparisons (Figure 3). In sub-studies III and IV, the pairwise comparison data were analysed with STEPS software (Haara and Leskinen 2007).

The relative importance of different intangible and tangible resources for LM sawmills' operations was assessed with the MCDA method in sub-study III. In sub-study IV, the relative importances of the resources received by using the MCDA technique were employed as the explanatory variables in the regression models to analyse the effects of firm-level resource usage decisions on the financial performance of 16 LM sawmills of which both financial accounting information and interview data were available. The idea of combining the multi-criteria decision analysis (MCDA) method and the financial performance assessments within the RBV framework has not been employed before and it is based on a tentative methodological framework illustrated in sub-study I.

5 RESULTS

5.1 Linking resource-based view with business economics of woodworking industry: Earlier findings and future insights

There are significant gaps in the empirical research information on the factors of firm-level competitiveness in the woodworking industries. In the survey, altogether 24 international peer-reviewed scientific papers were found that directly or indirectly concern the elements that have affected the business success of woodworking firms since the beginning of the 1990s.

The literature review shows that most of the analyses of the business success of woodworking firms concern the external perspective of firms, e.g., the business strategies in relation to the business environment that could form grounds for firm-level competitiveness. In contrast, the internal perspective of firms, e.g., the role of firms' tangible and intangible resource pool in implementing the selected business strategies and creating business success has been largely neglected. In fact, only in 5 of the 24 studies has the RBV approach been used in one form or another, although the role of resources has been stressed to play a crucial role in creating value and enhancing the competitiveness of woodworking industries (e.g., Toivonen et al. 2005). In addition, only 2 (Cohen and Sinclair 1990, Sinclair and Cohen 1992) of the 24 empirical studies comprise in-depth analysis of business success that is based on financial performance measurements derived from income statement and balance sheet information.

The RBV is a promising theoretical framework for gaining more accurate empirical information on the factors internal to firms that affect the firm-level competitiveness not only in the woodworking companies but also in other industries. In order to apply the RBV in the empirical context, new approaches to the research methodologies are needed.

The empirical testability of the RBV could be enhanced by the employment of the MCDM framework in assessing the relative importance of different resources that are exploited within firms. In addition, by combining firm-level financial accounting information with the results of resource assessments grounded on the application of the MCDM techniques, the link between the theoretical and practical utility of the RBV could be strengthened.

5.2 Financial performance in Finnish large- and medium-sized sawmills: The effects of value-added creation and cost-efficiency seeking

Both cost-efficiency of the operations (measured with material costs and salary expenses of the turnover) and value-added creation (assessed with investment activity and value added of the turnover) affected the financial performance of the sample of 27 LM sawmills in 2000–2004. Cost-efficiency indicators had a statistically significant, negative impact on the short-term financial performance measured with liquidity and solvency, while no statistical evidence was gained of their impact on the long-term business success measured with profitability and growth. At the other extreme, value-added creation did not have an impact on the shortest business timespan assessed with liquidity, but it affected statistically significantly solvency, profitability and turnover growth. Based on those findings, a satisfactory level of cost-efficiency in the short-term can be considered to have formed the grounds for the economic sustainability of the business, which, in the long-term, has been supported by the capability to create new value in the products and services.

Investing in value-added creation does not concern only buying modern technologies but also acquiring new know-how, which is a long-term-oriented strategic process. The impacts of these investments that are based on building new tangible and intangible resource combinations do not necessarily feature at all within a few fiscal periods directly or indirectly in financial performance measures. Because of that, the five-year time frame of the study was rather short in proportion to the timescale needed to make changes in the resource pools of firms, e.g., by acquiring and developing new capabilities and especially to witness their impacts on the overall financial performance.

Employing financial accounting information in its entirety in assessing the factors of competitiveness assumed by the RBV is problematic. Since most intangible investments are recorded as expenditures in the income statement instead of being reported as assets in the balance sheet (e.g., Tan et al. 2007), tracking reliably and extensively the impact of intangible resource employment on the financial performance of LM sawmills is not possible using accounting information alone.

On some occasions, the effects of intangible resources, e.g., human resources, on business success could have been captured by positive effects of salary expenses on the financial performance measures. In this study, this conclusion was not supposed to be made, because salary expenses affected negatively and statistically significantly both the short- and long-term business success of LM sawmills. In total, as an outcome of this study, it can be said that information that goes beyond the income statement and balance sheet is needed in order to measure the effects of tangible and intangible resource usage on the financial performance of LM sawmills and to have more profound information on the drivers of firm-level competitiveness assumed by the RBV.

5.3 Assessing the relative importance of tangible and intangible resources: Empirical results from the forest industry

Among LM sawmill managers, both tangible and intangible resources were regarded as factors of production that had been valuable in business operations during the 2000s. Although some of the resources were equally important for all of the 19 sawmills represented in the interview data, to some extent the sawnwood production structure (i.e., commodity or value-added-oriented companies) or the softwood species used (Scots pine, *Pinus sylvestris* L., Norway spruce, *Picea abies* L. or multiple wood species) also affected the relative importance of resources within firms.

The classification of tangible and intangible resources used in the empirical assessments is presented in Figure 1. Regardless of the firms' product orientation or the usage of wood species, the most prioritized sawmill sub-resources were classified as personnel where 'the existence of experienced personnel' was especially valued, as management where 'capabilities in process management' were considered particularly important and as raw material where especially 'moderate cost-level raw material' was regarded as particularly valuable for the firms' business operations. In addition, outside of value-added sawnwood product manufacturers, LM sawmill managers gave high priority to 'the availability of external capital with reasonable interest' in the main resource class of finance and strategy. In contrast, despite the production structure and the wood species used, the sub-resources least valued by managers were classified into the main resource classes of collaboration, reputation and services, geographic location, labour and organization culture.

According to the results classified by the sawmills' choice of product orientation and the usage of wood species, raw material characteristics both in terms of 'moderate cost level', 'right species and dimensions' and 'quality' were most valued by the LM sawmills producing value-added wood products and by those focusing specifically on either Scots pine or Norway spruce usage. On the other hand, one sub-resource in technological know-how, i.e., 'the capability to tailor products according to the needs of customers' as well as factory and machinery in each of its sub-resource dimensions (sufficient capacity, raw

material usage efficiency and appropriate technologies) were considered as especially important among unfocused raw material users and unrefined sawnwood producers.

By employing the MCDA technique, it is possible both to differentiate the more valued resources from the less valued ones within firms' resource pools and to clarify the empirical resource assessment task. However, the employment of the MCDA framework does not diminish the crucial role of sample selection and resource operationalization within the RBV. In order to maintain the consistency of the research questions and to ensure the validity of the results, the theoretical presuppositions of the RBV and the theoretical grounds of the MCDA must be taken diligently into account in the study design.

5.4 Resource usage decisions and business success: A case study of Finnish large- and medium-sized sawmills

The financial performance of the LM sawmills has been affected by both tangible and intangible resources during the passing decade. The results of sub-study IV are based on the financial performance information and interview data of 16 case LM sawmills for which accounting data were available. The effects of the strategic resource usage decisions have been twofold: valuing some of the resources has had an unambiguously positive impact on the business success of the firms, whereas putting strategic emphasis on some resources has reflected negatively in their financial performance.

The resource assessments were grounded on eleven tangible and intangible factors of production that were also employed in sub-study III. Four of these had a statistically significant and positive impact on the financial performance of case companies. One of the strategically important main resource classes was a tangible one (raw material) and three of them were intangible ones (collaboration; technological know-how; reputation and services). In addition, one tangible main resource class (geographic location) and one intangible one (personnel) showed a statistically significant and negative impact on the firms' financial performance. Three tangible main resource classes (labour; factory and machinery; finance and strategy) and two intangible resource classes (management; organization culture) did not gain any statistical significance in the results.

The positive effects on firm-level competitiveness of the case sawmills have been created by giving strategic value to raw material, reputation and services, collaboration and technological know-how. Raw material as well as reputation and services have affected positively the overall financial performance measured with profitability, turnover growth and multi-dimensional performance. The positive effects of collaboration have reflected in profitability and multi-dimensional performance, while technological know-how has had an impact on turnover growth.

The negative impacts of resource usage decisions on the financial performance of case LM sawmills have been linked to an emphasized strategic importance of geographic location and personnel. The strategic valuation of geographic location has resulted in negative effects on profitability and turnover growth, whereas the emphasis on personnel has affected profitability and multi-dimensional performance adversely.

Combining the MCDA techniques and financial performance analysis within the RBV framework is challenging but provides a promising approach to improve the empirical applicability of the RBV. By adding the perspective of financial performance assessment to the employment of the MCDA, the actual role of tangible and intangible resources in

creating competitiveness can also be tested in real-life business operations. However, in order to receive more general results, the amount of observations in the data must be increased from the present case.

6 CONCLUSIONS AND DISCUSSION

6.1 General description of the study and the main findings

The purpose of this study is to provide information on the strategic resources of LM sawmills that may contribute to a sustained firm-level competitive advantage in a global business environment. The research has been implemented in four subsequent sub-studies, each of which has provided new information on the research area and clarified the research questions for the next phases of the study.

The results of sub-study I provided the overall basis for the methodological framework and research questions for sub-studies II–IV and the grounds for resource operationalizations to be used for gathering the interview data employed in sub-studies III–IV. In sub-study II, the focus of the research was to assess the effects of cost-efficiency seeking and value-added creation on LM sawmills' financial performance. In addition, the aim of sub-study II was to examine the characteristics of the financial accounting data also to be used in sub-study IV. Connected to that, all the measures employed in the analyses of sub-study II were derived from firm-level financial accounting information. Sub-study III shed light on the LM sawmill managers' perceptions of the resources that have been important for LM sawmill operations during the current decade. Finally, in sub-study IV, the actual impacts of different firm-level resources on the financial performance of LM sawmills were modelled.

The main findings of the research by sub-studies and the managerial implications are illustrated in Figure 4. The contents of Figure 4 outline the following chapters, where the findings of this study are discussed in detail.

6.2 Strategic potential of LM sawmill resources assessed with financial measures

In terms of achieving a sufficient financial performance, according to the results of this study, decisions regarding raw material, company reputation and services, formal and informal firm collaboration and the level of technological know-how have affected the financial performance of LM sawmills the most during the current decade. Putting strategic emphasis on raw material issues and service offering has affected financial performance in terms of profitability, turnover growth and multi-dimensional performance. Stressing the importance of informal and formal collaboration with different interest groups, for example timber suppliers and customers, has had an effect on profitability and multi-dimensional performance. In addition, the capability to apply developed production technologies has reflected positively in turnover growth.

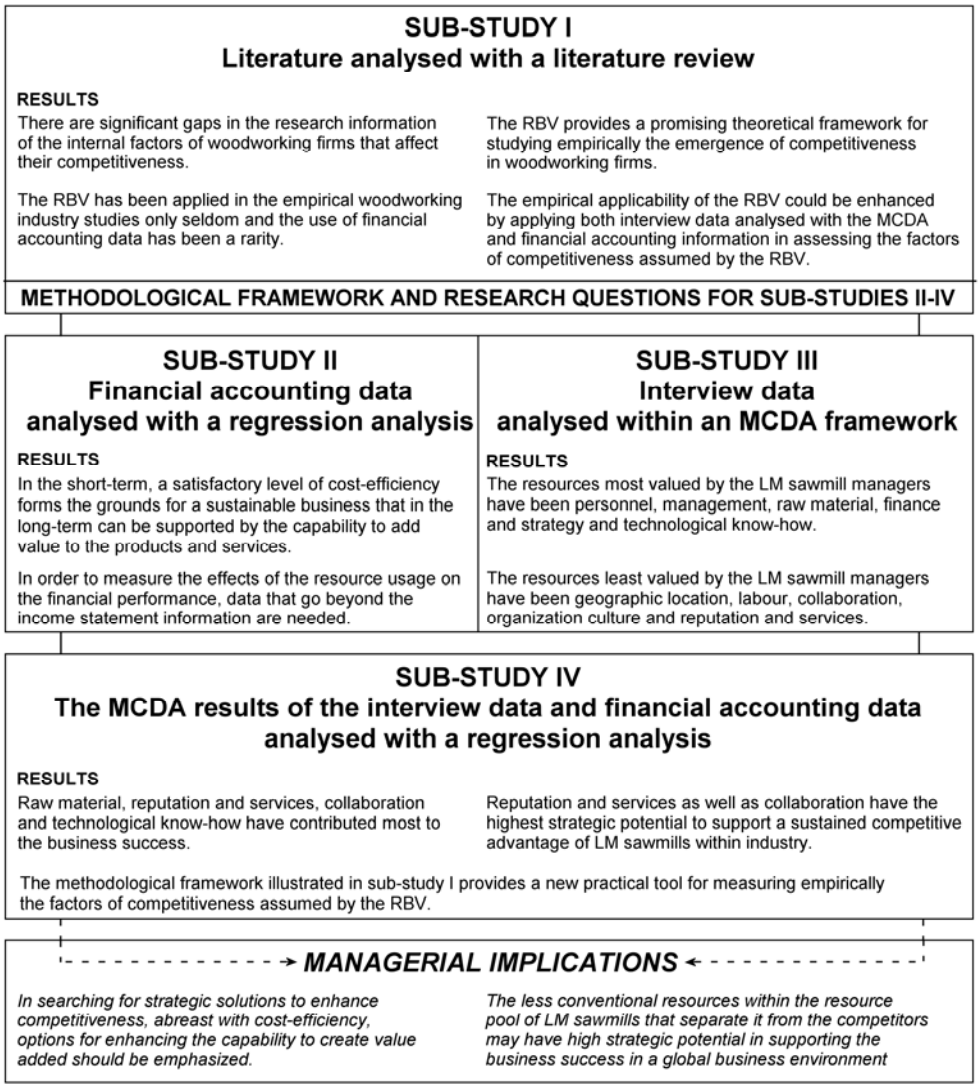

Figure 4. Structure, methodological framework and the main results of the study.

In the RBV, strategic resources are defined as valuable, rare, inimitable and not substitutable (VRIN) (e.g., Barney 1991) and they cannot usually be acquired from the markets or by analysing the firm's external environment (Barney 1986). Compared with reputation and services as well as collaboration, in LM sawmills, the strategic potential of raw material and technological know-how to support gaining a sustained competitive advantage within the sawmill industry is more ambiguous. Raw material is a crucial factor of production that can be considered as a basic resource possessed by all sawmills. Temporarily, some firms may be in a better competitive position in respect to raw material acquisition or costs but in the long-term raw material that can be acquired from the markets

cannot be a strategic resource that creates a sustained competitive advantage. In this study, technological know-how was found to affect only turnover growth but not other dimensions of business performance. Thus, when combined strategically and wisely with other resources, technological know-how may support achieving a competitive advantage but as such it does not seem to be a strategic resource for sawmills.

6.3 Managerial perceptions of strategic LM sawmill resources

Based on the results of this study, there have been some contradictions between the valuations of resources that have been expressed by LM sawmill managers and the actual influence the resources have had on LM sawmills' financial performance. In fact, based on the findings of this study, some of the resources least valued by the sawmill managers have contributed most to the business success of the companies in the 2000s. On the other hand, some of the resources that have been seen as crucial by the managers have not had any effect on the business success of the firms.

The most valued resources by LM sawmill managers were raw material, finance and strategy, management, personnel and technological know-how. Of these, raw material and technological know-how were found to have a positive effect on sawmills' business success in the analyses that were based on the financial statement information of the companies. In contrast, neither finance and strategy nor management showed any significance in creating business performance. In addition, in the light of the financial performance measures, the strategic valuation of personnel seems to have affected adversely LM sawmills' business success. However, measuring the effects of personnel capabilities on financial performance is highly problematic due to the fact that, in the recognized financial reporting systems, human resource investments are expensed and reported as costs in income statements (Høegh-Krohn and Knivsflå 2000). Further, the time frame of the study is rather short as compared with the temporal aspect of intangible asset accumulation (Dierixck and Cool 1989).

The resources least valued by LM sawmill managers were geographic location, labour, formal and informal collaboration with raw material deliverers, customers, other interest groups and other forest firms as well as culture and reputation and services. In that aspect, it seems likely that some strategic misjudgements have been made within LM sawmills, since formal and informal collaboration as well as reputation and services have, according to the results of this study, the highest strategic potential to support a sustained competitive advantage within the sawmill industry. On the other hand, considering geographic location as an insignificant resource has been a prudent decision in these LM sawmills because the companies emphasizing the strategic importance of geographic location have faced negative effects in their profitability and turnover growth.

6.4 Implications for LM sawmill management in resource pool building

In seeking sustainable competitiveness, the task of the company managers is to build a resource portfolio that enhances business success within the competitive environment. The existence of firm-specific strategic resources does not create foundations for competitiveness without distinctive strategic renewal processes that reflect both managers'

individual skills and experiences as well as creative ways of doing things within firms (Augier and Teece 2008). In all, the firm's ability to renew its knowledge base and other intangible resources as well as organizational structures and practises have been found to affect positively performance indicators (Jantunen 2005).

The results of this study show that, when the leaders are looking for solutions to support sawmills' competitiveness, the less conventional resources should also be taken open-mindedly into consideration in the firms' strategic planning processes. Although cost-efficiency, e.g., in terms of raw material usage, creates the grounds for the sustainability of the business, it is the value of the products and services that separates a certain firm from its competitors. Similar conclusions have been made, e.g., in Stendahl et al. (2007), where the recognition of the broad resource base and the capability to employ especially intangible resources were found to be crucial for the product development success of Finnish and Swedish sawmills.

In the course of time, abreast with cost-efficiency, the capability to create value added is needed to achieve competitiveness. Intangible resources such as collaboration and the ability to provide services play an important role, e.g., in searching for synergies, in receiving information as well as in creating an advantageous image of the sawnwood manufacturer. For example, these factors may essentially promote the capability of a firm to create value added appreciated by the customers, which enables the setting of product prices that are above the level of standard commodities. To reach the profit potential of a firm and to win out in the global business environment, managers must understand the relationship between the costs of the company and the value the company provides to its customers (McNair et al. 2001).

In addition to acknowledging the potential strategic value of the less conventional resources within the sawmill industry, it is crucial to remember that, after an environmental change, formerly valuable resources may start causing competitive disadvantages (Armstrong and Shimizu 2007). In the course of globalization, this has happened for example to the location resources, which have lost their strategic value (Fahy 2002). This is in line with the findings of this study, where leaning on geographic location was found to have caused negative effects on LM sawmills' financial performance. Thus, building the resource portfolio of LM sawmills does not concern only selecting the factors of production that might contribute to the business performance but also recognizing and neutralizing the ones that might weaken the competitive position of a firm in the global markets.

6.5 Theoretical contribution of the study to the empirical application of the RBV

The empirical results of this study are grounded on an RBV-based methodological framework developed in this study that enables assessing at firm-level both the relative importance of different tangible and intangible resources in business operations and their effects on the financial performance of the companies. The methodological framework is based on combining two different data sources, which are analysed separately and then linked with each other by using a quantitative analysis on financial performance.

In the first phase, the relative importance of the different resources is assessed with in-depth personal interviews that are made within an MCDA framework. In the second phase, the business performance of the companies is evaluated with measures derived from their firm-level financial statement analysis. In the last phase, the results received with MCDA

techniques are employed as explanatory variables in regression analyses on the business performance of sawmills. In addition, the results of this study create solid ground for future extension of the research work.

The methodological framework introduced in this study provides a new tool for measuring empirically the factors of production that contribute to a sustained competitive advantage assumed by the RBV. Because of the problems in identifying and measuring resources, most of the studies made within the RBV have been more conceptual than empirical (Fahy 2000). In addition, less research has been done to solve the methodological problems linked to the empirical application of the RBV (Armstrong and Shimizu 2007). This study contributes to the resource measurement problem but it also approaches the challenge of assessing at firm-level the impacts of the resource usage decisions on the business success of the companies.

6.6 Limitations of the study and further research needs

The results of this study provide new information on how to evaluate the contribution of the resource usage decisions on firm-level competitiveness within the sawmill industry that operates in a global business environment. In order to be able to control the effects of other characteristics than the firms' internal resources assumed by the RBV, the data were gathered from a homogeneous group of LM sawmills that operate in Finland.

Due to the sample limitations, the results cannot be generalized as such to the whole Finnish sawmill industry or sawmills operating in different countries. In addition, although the sample LM sawmills of this study have an important role in the Finnish sawmill industry in terms of production volume, turnover and employment, the rather small amount of observations in the data sample must be kept in mind when applying empirically the results of this study. Despite the data constraints, this study can still give valuable clues for strategic planning for different types of sawmills that operate in Finland or other higher cost-level countries in Europe or North America.

The implementation of this study has shown that, although applying the MCDA technique clarifies the empirical resource assessment task, it does not diminish the crucial role of sample selection and resource operationalization within the RBV framework. In this work, the resource operationalization was based on a thorough literature review of RBV studies and research made on woodworking industries. In regard to the pairwise comparison technique employed in the interviews, special attention must be paid to the study design. It is also crucial to ensure that the respondents understand the purpose and contents of the pairwise comparisons. Because of this, face-to-face contact between the managers and interviewers is the best way to ensure the validity of the interview data. Since the results of this study are relatively comprehensible and reasonable, the study design can be presumed to have succeeded well in relation to sample selection, resource operationalization and research methodology (e.g., Silverman 1999, Armstrong and Shimizu 2007).

The employment of the financial statement information in the methodological framework of this study is straightforward, presuming that comparable firm-level accounting information is available. Instead, there are challenges in applying the accounting information due to the lack of a systematic framework to quantify the stock of intangible assets reliably in the balance sheet (Wyatt 2001). As a result, most intangible investments in, for example, knowledge, research and development are expensed and reported as costs

in the income statement (Høegh-Krohn and Knivsflå 2000). In the end, companies valuing capable personnel and making know-how investments may in the light of financial performance measures seem, especially within a small number of fiscal periods, drastically more unsuccessful than they could be in the longer term. Unfortunately, this study did not facilitate a longitudinal analysis of the strategic resource usage decisions and the financial performance of LM sawmills.

In future studies, the results could be generalized by gathering the interview data from a larger amount of firms and by increasing the number of sequential accounting periods in business performance measurements. In addition, since the challenges of the global business environment are similar for all the woodworking companies operating in the higher cost-level areas, valuable information could be acquired by gathering comparable homogenous firm-level data from several countries. In the interviews, an attempt should be made to supplement the deficient accounting data of the human resource investments by asking the company human resource and development managers for additional information, which could be used to make adjustments to the financial accounting data.

Profound knowledge of the interconnections between the resource usage decisions, firm-level business strategies and financial performance is a prerequisite for enhancing the competitiveness of woodworking industries located in higher cost-level areas. In this study, business strategies (e.g., Porter 1980) were not directly approached in the context of resource assessments. Thus, that crucial link between the resources internal to firms and their external business environment remains open to be studied in future work.

REFERENCES

Andersen, O. & Kheam, L.S. 1998. Resource-based theory and international growth strategies: an exploratory study. International Business Review 7:163–184.

Aravuo, K. 2002. Puun sahaus, höyläys ja kyllästys. Toimialaraportti. KTM:n ja TE-keskusten julkaisu. Available at: http://www.temtoimialapalvelu.fi/. [Cited 13 Sept 2008].

– 2007. Puun sahaus, höyläys ja kyllästys. Toimialaraportti 4/2007. Available at: http://www.temtoimialapalvelu.fi/. [Cited 13 Sept 2008].

Armstrong, C. E. & Shimizu, K. 2007. A Review of approaches to empirical research on the resource-based view of the firm. Journal of Management 33:959–986.

Augier, M. & Teece, D. J. 2008. Strategy as evolution with design: The foundations of dynamic capabilities and the role of managers in the economic system. Organization Studies 29: 1187–1208.

Balance Consulting. 2005. Financial statement analyses for Finnish medium-sized and large privately owned sawmills in 2000–2004. Unpublished documents available by ordering. Available at: http://www.balanceconsulting.fi/esittely/english.shtml. [Cited 24 March 2006].

– 2006. Financial statement analyses for Finnish sawmills in 2002–2005. Unpublished documents available by ordering. Available at: http://www.balanceconsulting.fi/esittely/english.shtml. [Cited 19 Dec 2006].

– 2007. Financial statement analyses for Finnish sawmills in 2003–2006. Unpublished documents available by ordering. Available at: http://www.balanceconsulting.fi/esittely/english.shtml. [Cited 12 Feb 2008].

Barney, J. B. 1986. Strategic factor markets: Expectations, luck, and business strategy. Management Science 32:1231–1241.

– 1991. Firm resources and sustained competitive advantage. Journal of Management 17:99–120.

– 2001. Is the resource-based ”view” a useful perspective for strategic management research? Yes. Academy of Management Review 26:31–46.

Bergström, M. & Stehn, L. 2005. Matching industrialized timber frame housing needs and enterprise resource planning: a change process. International Journal of Production Economics 97:172–184.

Bonsi, R., Gnyawali, D. R. & Hammett. 2008. Achieving sustained competitive advantage in the forest products firm: The importance of the resource-based view. Journal of Forest Products Business Research 5:1–14.

Brown, S. & Blackmon, K. 2005. Aligning manufacturing strategy and business-level competitive strategy in new competitive environments: The case for strategic reasonanse. Journal of Management Studies 42:793–815.

Bull, L. & Ferguson, I. 2006. Factors influencing the success of wood product innovations in Australia and New Zealand. Forest Policy and Economics 8:742–750.

Bush, R. J. & Sinclair, S. A. 1991. A multivariate model and analysis of competitive strategy in the U.S. hardwood lumber industry. Forest Science 37:481–499.

Camelo-Ordaz, C., Martín-Alcázar, F. & Valle-Cabrera, R. 2003. Intangible resources and strategic orientation of companies. An analysis in the Spanish context. Journal of Business research 56:95–103.

Cohen, D. H. & Sinclair, S. A. 1990. The adoption of new manufacturing technologies: impact on the performance of North American producers of softwood lumber and structural panels. Forest Products Journal 40:67–73.

Committee for Corporate Analysis. 2000. A guide to the analysis of financial statements of Finnish Companies. Gaudeamus, Helsinki, Finland. 85 p.

– 2005. Yritystutkimuksen tilinpäätösanalyysi. Gaudeamus, Helsinki, Finland. 110 p.

Conner, K. R. 1991. A historical comparison of resource-based theory and five schools of thought within industrial organization economics: Do we have a new theory of the firm? Journal of Management 17:121–154.

Davis, T. J. & Claisse, P. A. 2000. Bolted joints in glulam and structural timber composites. Construction and Building Materials 14:407–417.

Dierickx, I. & Cool, K. 1989. Asset stock accumulation and sustainability of competitive advantage. Management Science 34:1504–1511.

European Comission 2008. List of NACE (Nomenclature des Activités dans la Communauté Européenne) Available at: http://ec.europa.eu/comm/competition/mergers/cases/index/nace_all.html. [Cited 17 Sept 2008].

Fahy, J. 2000. The resource-based view of the firm: some stumbling-blocks on the road to understand sustainable competitive advantage. Journal of European Industrial Training 24:94–104.

– 2002. A resource-based analysis of sustainable competitive advantage in a global environment. International Business Review 11:57–78.

FAO. 2008. The ForesSTAT database. Available at: http://faostat.fao.org/default.aspx. [Cited 13 Sept 2008].

Fernàndez, E., Montes, J. M. & Vàzquez, C. 2000. Typology and strategic analysis of intangible resources. A resource-based approach. Technovation 20:81–92.

Finnish Forest Research Institute. 2005. Finnish Forest Sector Economic Outlook 2005–2006. Available at: http://www.metla.fi/julkaisut/suhdannekatsaus/index-en.htm. [Cited 17 Oct 2008].

– 2007. Finnish Statistical Yearbook of Forestry. Finnish Forest Research Institute. Vammalan Kirjapaino Oy, Vammala. 436 p.

– 2008. Statistical database. Available at: www.metla.fi/metinfo/tilasto/. [Cited 16 Oct 2008].

– 2008. Finnish Forest Sector Economic Outlook 2008–2009. Available at: http://www.metla.fi/julkaisut/suhdannekatsaus/index-en.htm. [Cited 30 Oct 2008].

Finnish Sawmills Association. 2008. Available at http://www.suomensahat.fi/tietoa_eng1.htm. [Cited 13 Sept 2008].

Galbreath, J. 2005. Which resources matter the most to firm success? An exploratory study of resource-based theory? Technovation 25:979–987.

Grant, R. M. 1991. The resource-based theory of competitive advantage: Implications for strategy formulation. California Management Review 33:114–135.

– 2005. Contemporary strategy analysis. Blackwell Publishing. 5th edition. 548 p.

Haara, A. & Leskinen, P. 2007. STEPS manual. Unpublished memorandum. Finnish Forest Research Istitute, Joensuu Research Unit. 5 p.

Hansen, E., Seppälä, J. & Juslin, H. 2002. Marketing strategies of sowtwood sawmills in Western North America. Forest Products Journal 52:19–25.

─, Dibrell, C. & Down, J. 2006. Market orientation, strategy, and performance in the primary forest industry. Forest Science 52:209–220.

Hass, S., Burnaby, P. & Biestaker, J. L. 2005. The use of performance measures as an integral part of an entity's strategic plan. Managerial Auditing Journal 20:179–186.

Helfat, C. E. & Peteraf, M. A. 2003. The dynamic resource-based view: Capability lifecycles. Strategic Management Journal 24:997–1010.

Helstad, K. 2006. Managing timber procurement in Nordic purchasing sawmills. Doctoral dissertation. University of Växjö, Sweden. 63 p.

Høegh-Krohn, N. E. & Knivsflå, K. H. 2000. Accounting for intangible assets in Scandinavia, the UK, the US and by the IASC: Challenges and solution. The International Journal of Accounting 35:243–265.

Hovgaard, A. & Hansen, E. 2004. Innovativeness in the forest products industry. Forest Products Journal 54:26–33.

Idassi, J. O., Young, T. M., Winistorfer, P. M., Ostermeier, & D. M. Woodruff, R. B. 1994. A customer-oriented marketing method for hardwood lumber companies. Forest Products Journal 44:67–73.

Jantunen, A. 2005. Dynamic capabilities and firm performance. Doctoral dissertation. Lappeenranta University of Technology, Finland. 65 p + 5 articles.

Kallio, M. 2001. Interdependence of the sawlog, pulpwood and sawmill chip markets: An oligopsony model with an application to Finland. Silva Fennica 35:229–243.

Kangas, J., Store, R., Leskinen, P. & Mehtätalo, L. 2000. Improving the quality of landscape ecological forest planning by utilising advanced decision-support tools. Forest Ecology and Management 132:157–171.

Kivinen, V.-P., Uusitalo, J. & Nurmi, T. 2005. Comparison of four measures designed for assessing the fit between the demand and output distributions of logs. Canadian Journal of Forest Research 35:693–702.

Korhonen, S. 2006. A Capability-Based View of Organisational Renewal: Combining Opportunity – and Advantage-Seeking Growth in Large, Established European and North American Wood-Industry Companies. Dissertationes Forestales 202. Dissertation. 74. Available at: http://www.metla.fi/dissertationes/df20.pdf. [Cited 2 June 2008].

─ & Niemelä, J. S. 2004. Guidelines for sustainable, external corporate growth: A case study of the leading European and North American wood-industry companies. Journal of Forest Products Business Research 1:1–27.

─ & Niemelä, J. S. 2005. A Conceptual analysis of capabilities: Identifying and classifying sources of competitive advantage in the wood industry. The Finnish Journal of Business Economics 54:11–47.

Kozak, R. & Maness, T. C. 2001. Quality assurance for value-added wood products in British Columbia. Forest Products Journal 51:47–55.

Laitinen, E. K. 2000. Long-term success of adaptation Strategies: Evidence from Finnish companies. Long Range Planning 33:806–830.

Lee, L,. Cohen, D. & Maness, T. 1999. Markets and technology in Western Canadian sawmills. Forest Products Journal 49:36–42.

Leskinen, P. & Kangas, J. 1998. Analysing uncertainties of interval judgement data in multiple-criteria evaluation of forest plans. Silva Fennica 32:363–372.

─ & Kangas, J. 2005. Multi-criteria natural resource management with preferentially dependent decision criteria. Journal of Environmental Management 77:244–251.

Lockett, A. & Thompson, S. 2001. The resource-based view and economics. Journal of Management 27:723–754.

Mata, F. J., Fuerst, W. L. & Barney, J. B. 1995. Information technology and sustained competitive advantage: A resource-based analysis. MIS Quarterly 19:487–505.

McNair, C. J., Polutnik, L. & Silvi, R. 2001. Cost management and value creation: the missing link. The European Accounting Review 10:33–50.

Michael, J. H. & Leschinsky, R. M. 2003. Human resources management and training needs of Pennsylvania lumber producers. Forest Products Journal 53:28–32.

Newbert, S. L. 2007. Empirical research on the resource-based view of the firm: An assessment of suggestions for future research. Strategic Management Journal 28:121–146.

–, Gopalakrishnan, S. & Kirchhoff, B. A. 2008. Looking beyond resources: Exploring the importance of entrepreneurship to firm-level competitive advantage in technologically intensive industries. Technovation 28:6–19.

Niemelä. J. 1993. Marketing-oriented strategy concept and its empirical testing with large sawmills. Acta forestalia Fennica 240. Dissertation. 102 p.

– & Smith, P. M. 1997. A Multinational analysis of competitive strategies of softwood sawmills. Scandinavian Journal of Forest Research 12:297–301.

Nyrud, A. Q. & Bergseng, E. R. 2002. Efficiency and size in Norwegian sawmilling. Scandinavian Journal of Forest Research 17:566–575.

– & Baardsen, S. 2003. Production efficiency and productivity growth in Norwegian sawmilling. Forest Science 49:89–97.

Owari, T., Juslin, H., Rummukainen, A. & Yoshimura T. 2006. Strategies, functions and benefits of forest certification in wood products marketing: perspectives of Finnish suppliers. Forest Policy and Economics 9:380–391.

Penrose, E. 1995. The theory of the growth of the firm. 3rd edition. (reprint of 1959). Oxford University Press, Oxford, United Kingdom. 272 p.

Porter, M. E. 1980. Competitive strategy, techniques for analyzing industries and competitors. The Free Press, New York. 396 p.

Porter, M. E. 1998. Clusters and the new economics of competition. Harvard Business Review 76:77–90.

Powell, S. 2003. Accounting for intangible assets: current requirements, key players and future directions. European Accounting Review 12:797–811.

Richardson, G.B. 1972. The organisation of industry. The Economic Journal 82:883–896.

Roos, A., Flinkman, M., Jäppinen, A., Lönner, G. & Warensjö, M. 2001. Production strategies in the Swedish softwood sawmilling industry. Forest Policy and Economics 3:189–197.

Rouse, M. J. & Daellenbach, U. S. 1999. Rethinking research methods for the resource-based perspective: isolating the sources of sustainable competitive advantage. Strategic Management Journal 20:487–494.

– 2002. More thinking on research methods for the resource-based perspective. Strategic Management Journal 23:963–967.

Rubin, P. H. 1973. The expansion of firms. The Journal of Political Economy 81:936–949.

Schroeder, R. G., Bates, K. A. & Junttila, M. A. 2002. A resource-based view of manufacturing strategy and the relationship to manufacturing performance. Strategic Management Journal 23:105–117.

Siitonen, S. 2003. Impact of Globalisation and Regionalisation Strategies on the Performance of the World's Pulp and Paper Companies. Doctoral dissertation, Helsinki School of Economics, 2003. Acta Universitatis Oeconomicae Helsingiensis, A-225. 260 p.

Silverman, B. S. 1999. Technological resources and the direction of corporate diversification: toward and integration of resource-based view and transaction cost economics. Management Science 45:1109–1124.

Simpson, J. T. & Wren, B. M. 1997. Buyer-seller relationships in the wood products industry. Journal of Business Research 39:45–51.

Sinclair, S. A. & Cohen, D. H. 1992. Adoption of continuous processing technologies: Its strategic importance in standardized industrial product markets. Journal of Business Research 24:209–224.

Sirmon, D., Hitt, M. A., & Ireland, R. D. 2007. Managing firm resources in dynamic environments to create value: Looking inside the black box. Academy of Management Review 32:273–292.

Smith, P. M., Dasmohapatra, S. & Luppold, W. G. 2004. A profile of Pennsylvania's hardwood sawmill industry. Forest Products Journal 54:43–49.

StatFin. 2008. Statistics Finland. Internet database of Statistics Finland. Available at: http://www.stat.fi/til/index.html. [Cited 16 Sept 2008].

Stendahl, M., Roos, A. & Hugosson, M. 2007. Product development in the Swedish and Finnish Sawmilling Industry – A qualitative study of managerial perceptions. Journal of Forest Products Business Research 4:1–24.

Syme, J. H. & Duke, C. R. 1994. Market-oriented strategy for forest-based rural economy economic development. Forest Products Journal 44:10–16.

Tan, H. P., Plowman D. & Hancock, P. 2007. Intellectual capital and financial returns of companies. Journal of Intellectual Capital 8:76–95.

Toivonen, R. 1999. Planning the use of information technology in marketing: the case of Finnish forest industries. Forest Products Journal 49:25–30.

–, Hansen, E., Järvinen, E. & Enroth, R.-R. 2005. The competitive position of the Nordic wood industry in Germany – Intangible quality dimensions. Silva Fennica 39:277–287.

Van Horne, C., Frayret, J.-M. & Poulin, D. 2006. Creating value with innovation: From centre of expertise to the forest products industry. Forest Policy and Economics 8:751–761.

Wernerfelt, B. 1984. A resource-based view of the firm. Strategic Management Journal 5:171–180.

Villalonga, B. 2004. Intangible resources, Tobin's q and sustainability of performance differences. Journal of Economic Behavior & Organization 54:205–230.

Vlosky, R. P., Chance, N. P., Monroe, P. A., Hughes, D. W. & Blalock, L. B. 1998. An integrated market-based methodology for value-added solid wood products sector economic development. Forest Products Journal 48:29–35.

Wyatt, A. 2001. Accounting for intangibles: The great divide between obscurity in innovation activities and the balance sheet. The Singapore Economic Review 46:83–117.

Yang, D.-Q., Gignac, M. & Bisson, M.-C. 2004. Sawmill evaluation of a bioprotectant against moulds, stain, and decay on green lumber. Forest Products Journal 54:63–68.

Zhou, M. & Buongiorno, J. 2005. Price transmission between products at different stages of manufacturing in forest industries. Journal of Forest Economics 11:2–19.

ANNEX 1

Calculus of the financial performance measures

Liquidity measured with Current ratio =

$$\frac{\text{Inventories and work-in-progress + Receivables + Financial assets}}{\text{Short-term liabilities}}$$

Solvency measured with Equity ratio, % =

$$\frac{\text{Adjusted shareholders' equity}}{\text{Adjusted balance sheet total - Advances received}} \times 100\ \%$$

Profitability measured with Return on investment (ROI), % =

$$\frac{\text{Net result + Financial expenses + Taxes (12 months)}}{\text{Average invested capital for the fiscal period}} \times 100\ \%$$

Growth measured with Turnover growth, % =

$$\frac{\text{Change in turnover (12 months)}}{\text{Turnover for the previous fiscal period (12 months)}} \times 100\ \%$$

Cash flow measured with Net result, % =

$$\frac{\text{Operating result + Financial income - Financial expenses - Direct taxes}}{\text{Turnover (12 months)}} \times 100\ \%$$

Obligations measured with Payback period of debts (in years) =

$$\frac{\text{Invested external capital at the end of fiscal period}}{\text{Cash flow after financing activities (12 months)}}$$

ANNEX 2

Structured questionnaire used in the interview data gathering

1. KUINKA PALJON YRITYKSENNE KÄYTTI RAAKA-AINETTA VUONNA 2005?

		Mänty	Kuusi	Koivu
1. A.	Kotimaista tukkipuuta	_____m^3	_____m^3	_____m^3
1. B.	Ulkomaista tukkipuuta	_____m^3	_____m^3	_____m^3
1. C.	Pikkutukkia	_____m^3	_____m^3	_____m^3

1. D. Onko raaka-aineen käytössänne tapahtunut merkittäviä muutoksia vuosina 2000–2005?

□ Kyllä (Siirry kysymykseen **1. E.**) □ Ei (Siirry kysymykseen **2.**)

1. E. Millaisia raaka-aineen käytön muutokset ovat olleet ja mitkä yrityksen sisäiset tai ulkoiset syyt ovat olleet niiden taustalla?

_____

_____

2. KUINKA PALJON YRITYKSENNE TUOTTI SAHATUOTTEITA VUONNA 2005?

		Mänty	Kuusi	Koivu
2. A.	Perussahatavaraa	_____m^3	_____m^3	_____m^3
2. B.	Höylättyä sahatavaraa	_____m^3	_____m^3	_____m^3
2. C.	Muita jatkojalosteita, mitä?			
_____		_____m^3	_____m^3	_____m^3
_____		_____m^3	_____m^3	_____m^3

2. D. Onko tuotevalikoimassanne tapahtunut merkittäviä muutoksia vuosina 2000–2005?

□ Kyllä (Siirry kysymykseen **2. E.**) □ Ei (Siirry kysymykseen **3.**)

2. E. Mitä tuotevalikoimaanne tehdyt muutokset ovat olleet ja mitkä yrityksen sisäiset tai ulkoiset syyt ovat olleet niiden taustalla?

_____

_____

3. MITEN SAHAUKSENNE SIVUTUOTTEENA SYNTYVÄ HAKE JA PURU KÄYTETÄÄN?

3. A. Oma käyttö, mihin tarkoitukseen?_____

3. B. Myynti, mihin tarkoitukseen?_____

4. KUINKA SUURI OSUUS LIIKEVAIHDOSTANNE SAATIIN…?

		Vuonna 2000	Vuonna 2005
4. A.	…viennistä?	_____%	_____%
4. B.	…sahauksen sivutuotteista?	_____%	_____%

5. MITEN ALLA OLEVAT VÄITTÄMÄT KUVAAVAT TUOTEMARKKINOITANNE?

Täysin samaa mieltä		**En osaa sanoa**		**Täysin eri mieltä**
5	**4**	**3**	**2**	**1**

5. A. Toimimme laajoilla markkinoilla ja tuotamme massatuotteita kaikille asiakasryhmille niiden tarpeita erottelematta.

□ □ □ □ □

5. B. Toimimme laajoilla markkinoilla ja erilaistamme perustuotteita, jotta pystyisimme ottamaan huomioon eri asiakasryhmien tarpeet.

□ □ □ □ □

5. C. Toimimme suppeilla markkinoilla ja keskitymme tuottamaan perustuotteita yhden tai muutaman asiakasryhmän tarpeisiin.

□ □ □ □ □

5. D. Toimimme suppeilla markkinoilla ja valmistamme yhdelle tai muutamalle asiakasryhmälle räätälöityjä erikoistuotteita.

□ □ □ □ □

A	**B**	**C**	**D**

5. E. Mikä yllä olevista vaihtoehdoista **5. A.– 5. D.** kuvaa parhaiten yrityksenne liiketoimintaa?

6. MITEN ALLA OLEVAT VÄITTÄMÄT KUVAAVAT TUOTTEIDENNE TAI PALVELUIDENNE OMINAISUUKSIA?

Täysin samaa mieltä		**En osaa sanoa**		**Täysin eri mieltä**
5	**4**	**3**	**2**	**1**

6. A. Tuotteemme eivät poikkea olennaisilta osiltaan kilpailijoiden valmistamista tuotteista.

□ □ □ □ □

6. B. Tuotteissamme on asiakkaidemme arvostamia erityisominaisuuksia, jotka puuttuvat kilpailijoiden valmistamista tuotteista.

□ □ □ □ □

6. C. Palvelumme eivät poikkea olennaisilta osiltaan kilpailijoiden valmistamista palveluista.

□ □ □ □ □

6. D. Tarjoamme erityisiä palveluja, joita kilpailijat eivät tarjoa, mitä?

_____

□ □ □ □ □

7. MITEN ALLA OLEVAT VÄITTÄMÄT KUVAAVAT TUOTTEIDENNE JA PALVELUIDENNE HINNOITTELUA?

Täysin samaa mieltä		**En osaa sanoa**		**Täysin eri mieltä**
5	**4**	**3**	**2**	**1**

7. A. Tuotteidemme ja niihin liittyvien palvelujen hintojen on oltava vähintään yhtä alhaiset kuin vastaavia tuotteita vastaaville asiakasryhmille valmistavilla kilpailijoilla.

□ □ □ □ □

7. B. Tuotteidemme ja niihin liittyvien palveluiden hinnat voivat olla kilpailijoita korkeammat. Tämä siksi, että tuotteemme sisältävät asiakkaidemme arvostamia erityisominaisuuksia, jotka puuttuvat kilpailijoiden valmistamista tuotteista.

□ □ □ □ □

8. TILA KOMMENTEILLE

_____

_____

9. AINEELLISTEN JA AINEETTOMIEN TUOTANNONTEKIJÖIDEN MERKITYS LIIKETOIMINNASSA

Seuraaville sivuille on ryhmitelty yrityksissä käytettäviä aineellisia ja aineettomia tuotannontekijöitä. Vertailemalla ryhmiä keskenään voidaan arvioida erilaisten tuotannontekijöiden merkitystä yrityksessänne. Vertailuja tehdessänne miettikää, mikä on ollut kunkin tuotannontekijän rooli liiketoiminnassanne 2000-luvulla.

Alla olevassa kuvassa esitetään tutkimuksen kohteena olevat tuotannontekijäryhmät ja niiden sisältö. Tuotannontekijöiden kartoitus toteutetaan pareittaisin vertailuin siten, että esim. yrityksen sijainnin tärkeyttä verrataan raaka-ainekysymysten tärkeyteen, raaka-ainekysymysten tärkeyttä verrataan työvoima-asioiden tärkeyteen, jne.

Seuraavalla sivulla on esitetty malliksi neljä kuvitteellisen henkilön tekemää, tuotannontekijöihin liittyvää parivertailua ja selitys niiden tulkinnasta. Vertailujen idea on, että mikäli kaksi keskenään vertailtavaa tekijää ovat olleet yrityksessänne yhtä tärkeitä, rastittakaa molemmat vaihtoehdot ja merkitkää ”Suhde” -sarakkeeseen parin kohdalle viiva. Mikäli toinen vertailuparin tekijöistä on ollut tärkeämpi, rastittakaa se ja merkitkää ”Suhde” -sarakkeeseen, kuinka monta kertaa tärkeämpi kyseinen tekijä on ollut yrityksessänne.

Vertailuparien arvottamisessa käytetään suhdeasteikkoa, jolle ei ole annettu ylärajaa. Kukin vastaaja määrittelee siten itse oman arvosteluasteikkonsa, jossa myös desimaalien käyttö on sallittua.

Vaikka kaikki parivertailut eivät vaikuttaisi mielekkäiltä, on tärkeää, että jokaiseen kohtaan pyritään vastaamaan mahdollisimman harkitusti. Olennaista on, että vastatessa keskitytään vain yhtä vertailuparia koskevaan kysymykseen kerrallaan miettimättä ollenkaan muihin parivertailuihin annettuja vastauksia tai mahdollisesti edessä olevia kysymyksiä!

KUVITTEELLISEN HENKILÖN TEKEMÄT NELJÄ PARIVERTAILUA JA NIIDEN SANALLINEN TULKINTA:

Esimerkki

	RAAKA-AINEKYSYMYKSET	**Tärkeys**	**Suhde**
1	Raakapuuta on ollut saatavissa kohtuullisin kustannuksin **vs.**	**x**	**8**
	Tuotannossa tarvittavaa raaka-ainetta on ollut helposti saatavissa		

Tulkinta: "Tuotannossa tarvittavan raaka-aineen helppo saatavuus on ollut yrityksen liiketoiminnassa kahdeksan kertaa tärkeämpää kuin se, että tuotannossa tarvittavaa raaka-ainetta on ollut saatavissa kohtuullisin kustannuksin."

	JOHTAMISTAIDOT		
2	Organisaatiossa on ollut kyvykkäitä ihmisten johtajia **vs.**	**–**	
	Henkilöstön oppimista on tuettu ja tuotekehitykseen on kiinnitetty huomiota		

Tulkinta: "Kyvykkäiden ihmisten johtajien olemassaolo organisaatiossa on ollut yrityksen liiketoiminnassa yhtä tärkeää kuin se, että henkilöstön oppimista on tuettu ja tuotekehitykseen on kiinnitetty huomiota."

	TEKNOLOGINEN OSAAMINEN		
3	Sahatuotteita on jalostettu pilareiksi, palkeiksi, komponenteiksi ja/tai rakennepuutuotteiksi **vs.**	**x**	**1,3**
	Tuote-eriä on räätälöity valmistusprosesseissa asiakkaiden tarpeiden mukaisiksi		

Tulkinta: "Sahatuotteiden jalostaminen pilareiksi, palkeiksi, komponenteiksi ja/tai rakennepuutuotteiksi on ollut 1,3 kertaa tärkeämpää yrityksen liiketoiminnassa kuin tuote-erien räätälöiminen asiakkaiden tarpeiden mukaisiksi."

	ULKOISTEN JA SISÄISTEN TEKIJÖIDEN SEKÄ OSAAMISEN MERKITYS YRITYSTOIMINNASSA		
4	Tehtaan ja tuotantolaitteiden ominaisuudet **vs.**	**x**	**2**
	Teknologinen osaaminen		

Tulkinta: "Teknologinen osaaminen on ollut 2 kertaa tärkeämpää yrityksen liiketoiminnassa kuin tehtaan ja tuotantolaitteiden ominaisuudet."

PARIVERTAILUT TUOTANNONTEKIJÖIDEN KESKINÄISEN MERKITYKSEN ARVOTTAMISEKSI

		Tärkeys	Suhde
YRITYKSEN SIJAINTI			
1	Julkinen sektori on vaikuttanut positiivisesti sijaintikunnan yritystoimintaan ***vs.***	□	____
	Tärkeimmät asiakkaat ovat olleet samassa seutukunnassa tai maakunnassa	□	____
2	Sijaintipaikkakunnalla tai lähikunnissa on sijainnut myös muita metsäalan yrityksiä ***vs.***	□	____
	Julkinen sektori on vaikuttanut positiivisesti sijaintikunnan yritystoimintaan	□	____
3	Sijaintipaikkakunnalla tai lähikunnissa on sijainnut myös muita metsäalan yrityksiä ***vs.***	□	____
	Tärkeimmät asiakkaat ovat olleet samassa seutukunnassa tai maakunnassa	□	____
RAAKA-AINEKYSYMYKSET			
4	Korkealaatuisen raaka-aineen saatavuus on ollut hyvä ***vs.***	□	____
	Raakapuuta on ollut saatavissa kohtuullisin kustannuksin	□	____
5	Tuotannossa tarvittavaa raaka-ainetta on ollut helposti saatavissa ***vs.***	□	____
	Korkealaatuisen raaka-aineen saatavuus on ollut hyvä	□	____
6	Raakapuuta on ollut saatavissa kohtuullisin kustannuksin ***vs.***	□	____
	Tuotannossa tarvittavaa raaka-ainetta on ollut helposti saatavissa	□	____
TYÖVOIMA-ASIAT			
7	Työvoiman tuottavuus on ollut korkea ***vs.***	□	____
	Kokenutta alan työvoimaa on ollut tarjolla	□	____
8	Kokenutta alan työvoimaa on ollut tarjolla ***vs.***	□	____
	Alan koulutuksen saaneen työvoiman saatavuus on ollut hyvä	□	____
9	Työvoiman tuottavuus on ollut korkea ***vs.***	□	____
	Alan koulutuksen saaneen työvoiman saatavuus on ollut hyvä	□	____
TEHTAAN JA TUOTANTOLAITTEIDEN OMINAISUUDET			
10	Tuotannon kannalta tarkoituksenmukaista, tehokasta teknologiaa on ollut käytössä ***vs.***	□	____
	Raaka-ainetta on käytetty tehokkaasti	□	____
11	Tuotantokapasiteetti on ollut riittävä ja skaalaetujen aikaansaaminen ollut mahdollista ***vs.***	□	____
	Raaka-ainetta on käytetty tehokkaasti	□	____
12	Tuotannon kannalta tarkoituksenmukaista, tehokasta teknologiaa on ollut käytössä ***vs.***	□	____
	Tuotantokapasiteetti on ollut riittävä ja skaalaetujen aikaansaaminen ollut mahdollista	□	____

		Tärkeys	Suhde
TALOUTEEN LIITTYVÄT KYSYMYKSET			
13	Investointeja on pystytty rahoittamaan omalla tulorahoituksella ***vs.***	□	____
	Päätökset rahavarojen käytöstä on tehty liiketoimintasuunnitelmien perusteella	□	____
14	Vierasta pääomaa on ollut saatavissa riittävästi kohtuullisin kustannuksin ***vs.***	□	____
	Investointeja on pystytty rahoittamaan omalla tulorahoituksella	□	____
15	Vierasta pääomaa on ollut saatavissa riittävästi kohtuullisin kustannuksin ***vs.***	□	____
	Päätökset rahavarojen käytöstä on tehty liiketoimintasuunnitelmien perusteella	□	____
JOHTAMISTAIDOT			
16	Raaka-aineen hankintaa, tuotantoa, myyntiä ja muita toimintoja on johdettu ammattitaitoisesti ***vs.***	□	____
	Organisaatiossa on ollut kyvykkäitä ihmisten johtajia	□	____
17	Raaka-aineen hankintaa, tuotantoa, myyntiä ja muita toimintoja on johdettu ammattitaitoisesti ***vs.***	□	____
	Henkilöstön oppimista on tuettu ja tuotekehitykseen on kiinnitetty huomiota	□	____
18	Organisaatiossa on ollut kyvykkäitä ihmisten johtajia ***vs.***	□	____
	Henkilöstön oppimista on tuettu ja tuotekehitykseen on kiinnitetty huomiota	□	____
HENKILÖSTÖN OSAAMINEN			
19	Työntekijöiltä on tullut tehtäviinsä liittyviä innovatiivisia ideoita ***vs.***	□	____
	Henkilöstön työskentely on ollut itsenäistä ja joustavaa	□	____
20	Työntekijöiltä on tullut tehtäviinsä liittyviä innovatiivisia ideoita ***vs.***	□	____
	Palveluksessa on ollut henkilöstöä, jolla on vankka työkokemus tehtävissään	□	____
21	Henkilöstön työskentely on ollut itsenäistä ja joustavaa ***vs.***	□	____
	Palveluksessa on ollut henkilöstöä, jolla on vankka työkokemus tehtävissään	□	____
ORGANISAATION ULKOPUOLISEN YHTEISTYÖN HARJOITTAMINEN			
22	Raaka-aineen toimittajien ja/tai asiakkaiden kanssa on tehty pysyviä toimitussopimuksia ***vs.***	□	____
	Raaka-aineen hankinnassa on tehty yhteistyötä muiden puunjalostajien kanssa	□	____
23	Sidosryhmien kanssa on harjoitettu aktiivista, mutta epämuodollista tiedonvaihtoa ***vs.***	□	____
	Raaka-aineen hankinnassa on tehty yhteistyötä muiden puunjalostajien kanssa	□	____
24	Sidosryhmien kanssa on harjoitettu aktiivista, mutta epämuodollista tiedonvaihtoa ***vs.***	□	____
	Raaka-aineen toimittajien ja/tai asiakkaiden kanssa on tehty pysyviä toimitussopimuksia	□	____

		Tärkeys	Suhde
TIEDONHALLINTAAN, RUTIINEIHIN JA TOIMINTA-KULTTUURIIN LIITTYVÄT SEIKAT			
25	Rutiinitoimintojen suorittamiseen on ollut käytössä vakiintuneita toimintatapoja ***vs.***	□	____
	Organisaation toiminta-ajatus ja visio on ollut selkeä kaikille sen jäsenille	□	____
26	Toiminnan suunnittelussa ja seurannassa on hyödynnetty informaatiojärjestelmiä ***vs.***	□	____
	Organisaation toiminta-ajatus ja visio on ollut selkeä kaikille sen jäsenille	□	____
27	Rutiinitoimintojen suorittamiseen on ollut käytössä vakiintuneita toimintatapoja ***vs.***	□	____
	Toiminnan suunnittelussa ja seurannassa on hyödynnetty informaatiojärjestelmiä	□	____
TEKNOLOGINEN OSAAMINEN			
28	Tuote-eriä on räätälöity valmistusprosesseissa asiakkaiden tarpeiden mukaisiksi ***vs.***	□	____
	Tietokoneavusteisia menetelmiä on hyödynnetty tuotannossa	□	____
29	Sahatuotteita on jatkojalostettu pilareiksi, palkeiksi, komponenteiksi ja/tai rakennepuutuotteiksi ***vs.***	□	____
	Tuote-eriä on räätälöity valmistusprosesseissa asiakkaiden tarpeiden mukaisiksi	□	____
30	Sahatuotteita on jatkojalostettu pilareiksi, palkeiksi, komponenteiksi ja/tai rakennepuutuotteiksi ***vs.***	□	____
	Tietokoneavusteisia menetelmiä on hyödynnetty tuotannossa	□	____
YRITYKSEN MAINE JA PALVELUJEN TARJONTA			
31	Yrityksessä on ollut käytössä laatujärjestelmä tai valmisteita on myyty tuotemerkillä ***vs.***	□	____
	Puutuotteiden rinnalla asiakkaille on tarjottu palveluita	□	____
32	Yrityksessä on ollut käytössä laatujärjestelmä tai valmisteita on myyty tuotemerkillä ***vs.***	□	____
	Asiakkaiden tarpeet on tunnettu ja sovitusta laadusta sekä aikatauluista on pidetty kiinni	□	____
33	Asiakkaiden tarpeet on tunnettu ja sovitusta laadusta sekä aikatauluista on pidetty kiinni ***vs.***	□	____
	Puutuotteiden rinnalla asiakkaille on tarjottu palveluita	□	____

ULKOISTEN JA SISÄISTEN TEKIJÖIDEN SEKÄ OSAAMISEN MERKITYS YRITYSTOIMINNASSA		**Tärkeys**	**Suhde**
1	Teknologinen osaaminen ***vs.***	□	____
	Organisaation ulkopuolisen yhteistyön harjoittaminen	□	____
2	Raaka-ainekysymykset ***vs.***	□	____
	Yrityksen maine ja palvelujen tarjonta	□	____
3	Yrityksen maine ja palvelujen tarjonta ***vs.***	□	____
	Teknologinen osaaminen	□	____
4	Tiedonhallintaan, rutiineihin ja toimintakulttuuriin liittyvät seikat ***vs.***	□	____
	Yrityksen maine ja palvelujen tarjonta	□	____
5	Talouteen liittyvät kysymykset ***vs.***	□	____
	Johtamistaidot	□	____
6	Raaka-ainekysymykset ***vs.***	□	____
	Työvoima-asiat	□	____
7	Tehtaan ja tuotantolaitteiden ominaisuudet ***vs.***	□	____
	Raaka-ainekysymykset	□	____
8	Tehtaan ja tuotantolaitteiden ominaisuudet ***vs.***	□	____
	Talouteen liittyvät kysymykset	□	____
9	Työvoima-asiat ***vs.***	□	____
	Yrityksen sijainti	□	____
10	Raaka-ainekysymykset ***vs.***	□	____
	Yrityksen sijainti	□	____
11	Organisaation ulkopuolisen yhteistyön harjoittaminen ***vs.***	□	____
	Tiedonhallintaan, rutiineihin ja toimintakulttuuriin liittyvät seikat	□	____
12	Henkilöstön osaaminen ***vs.***	□	____
	Talouteen liittyvät kysymykset	□	____
13	Teknologinen osaaminen ***vs.***	□	____
	Tiedonhallintaan, rutiineihin ja toimintakulttuuriin liittyvät seikat	□	____
14	Henkilöstön osaaminen ***vs.***	□	____
	Organisaation ulkopuolisen yhteistyön harjoittaminen	□	____
15	Tiedonhallintaan, rutiineihin ja toimintakulttuuriin liittyvät seikat ***vs.***	□	____
	Henkilöstön osaaminen	□	____
16	Tehtaan ja tuotantolaitteiden ominaisuudet ***vs.***	□	____
	Työvoima-asiat	□	____
17	Yrityksen sijainti ***vs.***	□	____
	Teknologinen osaaminen	□	____
18	Tehtaan ja tuotantolaitteiden ominaisuudet **vs.**	□	____
	Johtamistaidot	□	____
19	Yrityksen sijainti ***vs.***	□	____
	Yrityksen maine ja palvelujen tarjonta	□	____
20	Työvoima-asiat ***vs.***	□	____
	Talouteen liittyvät kysymykset	□	____
21	Johtamistaidot ***vs.***	□	____
	Henkilöstön osaaminen	□	____
22	Organisaation ulkopuolisen yhteistyön harjoittaminen ***vs.***	□	____
	Johtamistaidot	□	____