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Outsourcing in the Wood Product Manufacturing Sector

A Combined Customer and Supplier Perspective

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2007
International Graduate School of Management and
Industrial Engineering Dissertation No. 113, Doctoral Dissertation
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ISBN: 978-91-85895-32-8
ISSN: 0345-7524
ISSN: 1402-0793

Printed by: LiU-Tryck, Linköping, Sweden 2007

Acknowledgements

"Partir, c'est mourir un peu – att skiljas är att dö en smula", the words of the wine connoisseur Nils Stormby, is the first thing that comes to mind whilst writing these final words. Perhaps it is strange how you can miss days, nights and even weekends of research, but that is the truth. No other previous work has been this challenging yet at the same time so developing and rewarding for my own personal growth.

First of all, I would like to express my sincerest and deepest gratitude to Professor Staffan Brege, Dr. Jakob Rehme and Dr. Dan Andersson. Thank you so much for introducing me to the field of research and taking me on as a PhD candidate. I will always be greatly indebted to you for your excellent support and guidance. Just to mention a few examples: Staffan, your incredible broad knowledge base together with an amazing ability to analyse, understand and synthesise large amounts of data have taught me so much, thank you a million times. Jakob, your never ending ideas, ability to find new perspectives, and good advice about how to synthesise into models are outstanding and have been tremendously valuable for me (also, just sitting in your office and talking is of great fun and has meant a lot to me!). Dan, your invaluable guidance as well as small and big advices on a daily basis have taught me so much about the theoretical research areas (we also share a big interest in Italian haute cuisine and wines, which discussions I have very much appreciated). All of you have provided terrific support and believed in me when I needed it the most and for that I am forever grateful. This dissertation would not exist if it were not for you three. It is a privilege working with you, thank you!

I would like to acknowledge and express my gratitude to Skogsägarna Norrskog Forskningsstiftelse, Kempestiftelsen and WoodWorks who have given me financial support for this dissertation. Olle Stendahl, Anders Warg and Lennart Witzell have contributed with their valuable experience, thank you so much!

My sincere acknowledgements to the representatives from the participating companies. Thank you all for your inspiring discussions and for taking time for our meetings, thus enabling this study; for this I will always be very grateful. I hope that you find the results rewarding and helpful.

Dr. Anna Bergek from Linköping Institute of Technology and Dr Fredrik Nordin from Stockholm School of Economics served as final seminar opponents on different occasions. Your thorough reading and discussion from different perspectives have been extremely valuable in the work of communicating the results of this thesis and helping me to focus and synthesise all of my ideas. Also, many thanks to the department's professor collegiate for very helpful ideas!

Thanks to my colleagues and friends in the Marketing Logistics Research Group and WoodWorks Research Group for providing stimulating working atmospheres. Professor Mats Abrahamsson, Professor Ove Brandes and Dr. Per-Olof Brehmer, during our discussions you have given me many inspiring ideas and excellent direction in my work, thank you! A special thank you to my colleagues Tomas Nord, whose great knowledge of the forest industry has improved my understanding and interest of the most exciting context there is, and Christian Kowalkowski, who I have spent many exciting conferences with. Many thanks to Lena Sjöholm and Anna Ahlbeck for all your valuable help and support, most often on short notice. Shelley Torgnyson and Brittmarie Genet helped me to sharpen up my English language skills and contributed with very good comments and suggestions, thank you.

Mother and Father, you have with ever lasting energy always supported me in my work and interests (everything from horses, playing several musical instruments with terrible or little success, running, skiing, to academic work etc.), you are fantastic! I am privileged to have such great and supporting parents and you mean so much to me, thank you. A big thank you also to all of my friends and the rest of my family for always being there for support and encouragement (yes, even you mother in law). Many thanks to Klas Högstadius and Simona Grob, you have provided me with the breaks I needed to find new energy! Carolina and Magnus Dafgård, thank you for helping me to understand what really matters in life.

A special acknowledgement to our dog Bambi; thank you for being such a good listener during the long days and nights; it is likely that you know more about outsourcing than any other dog in the world (I hope that this is not the reason why you have begun to turn grey the last year).

Finally, there is one person to acknowledge that actually deserves several pages of thanks. Dear Amanda, you are my wife and life companion and mean more to me than anything in the world. I would not be the person I am today without you; Amanda you make me a much better person. Thank you for your endless understanding and patience. I dedicate this dissertation and any other work I do to you. I will leave with you a quote that I promise to adhere to in the future: "*Life is an adventure to experience, not a problem to solve*".

Linköping, 2007

Daniel Nordigården

Abstract

Outsourcing can be defined as transferring an activity from internal to external control. This thesis studies outsourcing in the wood product manufacturing (WPM) sector from both a customer and supplier perspective. The research design is a multiple case study approach, and it is based on six Scandinavian companies in the door, floor and window industries and one larger supplier of raw material. This study provides an understanding of driving forces for outsourcing in a different context than previously studied and has identified cost reduction in combination with reallocating resources from non-core activities as main driving forces. Compared to several other industrial sectors, outsourcing strategies for the WPM firms have little to do with accessing external sources' capabilities.

In the literature, there is often a main focus on the strategic level of outsourcing, however, such heavy resource-based focus in terms of a core competence approach in the formulation of outsourcing strategies at the customer side risks forgetting that components can still be vulnerable to supplier failure. Here, more focus needs to be put on the operational level when considering outsourcing. This thesis illustrates customers considering outsourcing where there are not any given outsourcing supplier partners developed. At the same time, for the supplier side, forward integration and specialising by taking over outsourcing is complicated by an initial divergent production flow of sawn timber. When not all contexts have developed supplier markets for directly managing outsourcing, it should not be assumed that general outsourcing models are directly applicable. In general, the question of whether or not to outsource seems too complex to simply be considered as either "in or out". A company needs safeguards when conducting outsourcing and in a situation where there is a non-developed supplier market, parallel in-house production becomes an alternative.

Keywords: Outsourcing, driving forces, forward integration, supplier value-adding strategies, parallel production, wood products and sawmills

Outsourcing i trämanufakturledet

Ett kombinerat kund och leverantörsperspektiv

Sammanfattning

Outsourcing kan definieras som att förflytta aktiviteter från intern kontroll till en extern leverantör. Denna avhandling studerar outsourcing av industriella träkomponenter i trämanufakturledet från både ett kund- och ett leverantörsperspektiv. Avhandlingen har en kvalitativ ansats och har utförts genom intervjuer på en ledningsnivå hos ledande Skandinaviska dörr-, fönster- och golvtillverkare i trämanufakturledet samt ett större sågverksföretag.

Företag i trämanufakturledet har inte tidigare i någon större utsträckning hanterat outsourcing. Istället har dessa företag oftast haft en tradition att hantera vidareförädlingen av komponenter inom företaget. Som leverantör har sågverk huvudsakligen levererat råvara oftast i form av sågade trävaror. Detta håller dock på att förändras och denna studie bekräftar ett tydligt ökat fokus på outsourcing hos de studerade trämanufakturföretagen där allt inte längre behöver hanteras internt. Tillverkningen av många typer träkomponenter betraktas numera inte som någon kärnkompetens. Fokus är istället på de aktiviteter som skapar differentiering och konkurrensfördel. Denna studie visar dock att företagen inte outsourcar för att få tillgång till kompetenser eller teknologier som kan vara svåra att utveckla internt. Istället är de huvudsakliga orsakerna till outsourcingfokus kostnadsreduktion i kombination med att flytta kostnader från icke-kärnområden till mer kundnära.

Denna avhandling visar ett behov av att analysera outsourcing också på en operativ nivå, vilket är relaterat till att komponenter som avses för outsourcing kan vara mycket kritiska i produktionen i kombination av få eller inga alternativa leverantörer. Därav är det inte säkert att komponenter bara för att de inte skapar differentiering helt kan outsourcas. För att hantera ett ökat beroendeförhållande när det finns få alternativa leverantörer kan ett verktyg vara att initialt behålla kapacitet internt i kombination med outsourcing, så kallad parallell produktion.

En utmaning för sågverksindustrin är att integrera framåt mot sina kunder. Ur ett trämanufakturperspektiv innebär detta att genom outsourcing släppa delar av sin egen komponenttillverkning till sågverksföretaget. Denna avhandling visar att en viktig del för att möjliggöra detta är att ta till vara på värden som kunden i trämanufakturledet har svårighet att tillvarata, såsom att kunna kapa produktionssteg och skapa processfördelar. Detta ställer dock krav på sågverksproduktionen och på att komponentproduktion kan integreras med den initiala produktionen av sågade trävaror. Problematiken är att relativt stora investeringskostnader fortfarande kan konsumera små volymer av den totala sågverksproduktionen i kombination med ett initialt divergent produktflöde av sågade trävaror som försvårar möjligheten att skapa skalfördelar i komponentlinan hos leverantören. Därav blir det viktigt för sågverk att en vidareförädlingsstrategi i termer av att ta över outsourcing är lönsam i sig själv. Om kundföretaget är i ett direkt investeringsbehov verkar det finnas större möjligheter för sågverk att kunna skapa tillräckliga kostnadsfördelar för att kunna ta över outsourcing.

Contents

List of Appendices:

1 Introduction

Outsourcing can be defined as transferring an activity from internal to external control and is widely employed by firms in many different industries; it has been comprehensively researched in, for instance, the automotive and high-tech industries (see e.g. Rothery and Robertson, 1995; Lonsdale and Cox, 1998; Greaver, 1999; McIvor, 2005). This thesis will study outsourcing of manufacturing in a different type of context and will also serve as a study of the supplier side of outsourcing that has not been given the same attention in the literature field of outsourcing. In so doing, the outsourcing phenomenon can be described and analysed from both a customer and supplier perspective. More specifically wood product manufacturing (WPM) firms and their suppliers of raw material (sawmills) will be studied. The study is a part of a research project between Skogsägarna Norrskog Research Foundation and Linköping University with the objective being to understand the development of outsourcing strategies in the WPM sector. The research is based on a multiple case study approach where the six leading companies in the Scandinavian door, floor and window industries and one larger supplier of wood raw material are studied. Before further addressing the context (section 1.2), the phenomena of outsourcing will shortly be introduced.

A different type of context:
1) Supplier and customer have different business logics
2) Not any given outsourcing supplier partner
3) Sector with extensive use of raw material
4) WPM firms have traditionally managed most activities in-house
5) Suppliers' input is considered as raw material commodities

1.1 Outsourcing at a Glance

Companies have embraced outsourcing as an important means to becoming more competitive in their business processes (see e.g. Quinn, 1999; 2001; Insinga and Werle, 2000). As a result of firms applying "me too" outsourcing strategies, new sub-sectors with new types of firms have even been developed (Harland et al., 2005). Managed right, outsourcing will provide opportunities for companies to develop their core competencies while at the same time lower overall costs by transferring activities to suppliers who perform them at a lower cost (Quinn and Hilmer, 1994; McIvor, 2005). Here, outsourcing becomes a central tool for organisations' business process reengineering to access world class techniques (Rothery and Robertson, 1995; Quinn, 2000). Increasingly, outsourcing has moved from peripheral activities to include those more critical of the business (Jennings, 1997; Bragg, 1998; Greaver, 1999; McIvor, 2000a; Gottfredson et al., 2005; McIvor, 2005).

To improve the understanding of the boundaries of the firms in terms of outsourcing, authors have taken the starting point from both a single theoretical approach or combined the concept of core competence (resource-based theory) with transaction cost theory (cf. e.g. McIvor, 2005; Espino-Rodrigez et al., 2006). These approaches give two different theoretical perspectives of the driving forces for outsourcing. From a transaction cost theory viewpoint there are economic reasons for organising some transactions in one way (i.e. in-house or market), and other transactions in another way (Williamson, 1979; 1985). At the same time, from resource-based theory it is more argued that firms will develop their competitiveness by resource uniqueness (i.e. focus on core competencies), which can distinguish them from competitors (Barney, 1991; Peteraf, 1993).

Initiation of outsourcing would also mean possibilities for external sources to become suppliers, but also raises the question of how suppliers will manage to take over outsourced activities and what kind of mechanisms (e.g. economies of scale or new competencies) need to be developed (cf. Augustson, 1998; Porter, 1998; Lilliecreutz, 1996). Becoming the provider for the outsourcing company puts new demands on a supplier and does not imply

doing the same thing as their customer (Augustson, 1998; Abrahamsson et al., 2003). To put it simply, the challenge is that they must be able to capture values that their customers failed to do (Auguste et al., 2002; Abrahamsson et al., 2003).

1.2 Context of this Study

Most firms in the WPM sector have started as joinery factories or sawmill related companies and many of these firms have remained small and concentrated on serving local markets (see Brege et al., 2004a). Firms in the WPM sector can be defined as manufacturers of products incorporating sawn timber and are considered to be the secondary processed wood product industries (cf. Declos, 2000) or, from a sawmilling industry perspective, industrial end-users (Nord, 2005). The products of WPM firms are the results of further transformation of wood raw material to products and systems such as doors, windows, floorings, kitchen and bath, stairways and different kinds of other joineries (Desclos, 2000; Brege et al., 2004a; 2004b). WPM firms are closely related by having the same types of suppliers for their purchase of wood raw material: sawmill companies in the primary wood industry (Breget et al., 2004b; Nord, 2005). In a simplified way, sawlogs are supplied from the forest that sawmills[1] in the primary wood industry transform to sawn timber, which is then supplied to subsequent customer groups. In the view of WPM firms, sawmills in the primary wood industry are the suppliers of raw material.

In this context, neither the supplier of wood nor the customer has any broad experience of outsourcing. WPM firms have traditionally handled most manufacturing of wood components and parts in-house and have mainly bought standard or bulk delivery of sawn timber from multiple sawmills' production output (Brege et al., 2004b; 2006d). However, discussions with suppliers from the primary wood industry indicate that they are now, instead, considering going from buying sawn timber as raw material commodities to outsourcing components (cf. Brege et al., 2006d), see figure 1-1.

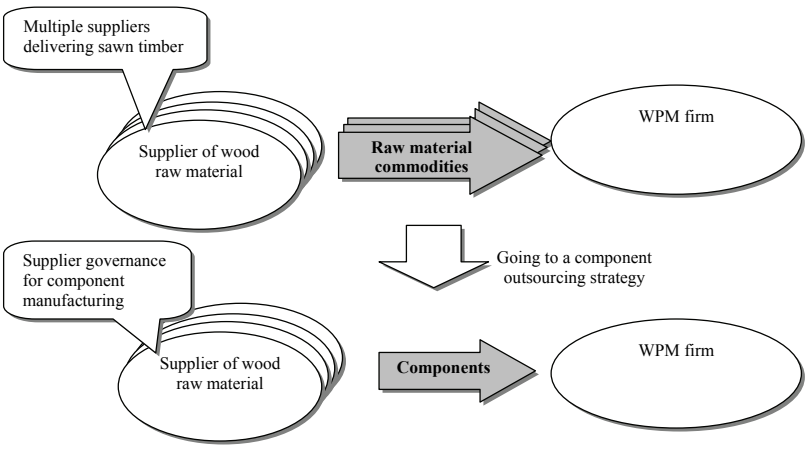

Figure 1-1. Going from buying raw material to components

[1] A sawmill is in this thesis defined in line with Nord (2005, p. 1): "…*primary actor transforming the conical sawlog to a squared board [i.e. sawn timber]*", i.e. a supplier of raw material. See also appendix 5 for a context glossary.

Increased outsourcing would imply going from having multiple sawn timber suppliers to a closer relationship with a few suppliers and closing in-house component manufacturing capacity. However, there are some complicating factors when looking at the potential for achieving these outsourcing strategies, which are addressed below.

The purchasing cost of wood raw material is more often than not a substantial part of WPM firms' total manufacturing costs (Brege et al., 2004a; 2006d). This would make purchasing an important issue with significant impact on the financial results of the firm (cf. Kraljic, 1983). Nonetheless, firms in the WPM sector have not worked closely together with suppliers from the primary wood industry and do not have great confidence in the capabilities of these suppliers who have generally only delivered wood raw material mostly processed in the form of sawn timber (also cf. Warensjö, 1997; Staland et al., 2002; Nord, 2005). This lack of confidence has been mutual when suppliers of the primary wood industry state that firms in the WPM sector make insufficient planning of their raw material needs and often search the market for alternative suppliers that can offer lower prices (also cf. Nord, 2005). This has resulted in a situation of arms-length customer-supplier relationship under standardised interfaces.

The primary wood industry sorts their output according to different properties and quality classes and that makes it difficult to adjust to specific customer requirements when it can result in consequence products that can be difficult to off-set on the market (i.e. the sawmill is somewhat restricted in their sawing to the "standard dimensions" of sawn timber that exists in the industry). As a consequence, WPM firms often have difficulties obtaining just that wood raw material with the properties demanded[2] for their manufacturing. Nord (2005, p. 3) states that this inability refers to uncertainties in the production processes of sawmills where there is difficult linking the wood property demands of customers with the wood properties of the raw material input. Here, the actual outcome of sawn timber will depend on the quality of the raw material input.

Related to this is the output of sawmills' production, which is characterised by a divergent production flow and a high level of upstream uncertainty of input due to the heterogeneity of the wood. This is because every single piece of production input of sawlogs to the sawmills can result in a number of various outputs to different possible customers, i.e. several possible products can be produced from the raw material input (cf. Nord, 2005). This also means that manufacturers of products incorporating sawn timber products (e.g. WPM firms) often only procure parts of their production input of wood from each sawmills' production and need multiple suppliers to manage, where one single sourcing strategy becomes more difficult to apply. The divergent production flow causes several consequence products and by-products (e.g. sawdust and wood chips) that sawmills also need to be off-set to assure profitability (Nord, 2005, p. 50). Thus, for the suppliers from the primary wood industry it is not just a question of choosing the most valuable customer and only focusing on the most profitable product output. In fact, traditionally all the sawmill's production output (including by-products) have needed to be sold to assure profitability (Nord, 2005).

Raw material costs that are a large part of sawmills' total production costs have caused a production orientation primary wood industry with focus on operational effectiveness and volume yield (also cf. Staland et al., 2002; ; Von Platen and Nord; 2004; Nord, 2005).

[2] For example, in terms of quality class/property but also length, width and thickness.

Together with a process focused primary wood industry where the output of wood is considered as a raw material commodity, the divergent production flow seems to cause somewhat weak customer focus in the primary wood industry (cf. Nord, 2005). In addition, the availability of wood raw material on the national market is affected by the export of wood (Staland et al., 2002), which can often be more profitable for the primary wood industry.

Altogether, the supplier and customer in the context studied seem to apply different business logics. The supplier's value chain business logic is characterised by the divergent production output from one major input (sawlogs). The focus is on economies of scale in the sawmill production and assuring a high yield between production input and output. Here, the production is difficult to just steer after customer's needs (Nord, 2005). In comparison, the WPM firm's value chain is more convergent when they need to buy volumes of wood from multiple suppliers to manage (cf. Brege et al., 2006d). While the customers only need to procure a selection of wood raw material with the right properties and qualities suitable as input for their own manufacturing of products, sawmills need to make sure to off-set their production output and are also restrained by the wood properties of the raw material input. Figure 1-2 gives an illustrative view of the divergent and convergent production flow situation.

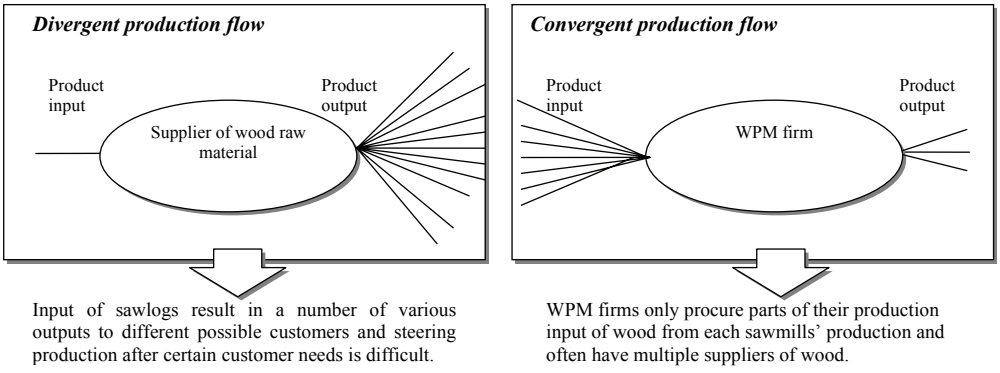

Figure 1-2. A divergent vs. convergent production flow

Here, traditionally the WPM firms have guarded themselves against the uncertainty of supplies from the primary wood industry and their own deficiencies of planning by spot purchasing sawn timber from multiple suppliers, buffers, and in-house sawmill activities to process some of the raw material (see also Brege et al., 2004a; Brege et al., 2006d). Now when WPM firms are considering outsourcing strategies, the coordination point that the WPM firms traditionally have handled would instead be pushed towards the suppliers of sawn timber. In a more general outsourcing perspective this is an interesting point of departure, when being able to study the intersection between these two different business logics.

Based on the discussion above, five main interesting context characteristics can be identified:

1. *The supplier and customer apply differing business logics where one main difference is the divergent vs. convergent production flow.*

2. *Not any given outsourcing supplier partner: There is as of today no developed sector to directly manage outsourced component manufacturing from WPM firms.*

3. *A sector with extensive use of raw material, where further processing at WPM firms often start on a raw material basis.*

4. *Relatively little tradition of outsourcing: customers (WPM firms) have traditionally been fairly integrated by managing most manufacturing activities in-house, reaching from the point of raw material to the delivery of products to customer.*

5. *Suppliers (sawmills) supply input to WPM firms, which is considered as raw material commodities.*

1.3 Purpose and Research Questions

The purpose of this thesis is to:

…describe and analyse outsourcing from both a customer and supplier perspective in the intersection of two different business logics, in a sector with a relatively low tradition of outsourcing and where there are no given outsourcing supplier partners.

From this general purpose some research questions have been formulated. Figure 1-3 illustrates the scope of this thesis with relation to the content of the derived research questions.

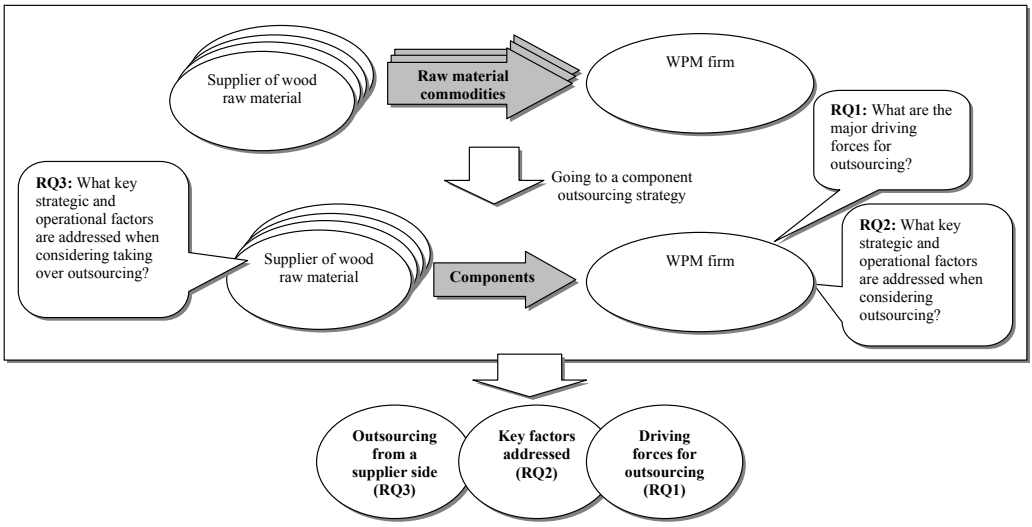

Figure 1-3. Scope of the thesis.

The three research questions will be the basis for the overall structure of the theoretical framework and the starting point for the development of an analysis model. The research questions and their background are further addressed below, starting with the driving forces for outsourcing.

RQ1: Driving forces for outsourcing. Firms in the WPM sector have previously not dealt with outsourcing to any great extent and have lagged behind in the development of such strategies. Instead, WPM firms have usually handled the component manufacturing activities in-house, often with their own processing of the wood raw material. This now seems to be changing. Discussions with major suppliers of wood raw material imply that recently firms in the WPM sector are more and more considering outsourcing parts of their manufacturing. The question is if these WPM firms are just laggards employing a "me too" outsourcing strategy, or have they indeed made thorough evaluations of the potential for outsourcing component manufacturing. This is especially interesting when the outsourcing trend has been more and more debated/questioned over the last few years (see e.g. Doig et al, 2001; Berggren and Bengtsson, 2004; Bengtsson et al, 2005). Of course, driving forces for outsourcing have been well studied before, for example see table 1-1.

Table 1-1. Compilation of a selection of articles giving implicit or explicit understanding of driving forces for outsourcing

Author:	**Context/ industrial setting:**
Rothery and Robertson (1995); Deavers (1997); Greaver (1999); Cánez et al. (2000); Linder (2004); McIvor (2000; 2005)	Broad cross-industry
Brück (1995)	Medium-sized machinery/component manufacturers
Harrison and Kelly (1993)	Metal working and machinery sector
Quinn (2000)	Pharmaceutical industry
Quinn and Hilmer (1994)	Computer, apparel manufacturing and Food service
Quinn (2000); Fill and Visser (2000); Lonsdale and Cox (2000); Kern et al. (2002)	IT/high-tech-industry
Walker and Weber (1984); Walker (1988); Fine and Whitney (1999)	Automotive context

Nevertheless, whereas the question of driving forces for outsourcing taken up in this thesis is not new, the business context is different in comparison with previous studies relating to outsourcing motives (see also section 1.2). Previous research has not focused on the outsourcing strategies of WPM firms, nor on their recent interest in starting outsourcing programmes. Using frameworks developed in other business contexts, this thesis will focus on this little researched area in the field of outsourcing. This leads to the question:

1. *What major driving forces for initialising outsourcing can be identified in the WPM sector and how do these driving forces relate to theoretical driving forces derived from studies in other contexts/ industrial settings?*

RQ2: Key factors addressed when considering outsourcing. Outsourcing from a customer perspective has been well researched (see e.g. Cánez et al., 2000; McIvor, 2005). Nonetheless, while other firms might have far more developed outsourcing strategies, this thesis follows the late development of WPM firms' outsourcing strategies to see if they are also using lessons from other industries. In addition, when studying this in a different context an interesting question is whether the WPM firms' outsourcing strategies could be analysed and understood by applying models developed in other business contexts? Here, WPM firms have traditionally managed the manufacturing activities by themselves starting from raw material commodities that have been supplied by sawmills, often of arms-lengths distance. In this context with extensive use of raw material, in comparison to other studied industries (such as IT, telecom and automotive), there is no developed sector to directly manage outsourced component manufacturing. Following this neither the supplier of raw material nor the WPM firm in this context has any broad experience of handling outsourcing programs. This leads to the question:

2. *What key strategic and operational factors are addressed when a customer is considering outsourcing?*

RQ3: Outsourcing from the Supplier Side. In a situation of outsourcing manufacturing, there seems to be little research done that considers outsourcing from both a customer and supplier view in the same study. Comparatively little attention has been given to the supplier side in outsourcing activities and under which circumstances becoming an outsourcing partner can be a suitable strategy for such supplier (Augustson, 1998). Thus, there seems to be few studies with an explicitly expressed objective to study outsourcing of manufacturing from a supplier perspective. From a supplier side or by giving both a customer and supplier perspective of outsourcing, it can in the literature be more about taking over routine operational support services (see e.g. Rothery and Robertson, 1995; Auguste et al., 2002), IT-outsourcing (e.g. Augustson, 1998; Kern et al., 2002) or more about providing a practical view of what to do and not to do in outsourcing agreements (White and James, 1998). Here, a contribution of this thesis is the possibility to further improve the understanding of the outsourcing phenomenon by giving both a customer and supplier perspective (cf. Augustson, 1998). Outsourcing of manufacturing from an explicit supplier view can provide a fruitful development to complement a predominately focus of the customer side (cf. Augustson, 1998; Auguste et al., 2002).

Particularly on the supplier side in the context studied, there is a stated need of more research on how sawmills can integrate forward to start manufacturing more processed products (see e.g. Nord, 2005), which could be done by taking over outsourcing. A sawmill taking over outsourced component manufacturing can be considered as a value-adding strategy, which is a term used in the context studied (e.g. Roos et al., 1999; 2001; Nord, 2005). The primary wood industry faces a tough situation with high competitive pressure from substitutes such as concrete, plastics and steel (Roos et al., 2001; 2002). The world market of sawn timber can be characterised as very competitive with both national and international actors and cyclic return patterns driven by the market demand (e.g. Roos et al., 2001). By a value-adding strategy a sawmill company can move away from a commodity product market to products that customers are willing to pay a higher price for (Roos et al., 2000; 2001). Such strategy in combination with better focus will improve the performance of sawmill companies (Hansen et al., 2002).

In the context studied, a larger survey of Swedish sawmills showed that the main value-adding in terms of volume is mainly planing, additional drying (drying to orders), stress grading and length trimming to order (Staland et al., 2002). Hence, the larger volumes of value-adding at large sawmills remains somewhat sawmill-linked operations (Warensjö, 1997; Staland et al., 2002). There have lately been some studies indicating a development towards more focus on value-adding strategies in several different areas: developing distribution platforms and augmented services as well as sales support for retailers (Henningsson, 2005; Fransson[3] and Rehme, 2005a), product development and prefabrication for industrialised building systems (Sardén, 2005) and overall increased market orientation and developing customer linking activities (Nord, 2005). In line with the above studies, Roos et al. (2002) argue that value-adding strategies for sawmills are not homogenous (also cf. Staland et al., 2002); instead they can include several different products and customer groups and thereby search for competitive advantages on more niche markets. More research is needed on how value-adding strategies should be developed, especially nowadays when further processed products (e.g. planed and trimmed timber) have become somewhat commodities where both the products and production processes can be imitated (see also Roos et al., 2000; 2002; Nord, 2005). For example, the study of Roos et al (2002, p. 94) indicated that sawmills' value-adding strategies did not, to any great extent, include adding extra processing activities and the products produced were still quite undifferentiated.

WPM firm's indicated movement towards outsourcing raises the questions of how suppliers of wood raw material would manage to integrate forward to take over outsourced activities and what kinds of mechanisms (e.g. scale, scope or competencies, ability to learn) would be necessary to develop (Hayes and Wheelwright, 1984). Traditionally, suppliers from the primary wood industry have mainly delivered raw material commodities in terms of sawn timber and it is not certain that they have any experience of such type of component manufacturing. Taking over outsourced manufacturing could then mean a strategic choice for these suppliers to enter a new business area (Porter, 1998). Such strategy may very well require the supplier to develop new capabilities (Hayes and Wheelwright, 1984; Lilliecreutz, 1996). Altogether, this leads to the question:

3. *What key strategic and operational factors are addressed when a supplier is considering taking over outsourcing?*

[3] Now Nordigården

1.4 Thesis Structure

Figure 1-4 presents the structure of this thesis, which is followed by short description of each chapter.

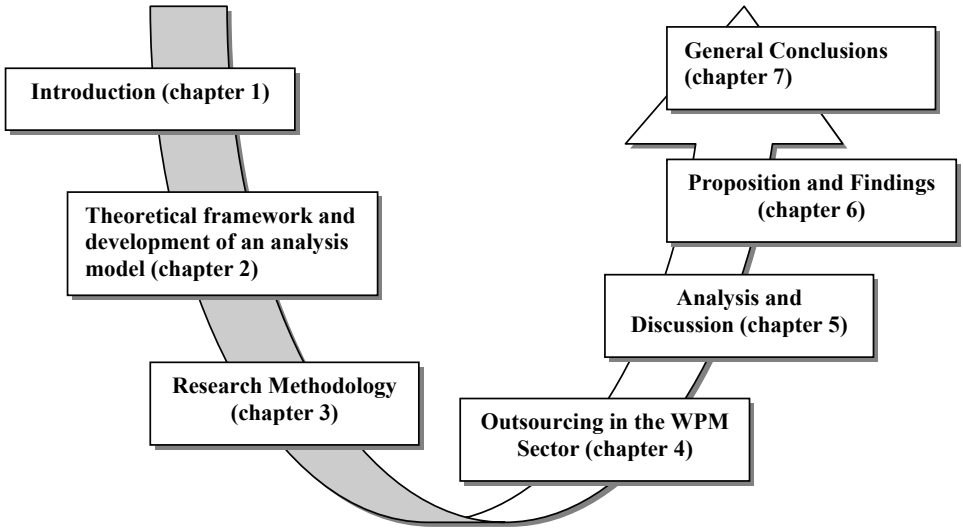

Figure 1-4. Structure of the thesis (Adaptation based on: Lekvall and Wahlbin, 2001)

Chapter 1. The introduction chapter addresses the phenomenon of interest and gives an understanding of the context studied. The outsourcing concept is also introduced. Altogether, the introduction chapter leads to the purpose and research questions of the thesis.

Chapter 2. This theoretical framework chapter becomes the basis for analysing the empirical material collected. The chapter starts with defining the concept of outsourcing. Following this, in line with the research questions formulated in chapter 1, the framework is divided into three main parts: (1) driving forces for outsourcing - giving an overview of two basic theoretical perspectives to understand the theoretical basis for outsourcing and reviewing previously defined driving forces; (2) considering the outsourcing decision from a customer side to review previously defined key factors to address when considering outsourcing, and (3) addressing outsourcing from a supplier side. The chapter ends by summarising areas addressed and developing an analysis model. This analysis model will link the specific context studied, research questions and the theoretical framework. Together with the research questions, the analysis model is the basis for the structure of the (a) case descriptions, (b) analysis and discussion and (c) conclusions.

Chapter 3. This chapter addresses the research methodology of the thesis, discussing the chosen research approach and giving an overview of the research process. The chapter ends by summarising how I have worked for assuring a high quality of the research.

Chapter 4. This chapter presents outsourcing in the WPM sector from both a customer and supplier perspective. Firstly, two in-depth case studies of the floor manufacturer Kährs and the window manufacturer Elitfönster are given. Secondly, the four additional WPM case studies are presented: the floor manufacturer Tarkett Wood, door manufacturers Vest-Wood and Dooria Kungsäter and also the window manufacturer Svenska Fönster. Thirdly, the supplier perspective of outsourcing is given by a case study of Norrskog Wood Products (NWP).

Chapter 5. The analysis chapter is divided based on the research questions and the analysis model formulated: (a) driving forces for outsourcing, (b) key factors addressed when considering outsourcing, and (c) outsourcing from a supplier side. In the end of the analysis, I shortly combine the customer and supplier view of the outsourcing analysis.

Chapter 6. From the basis of the analysis chapter and the point of departure from the research questions formulated, this chapter addresses the findings of this thesis and suggests some propositions. The chapter ends by linking back to the purpose of the thesis.

Chapter 7. This chapter provides implications for theory as well as for practionaires. Suggestions for further research are also addressed.

2 Theoretical Framework

In line with the research questions, this framework is mainly divided into three parts: (1) driving forces for outsourcing; (2) key factors addressed when considering outsourcing from a customer side, and (3) addressing outsourcing from a supplier side (see figure 2-1).

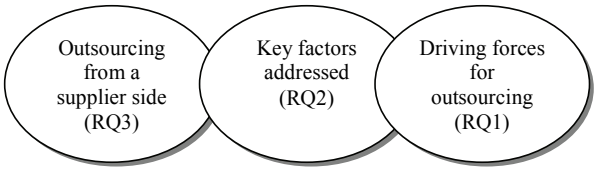

Figure 2-1. Structure of the theoretical framework

A summary of the theoretical framework and development of analysis model will be provided at the end of the chapter. However, the concept of outsourcing will be defined first.

2.1 Defining Outsourcing

Greaver (1999) states that the term outsourcing was invented by information systems trade press in the late 1980s and is closely related to subcontracting, joint venturing and strategic partnering concepts. However, the understanding of outsourcing can be traced back much earlier: "*companies have always made decisions regarding where the boundary should be*" (Lonsdale and Cox, 2000, p. 444). Here, the traditional make-or-buy decision (see e.g. Culliton, 1947;[4] Higgins, 1955), is the explicit core of outsourcing (see e.g. Welch and Nayak, 1992; Venkatesan, 1992; Brück, 1995; Rothery and Robertson, 1995; Probert, 1996; Jennings, 1997; McIvor et al., 1997; Cánez et al., 2000).

> *"The make it or buy it decision is fundamental to the process of outsourcing… central to both outsourcing decisions and to the management of supply is the make it or buy it question" (Rothery and Robertson, 1995, p. 25)*

Nonetheless, despite an abundance of literature which looks into outsourcing, there appears to be a lack of a common definition of the term outsourcing (cf. Deavers, 1997; Wasner, 1999). Instead, the use and the definition of the term outsourcing seems to be fairly general and occasionally left to the readers own interpretation. It is also often defined too broadly to clearly distinguish outsourcing from procurement of goods or services. Table 2-1 gives an overview of some articles defining outsourcing.

[4] Culliton, J., W., (1942), *Make-or-Buy, Business Research Study 27*, Graduate Business School, Harvard University, Boston, MA. See e.g. Cánez's (2000) or Wasner's (1999) references to Culliton's discussion about make-or-buy decision and its strategic implications.

Table 2-1. Compilation of a selection on articles defining outsourcing

Author:	**Definition of outsourcing:**
Saunders et al. (1997) ; Franceschini et al. (2003)	Purchase/farming out goods or services
Lakenan et al. (2001)	Outsourcing as contract manufacturing
Fill and Visser (2000)	Subcontracting (procurement) as a make-or-buy decision
Arnold (2000)	Outside resource using
Bettis et al. (1992); Welch and Nayak (1992); Venkatesan (1992); Yoon Paul and Naadimuthu (1994); Brück (1995); Probert (1996); Jennings (1997); McIvor et al. (1997); Cánez et al. (2000); McIvor (2000a)	Not explicitly defined, but interchangeably with make-or-buy decisions
Harland et al. (2005)	Sourcing activities
Augustson (1998); Greaver (1999); Wasner (1999); Gilley and Rasheed (2000); Doig et al. (2001); Ellram and Billington (2001); Heywood (2001); Lonsdale (2001); Abrahamsson et al. (2003); Berggren and Bengtsson (2004)	Transfer of activities

Wasner (1999) and Gilley and Rasheed (2000) emphasise that defining outsourcing in terms of procurement limits the definition.

> *"…defining outsourcing simply in terms of procurement activities does not capture the true strategic nature of this issue… outsourcing is not simply a purchasing decision" (Gilley and Rasheed, 2000, p. 764).*

To better capture the conceptual basis of outsourcing it has been argued that the definition will be more meaningful if it incorporates the notion of transfer of activities that previously have been governed internally to an external source (Greaver, 1999; Wasner, 1999; Gilley and Rasheed, 2000; Ellram and Billington, 2001; Heywood, 2001).

> *"What sets outsourcing apart from these similar activities [subcontracting, joint venturing and strategic partnering concepts] is the fact that internal activities are being transferred out. This may not necessarily be the case with subcontracting and joint venturing" (Greaver, 1999, p. 10)*

Ellram and Billington (2001) defines outsourcing *as "…the transfer of the production of goods or services that had been performed internally to an external party*" (p. 16). Heywood (2001, p. 27) defines it as "…*transferring of an internal business function or functions, plus any associated assets, to an external supplier or service provider who offer a defined service for a specified period of time, at an agreed but probably qualified price*". Along similar lines, Wasner (1999, p. 24) defines outsourcing as "…*to turn over to an external vendor the control of an in-house activity, or an activity for which an immediate ability exists of performing it internally*". Wasner states that outsourcing is composed of a make-or-buy decision together with transfer. Similarly, Gilley and Rasheed (2000, p. 764) claim that outsourcing *"…represents the fundamental decision to reject the internalization of an activity…*". Anchored on the notion that outsourcing is more related to transfer than procurement, outsourcing in this thesis is defined as: transferring an activity from internal governance to external control.

2.2 The Driving Forces for Outsourcing

This section will serve as a starting point to understanding the driving forces for outsourcing and firstly give an overview of two basic theoretical perspectives: resource-based theory (RBT) and transaction cost theory (TCT). With a single or combined approach these are often the starting points from which to explain outsourcing and to create frameworks for the outsourcing decision, see table 2-2.

Table 2-2. Compilation of a selection of various articles' theoretical approach to outsourcing

	Author:	**Theoretical Approach:**	**Type of study:**
TCT	Walker and Weber (1984)	Transaction cost theory	Survey
↑	Walker (1988); Augustson (1998); Fill and Visser (2000); Ellram and Billington (2001); Lonsdale (2001)	Transaction cost theory	Case
	Cox (1996); Arnold (2000)	Transaction cost theory and core competence	Theoretical with empirical examples
	Brandes et al. (1997)	Transaction cost theory and core competence	Case
	McIvor (2000a)	Transaction cost theory and core competence	Theoretical
	Quinn and Hilmer (1994); Quinn (2000)	Core competence focus (but partly mentioning transaction cost theory)	Theoretical with empirical examples
RBT	McIvor et al. (1997); Venkatesan (1992)	Core competence	Theoretical/ Empirical examples

Looking at the development of frameworks to understand and explain outsourcing in the area of transaction cost theory and resource-based theory, they seem to have evolved from a focus on transaction cost theory to a trend of using resource-based theory, or at least a mixed theoretical approach. Here, transaction cost theory has traditionally been used as a theoretical framework for the analyses of outsourcing a cost perspective by looking at transaction costs and production costs (cf. Espino-Rodrigez et al., 2006). There are early examples of studies applying transaction cost theory in an outsourcing context with starting point from authors such as Williamson (e.g. 1979), for example Walker and Weber (1984) applied transaction cost theory to understand make-or-buy decisions for firms in the U.S. automobile industry.

At a similar time period as the publication of the influential article on core competence by Prahalad and Hamel (1990), the application of more resource-based theory to understand the use of outsourcing has become more current (e.g. Venkatesan, 1992; Winkleman et al., 1993; Quinn and Hilmer, 1994). Here, resource-based theory has been applied as starting points to argue that outsourcing will help companies to ameliorate competitive pressure by strategically focusing more of their scarce resources to leverage the core competencies of the firm (e.g. Winkleman et al., 1993; Quinn and Hilmer, 1994; Quinn, 2000). In comparison with transaction cost theory, focus on the strategic level of outsourcing in terms of core and non-core, and not just costs, is also more apparent in resource-based theory (e.g. cf. McIvor et al., 1997; Quinn 1999; Insinga and Werle, 2000; Espino-Rodrigez et al., 2006). There are also examples of the difficulty to apply transaction cost theory in practice (cf. Probert, 1996), and the need of linking outsourcing more to the competitive position of a firm in the market (cf. Reve, 1990; Cox, 1996; Arnold, 2000). Outsourcing frameworks approached later with the starting point from transaction cost theory have closer empirical linkage (e.g. Augustson,

1998; Lonsdale, 2001; Ellram and Billington, 2001). At the same time, there are several examples of mixed theoretical approaches, but still lean towards the application of resource-based theory (e.g. Brandes et al., 1997; McIvor, 2000). In later literature there seems to be more focus on using resource-based theory to explain the potential of using outsourcing as an important instrument to access world-class capabilities and manage organisational change (e.g. Cánez et al., 2000; Quinn, 2000; Linder, 2004).

2.2.1 Resource-Based Theory

Resource-based theory focuses on strategies for exploiting firm-specific assets and how to develop new competencies (Winterscheid, 1994, p. 268). From a resource-based theory perspective the firm is more than a portfolio of businesses, it is also a portfolio of competencies and it is more meaningful to define a firm in terms of its resources than in terms of its products (Wernerfelt, 1984; Prahalad and Hamel, 1990; Hamel and Heene, 1994; Long and Vickers-Koch, 1995; Javidan, 1998). The main theme is that firms are fundamentally heterogeneous in terms of their internal resources (Peteraf, 1993). Here, competitive advantage arises from resources which are difficult for competitors to imitate (Barney, 1991; Grant, 1991).

With a resource-based theory view, a firm can provide a better match of internal strengths and external opportunities as well as recognise resources that can work as a basis for competitive advantage (Javidan, 1998). Thus, resource-based theory advocates that the firm should define its businesses on the strength of its own resources and emphasise on leveraging the firm's core competencies. Here, the analysis of the firm's possibilities for competitive advantage should start with considering the internal strengths and weaknesses (Barney, 1991). This can be compared with starting the analysis by considering the attractiveness of the industry and current competitiveness on the market (see e.g. Porter, 1981; 1998). In this sense, resource-based theory focuses on the returns a firm can generate by having unique resources, not the possible profits by selecting an attractive industry (McIvor, 2005, p. 53). Similarly, Lonsdale (1999, p. 177) argues that "*…in resource-based thinking, the central condition that underpins competitive advantage is resource heterogeneity*" Thus, firms' internal resources and competencies are the conceptual basis for resource-based theory and only resources with the characteristics of resource heterogeneity and immobility (i.e. low degree of transferability between firms) can offer a basis for sustaining competitive advantage (Barney, 1991). According to Barney (1991), a sustainable competitive advantage can only be sustained by developing resources that are (1) valuable in the context of the firm's environment, (2) rare compared to the firm's current competitors (3) imperfectly imitable, and (4) no equivalent substitutes are available (Ibid.). From a resource-based theory perspective the concept of resources can be defined as:

> *"…by a resource it is meant anything which could be thought of as a strength or weakness of a given firm… a firm's resources at a given time could be defined as those (tangible and intangible) assets which are tied semipermanently to the firm" (Wernerfelt, 1984, p. 172)*

Linked to this is the notion of core competencies, which is a focal point of the resource-based theory perspective where core competencies are considered as the source for competitiveness.

Core Competence: a Critical Consideration

A main theme in the concept of core competence is the emphasis on the collective learning in organisations (see e.g. Prahalad and Hamel, 1990; Grant, 1991; Hamel and Heene, 1994; Javidan, 1998). The influential article by Prahalad and Hamel (1990) defines core competencies as

> *"…the collective learning in the organization, especially how to coordinate diverse production skills and integrate multiple streams of technologies" (Prahalad and Hamel, 1990, p. 82)*

Similarly, Hamel and Heene (1994) claim that a core competence is not a single skill or asset. Therefore, a factory or a distribution channel could not be considered as a core competence.

> *"…the aptitude to manage that factory or channel or brand may constitute a core competence… a core competence is not an inanimate thing, it is an activity, a messy accumulation of learning…a core competence will undoubtedly comprise both tacit and explicit knowledge". (Hamel and Heene, 1994, p. 12)*

Because of the easiness to imitate or the risk of obsoleteness, a physical asset can never be considered as a core competence (McIvor, 2005). Core competencies considered as certain activities where the firm has enhanced skills or technological know-how will help to enable the creation of core products (Quinn and Hilmer, 1994). In line with this, Prahalad and Hamel (1990) express the diversified corporation in terms of a tree where core competencies are the roots, core products the limbs, business units the branches and end products seen as leaves and fruits of the tree. Here, the authors state that a core competence must meet three criteria it (1) should provide access to markets, (2) provide customer value and (3) be difficult for competitors to imitate. By a broad line of products based on a core competence the company can reap more economies of scope in its competence development. (Hamel and Heene, 1994, p. 30) For a firm, combining outsourcing but still creating core products based on its core competencies is possible. The company Canon, for example, buys a large part of their components needed (up to 85%) but is still able to transform its core competencies to world-class products (Hamel and Heene, 1994).

Based on several arguments, from the viewpoint of strategic outsourcing, Quinn and Hilmer (1994, p. 47) state that core competencies are *"…activities that offer long-term competitive advantage and thus must be rigidly controlled and protected*". Consequently, Quinn and Hilmer (1994) and Hamel and Heene (1994) suggest that a core competence can be certain activities which are strategically important which give the firm superior advantages (e.g. productive, technological or experience) that contribute to increased competitiveness and also facilitate the creation of core products (cf. Prahalad and Hamel, 1990). It is not certain that particular activities can always encompass the characteristics of core competencies (see e.g. Stalk Jr. et al., 1992; Long and Vickers-Koch, 1995). However, for now and for the remainder of this thesis, in a very simplified way in an outsourcing perspective and on the basis of Quinn and Hilmer's (1994) and Hamel and Heene's (1994) definitions, core competencies will be considered more or less the same as definite strategically important activities for long-term competitive advantage. From a resource-based theory view of the firm, considering core competencies of the firm are very important when studying outsourcing, especially when a core competence approach proposes the internal organisation of the firm as the source for creating competitive advantage (McIvor, 2005, p. 47).

2.2.2 Transaction Cost Theory

Transaction cost theory has been one of the dominating theoretical explanations of the boundary setting of firms (Poppo and Zenger, 1998). Transaction cost theory connects law, economics and organisation theory and is concerned with explaining the existence of the firm (Williamson, 1990; 1999), but also challenges these areas (Williamson, 1985). Transaction cost theory does not consider the firm as a production function but more as a governance structure (Williamson, 1985; Rindfleisch and Heide, 1997). Williamson (1981, p. 552; 1985, p. 2) states that transaction cost analysis:

> *"…supplants the usual preoccupation with technology and steady-state production (or distribution) expenses with an examination of the comparative costs of planning, adapting, and monitoring task completion under alternative governance structures".*

Transaction costs are often referred to as the costs of running an economic system (Williamson, 1985; 1990), and can be considered as the economic equivalent of friction in physical systems (Williamson, 1981; 1985; Rindfleisch and Heide, 1997).

> *"…transaction costs are the costs of running the system and include such ex ante costs as drafting and negotiating contracts and such ex post as monitoring and enforcing agreements" (Rindfleisch and Heide, 1997, p. 31)*

Governance Choices: Hierarchy, Hybrid or Market

On the basis of cost efficiency, transaction cost theory considers the efficient boundary of a firm and in this way decide an appropriate governance structure to see if a firm should make or buy certain activities.

> *"The transaction cost approach to study of organisations has been applied at three levels of analyses… The second or middle level focuses on the operating parts and asks which activities should be performed within the firm, which outside it, and why. This can be thought of as developing the criteria for and defining the 'efficient boundaries' of an operating unit" (Williamson, 1981, p. 549)*

Williamson (1985) claims that there are rational economic reasons for organising some transactions in one way and other transactions in another way, strictly on the basis of cost economising. Williamson (1991) provides three ways by which transaction can be organised, market, hybrid and hierarchy (i.e. handling the activity within the firm), and argues that market and hierarchy are polar modes. The third governance form, hybrid, is located as a bilateral governance mode between hierarchy and market. This mode can be characterised by various forms of strategic alliance agreements between buyer and seller. Thus, for every transaction there are three possible governance structures: (1) hierarchy, (2) hybrid and (3) market.

Williamson (1979) emphasises that, from a strictly theoretical perspective, if a firm only considers production costs and neglects transaction costs because of economies of scale and collective pooling effects from several customers, it will make market governance favourable. Here, market governance will offer lower prices and supplier production cost advantages will lead to buying rather than to making. However, to understand why one transaction is organised in one way and another transaction in another way, transaction cost should also be considered.

> *"The basic premise of TCA [Transaction Cost Analysis] is that adaptation, performance evaluation, and safeguarding are absent or low, economic actors will favour market governance. If these costs are high enough to exceed the production cost advantages of the*

> *market, firms will favour internal [hierarchy] organization. The logic behind this argument is based on certain a priori assumptions about the properties of internal organizations and its ability to minimise transaction costs" (Rindfleisch and Heide, 1997, p. 32)*

Williamson (1981; 1996) regards the transaction as the ultimate unit of economic investigation. Transaction occurs, according to Williamson, when

> *"… goods or services are transferred across a technologically separable interface…with a well working interface, as with a well working machine, these transfers occur smoothly… the economic counterpart of friction is transaction cost" (Williamson, 1981, p. 552).*

In a perfect market, transactions can be handled without transaction costs, which arise when there is a necessity to allocate resources to organise and control transactions between parties that are interdependent (Johanson and Mattsson, 1987, p. 41). However, it is important to emphasise that transaction costs do not incorporate production costs (Williamson, 1979; 1990). Here, transaction cost theory rests on the objective of minimising both the production and the transaction costs.

> *"…the criterion for organizing commercial transactions is assumed to be the strictly instrumental on cost economizing… this takes two parts: economizing on production cost expense and economizing on transaction cost" (Williamson, 1979, p. 245)*

Transaction costs include such *ex ante* costs as drafting and negotiating contracts and such *ex post* as monitoring and enforcing agreements (Rindfleisch and Heide, 1997). If transactions are managed by market governance, transactions costs will be higher while production cost is lower. In-house governance offers lower transaction costs, but due to not achieving the same economies of scale or collective polling effects, production costs will be higher. By this Williamson argues that when firms decide to handle a certain activity by market governance, their competitiveness will arise from minimising transaction costs, because it is assumed that all other firms handling transactions by the market mode will have the same production costs (Reve, 1990).

Transaction Difficulties and the Dimensions of the Transaction

The choice of governance mode will be effected by: (1) the human behaviour that makes transactions more difficult and (2) the dimension of the transaction that influences the transaction costs (Reve, 1990).

Transaction cost theory relies on two fundamental behavioural assumptions about human behaviour that cause transaction difficulties:

- Bounded rationality, decisions makers have cognitive limits and are intendedly rational, but only limited so[5] (Williamson, 1975, p. 21; 1990).

  > *Because of bounded rationality"…all complex contracts are unavoidably incomplete… given opportunism, contract-as-promise unsupported by credible commitments is hopelessly naive" (Williamson, 1990, p. 12).*

  At best, incomplete contracts are established.

- Opportunism occurs because humans are self-interest seekers with guile, which is seldom transparent *ex ante*, and is an important consideration when choosing a suitable contractual relationship (Williamson, 1979; 1985). Opportunism becomes difficult to handle and creates uncertainty in the economic transaction (Williamson, 1985). This is especially a hazard when there are only a small number of available contracting partners (Williamson, 1975, p. 26). When there are only few available suppliers and hence low competition, there is an increased risk that suppliers will act opportunistically. Together with bounded rationality, this would increase the uncertainty and increase the hazards in the contracting process.

If opportunism did not exist, bounded rationality would not be a problem (Williamson, 1981). As a reduction in one of the above will cause an increase in the other (Williamson, 1979), these factors will complicate outsourcing and are likely to impede the initialisation of the outsourcing programs.

The dimensions of the transaction will also influence the transaction costs and thus impact the choice of governance mode (Williamson, 1985; Reve, 1990; 1991). According to Williamson (1991) the dimensions that define a transaction are: (1) asset specificity, (2) uncertainty of the transaction (frequency of disturbance), (3) frequency of the transactions occurring. Williamson (1991) defines asset specificity as the degree to which an asset can be redeployed to alternative uses without a decreased productive value. Bounded rationality and opportunism in combination with uncertainty make asset specificity the most important dimension for deciding an efficient governance structure (Williamson, 1985; Poppo and Zenger, 1998).

Williamson (1981) distinguished between three different types of asset specificity, and Williamson (1985) expanded it to four types. But in his later article (1991) he added two and now considers six types of asset specificity: (1) Site specificity, certain location assets (e.g. warehouses) where a redeployment would cause a significant decreased productive value, (2) Physical asset specificity, asset as specialised equipment or machines required to produce a component, (3) Human asset specificity, assets that arise through learning-curves and

[5] However, does not imply that humans are irrational.

technology skills as well as know-how, (4) Brand name capital, (5) Dedicated assets, discrete investments on behalf of a particular customer and (6) Temporal specificity, caused by technological non-separability. These different types of asset specificity create a bilateral dependency between seller and buyer (Williamson, 1991). Lonsdale (2001) argues that asset specificity together with a dominant opportunistic supplier will especially lead to a risk of shift in power in favour of the supplier.

Due mainly to uncertainty and opportunism, but also because of bounded rationality, information impactedness arises, which Williamson (1975, p. 31) refers to as information that is asymmetrically distributed between parties coupled with high cost to enable information symmetry.

> *"[Information impactedness] exist when true underlying circumstances relevant to the transaction, or related set of transactions, are known to one or more parties but cannot be costlessly discerned by or displayed by others" (Williamson, 1975, p. 31)*

In a context of small-numbers bargain, Williamson states that information impactedness especially becomes an issue. Similarly, Lonsdale (2001) argues that information asymmetry will increases the risk of opportunism (e.g. in an outsourcing perspective the supplier often becomes more knowledgeable about the outsourcing than the buyer). Williamson links bounded rationality with uncertainty/complexity and opportunism with small-number exchange. Thus, information impactedness arises from uncertainty and opportunism. From a transaction cost theory perspective, Walker (1988) and Walker and Weber (1984) state that uncertainty can be of either:

- Volume uncertainty raises costs when using external contracting and includes uncertainty of the estimation of volume or fluctuations. High volume uncertainty will lead to making rather than buying a component.

- Technological uncertainty raises costs when using internal governance and includes probability of future technological developments or changes in the specification of a component.

If asset specificity is high and the transaction is characterised by uncertainty and infrequency, transaction difficulties will arise and increase the transaction costs (Reve, 1990). When asset specificity is high, hierarchy is preferable and if a transaction has low asset specificity this implies that these transactions should be handled by a market or hybrid. For medium asset specificity hybrid agreement is preferable, but only when the uncertainty (frequency of disturbance) is relatively low. If the uncertainty of a transaction is high, the degree asset specificity will decide which of the two polar modes is preferable. (Williamson, 1991) While Williamson suggests that medium asset specificity is best governed by hybrid bilateral agreement due to suppliers' possibility to gain economies of scale, he is not very explicit about how to decide an appropriate contractual relationship for this situation.

> *"The hybrid mode is located between market and hierarchy with respect to incentives, adaptability, and bureaucratic costs. As compared with the market, the hybrid scarifies incentives in favour of superior coordination among the parts. As compared with hierarchy, the hybrid sacrifices cooperativeness in favour of greater incentive intensity" (Williamson, 1991, p. 283)*

To summarise, Williamson (1979; 1985) says that there are rational economical reasons for organising some transactions in one way and other transactions another way. The starting point is that firms, when deciding an appropriate governance structure for certain activities,

need to economise on both production and transaction costs (Williamson, 1979). If a firm handles transactions by market, competitiveness will arise from having low transaction costs. However, high asset specificity, uncertainty and infrequency will cause transaction difficulties that increase the transaction costs (Reve, 1990). In addition, the combination of the two fundamental behavioural assumptions (bounded rationality and opportunism) cause transaction difficulties.

Interpreting Asset Specificity as a Competence

Williamson's work has influenced scholars to bring the core competence concepts to the realm of transaction cost economics; in this way, utilise the notion of asset specificity to create a framework for deciding the boundary of the firm (i.e. examine why some transactions are governed one way and others another way). However, Williamson's understanding of asset specificity has been interpreted differently, see table 2-3.

Table 2-3. Compilation of articles interpreting asset specificity

Author:	**Interpretation of asset specificity:**
(Williamson, 1991)	Degree to redeploy asset to alternative uses
(Reve, 1990)	Firm's unique resources
(Cox, 1996)	Embedded in an entrepreneurial rather than a productive view of the firm as a core competence
(Arnold, 2000)	Core competence

Influenced by the notion of the firms' unique resources (cf. core competencies), Reve (1990) intends to develop a contract theory of strategic management and claims that strategic management should consist of both theory of competitive positioning and a theory of the firm, and defines strategy as

> *"...the match between a firm's unique resources and its relationship to an ever-changing environment to attain its best performance" (Reve, 1990, p. 134).*

With this starting point, Reve (1990, p. 138) uses agency theory and transaction cost theory and concludes that a firm needs to decide its efficient boundary (i.e. its internal and bilateral governance forms). In this way he put forth that the firm is a function consisting of both a strategic core and strategic alliances:

$Firm = f(strategic\ core, strategic\ alliances)$, where

- Strategic core is close to the firm's business idea and consists of the firms' core skills (cf. heterogeneity of resources (Peteraf, 1993)) governed by internal contracts and relies on organisational incentives.
- Strategic alliances are the firm's complementary skills and are governed by external contracts (cf. market or by hybrid) and rely on interorganisational incentives.

Moreover, Reve says that the core skills should be considered as high asset specificity, and therefore should be governed internally. Complementary skills are of medium asset specificity and should be governed by bilateral governance forms (cf. hybrid). All other low asset specificity should be governed by market. Hence, it could be interpreted that Reve considers asset specificity as unique skills (cf. core competencies), which is a different interpretation compared to Williamson's (1985; 1991). In addition, Reve emphasises the experience and

increased learning of the organisation when he considers the concept of asset specificity. Based on Williamson's (1985) taxonomy of asset specificity from transaction economics, Reve (1990) divides core skills into: (1) site specificity, (2) physical asset specificity, (3) human asset specificity and (4) dedicated asset specificity. This is the same classification as Williamson's but with a different interpretation of asset specificity. On the basis of the work of Reve (1990), Cox (1996) somewhat disparages Williamson's interpretation of asset specificity. Here, Cox states that firms must choose the internal and external relationships which will maximise their business profitability. For Cox, Williamson's interpretation of asset specificity and transaction cost theory will lead to firms being unable to react quickly to changes in technology and competitive market pressure.

> *"…the determining factors behind asset specificity and transaction cost must be the relationship of the transactions to the competitive position of the firm in the market… what is needed is an approach to understand asset specificity that is embedded in an entrepreneurial rather than a productive view of the firm". (Cox, 1996, pp. 60-61)*

Cox (1996) links the concept of core competence to transaction cost theory and thus states that asset specificity should be considered as specific skills and knowledge that contribute to sustaining positions of profit in the supply and value chain (relative degree of strategic importance to core competencies). Hence, asset specificity is interpreted in a way which is comparable with Reve's (1990) understanding of core skills. What is seen here is that Williamson's discussion about transaction cost theory has limitations as it does not consider the creation of revenues or maximise the business profitability and does not consider the basis for competitive advantage (Reve, 1990; Cox, 1996).

2.2.3 Previously Defined Driving Forces for Outsourcing

In other industrial contexts, motives for outsourcing includes several driving forces. For example, in a broad cross-industry survey of 1200 companies conducted by the Outsourcing Institute: (1) improving focus, (2) access to World-Class-Capabilities, (3) accelerating benefits from reengineering, (4) sharing risks and (5) being able to free resources for other purpose, were identified as the five top reasons why companies initialise outsourcing (Deavers, 1997, p. 508). Another large empirical survey done on manufacturing companies in the metal working and machinery sector in the USA by Harrison and Kelly (1993) shows that capacity constraints, together with access to special skills, are indicated as being the main reasons to outsource. Rothery and Robertson (1995) consider outsourcing as a re-engineering tool which companies can benefit from:

> *"Organisations which really are prepared to go back to square one and think about how best to produce, market and distribute a product or service will be forced to ask themselves what the best ways are of doing so, and at the same time whether they really need to own all the processes within their companies" (Rothery and Robertson, 1995, p. 13)*

There are thus several different driving forces for outsourcing, which are enumerated in this section. However, there are too many "*top five reasons to outsource surveys floating around*" with somewhat different factors (Greaver, 1999, p. 3) that could be considered as drivers for outsourcing. Therefore, as a start for the following discussion, a literature review has been done on driving forces for outsourcing, see appendix 2. In line with Greaver (1999), the review shows on a wide range of arguments why firms should initialise outsourcing, often with arguments of the possibilities of leveraging core competencies. Based on this review, the driving forces for outsourcing will be discussed below with the objective of presenting the forces in a more structured manner, starting with costs reduction motives.

Reducing Costs

The possibility to reduce costs is often stated as "the one main driving force" why firms decide to buy rather than to make (Bettis et al., 1992; Welch and Nayak, 1992; Brandes et al., 1997; Jennings, 1997; Lonsdale and Cox, 1997; McIvor et al., 1997; Cánez et al., 2000; Fill and Visser, 2000; McIvor, 2000a; Barthélemy, 2003). When considering the outsourcing decision, companies relate the comparative costs of in-house and external sourcing (Brück, 1995; McIvor et al., 1997). Already in 1955 Higgins pointed out that the principal factor deciding whether to make-or-buy is cost reduction potential, based on comparing the in-house and external sources. He states that cost studies have shown that both making and buying can be preferable when the decision is based solely on costs. In line with this Mullin (1996) argues that contract manufacturing to reduce costs has been present for several decades.

Outsourcing, under the right circumstances, will offer large cost savings (Heywood, 2001). For example, outsourcing based on cost comparison is often swiftly reinforced by short-term cost improvements as a result of lower fixed costs and lower break-even points (Gilley and Rasheed, 2000; McIvor, 2005). Small cost improvements can also yield high increases on profits. This is especially true for companies where the material costs are a large part of the total production costs, for example a company where material costs accounted for 80% of the total manufacturing costs and that reduced these costs by 5%, enabled a 40% increase in operating profits (Tayles and Drury, 2001).

Brück (1995) identifies four areas of different costs issues that should be considered when outsourcing: (1) factor costs, comprising of labour costs, (2) economies of scale for unit output as well as material costs, (3) productivity, (4) design-to-cost potential, composing cost

optimisation by experience, logistics factors, set-up costs and possibilities for continuous improvements. Here, companies can lower costs and achieve better cost efficiency by outsourcing to suppliers with comparative advantages such as economies of scale, better cost structure by lower factor costs (labour costs) or higher productivity (higher yield between input and output) (Bettis et al., 1992; Brück, 1995; Brandes et al., 1997; Bragg, 1998; Greaver, 1999; Fill and Visser, 2000). Economies of scale especially provide a strong motivation for outsourcing (Cachon and Harker, 2002). Brück (1995) argues that, together with economies of scale, the factor cost advantages for companies by low labour costs can be so large that other in-house advantages are insignificant in comparison.

Albeit, some studies have shown that outsourcing based on cost reduction not necessarily was driven by searching for lower labour costs (see Harrison and Kelly, 1993; Deavers, 1997). Outsourcing also enables benchmarking in-house operations to external suppliers. Heywood (2001) says that all companies focus more and more on continuously analysing their business processes to see how competitive they are, and here outsourcing can offer the possibility to benchmark internal operations with external suppliers.

Financial Leverage Considerations

A factor that seems to motivate outsourcing is that companies generally tend to value investments that yield cost reductions with short pay-back time much higher than investments that can help to improve long-term profitability but require longer pay-back time (Carlsson and Lind, 2005). Here, outsourcing from a financial motive can be driven by the potential of converting fixed costs into variable costs to alleviate the balance-sheet and to enhance financial performance (Blaxill and Hout, 1991; Hendry, 1995; Greaver, 1999; Wasner, 1999; Gilley and Rasheed, 2000; Abrahamsson et al., 2003).

Linked to a firm's outsourcing can especially be the possibility to ease the balance-sheet for the work-force (Blaxill and Hout, 1991; Welch and Nayak, 1992), which can be a consequence of outsourcing to a supplier with lower factor costs (Brück, 1995). In addition, as long as the purchasing costs are lower than or at least equal to the previous production costs, a company's financial performance measurements (e.g. ROCE or ROI) will be fast improved if they were outsourcing production activities (Carlsson and Lind, 2005). In addition, financially driven reasons include avoiding costly investments (Bragg, 1998; Greaver, 1999; Carlsson and Lind, 2005)

> *"A company may find that it has a function that is not as efficient as it could be, due to lack of investments in the function. If the company keeps the function in-house, it will eventually have to make major investments in order to modernize it. By outsourcing the function the company can permanently avoid having to make this investment" (Bragg, 1998, p. 2)*

> *"For most companies, employee related costs and the associated overhead are relatively fixed. Product or service demand can vary, but these costs generally remain the same. This can be costly when demand slackens. Should we hire or downsize at every demand change? Of course not. Outsourcing allows us to turn fixed costs into variable costs" (Greaver, 1999, p. 183)*

Here, internal numerical flexibility can be increased by not having an unnecessary workforce or production units, which during market downturns result in high fixed costs (Harrison and Kelly, 1993). In this sense, outsourcing can be used as an instrument to downsize the organisation (Winkleman et al., 1993; Bragg, 1998).

> *"…outsourcing has helped companies ameliorate competitive pressures that squeeze profit margins and eliminate investments in fixed infrastructure that can quickly be outdated" (Winkleman et al., 1993, p. 52)*

Cooper et al. (2004) says that many organisations in the USA have such a strategy and defines it as just-in-time labour. In line with this, Bragg (1998) suggests that when a company experiences too many large swings in volume, it is more beneficial to eliminate the fixed cost. This is done by outsourcing the activity and thus converting fixed cost into variable costs. Outsourcing driven by financial motives is often related to fulfil expectations from owners and shareholders on operating profits (Carlsson and Lind, 2005).

Outsourcing Driven by Capacity and Operational Considerations

In close relation to avoiding investments, outsourcing enables increased manufacturing flexibility and to cope with bottlenecks/operational overload in the production, which cannot be fully justified by costly investments (Quinn and Hilmer, 1994; Hendry, 1995; Bragg, 1998; Fine and Whitney, 1999; Cánez et al., 2000; Gilley and Rasheed, 2000). Based on empirical examples from a computer manufacturer and a food service retailer, Quinn and Hilmer (1994) suggest that one main purpose of outsourcing is to maintain operational flexibility.

> *"…one of the main purposes of outsourcing is to have the supplier assume certain classes of investments and risks, such as demand variability… the buying company may want to maintain its internal capacity at relative constant levels despite highly fluctuating sales demands" (Quinn and Hilmer, 1994, p. 50)*

Similarly, Greaver (1999) argues that an external provider can better handle variations in demand because of their economies of scale. Already in 1955, Higgins emphasised that buying rather than making is driven by needs to increase capacity. After conducting a broad study of manufacturing companies in the metal working and machinery sector in the USA, Harrison and Kelly (1993) state that capacity constraints, together with access to special skills, are the main reason to outsource. Accordingly, but in an automotive context, Fine and Whitney (1999) say that dependency for capacity is one of two main arguments for outsourcing, where a firm chooses to become dependent on a supplier.

Fill and Visser (2000) even suggest that outsourcing should be divided between capacity outsourcing and non-capacity outsourcing. Capacity outsourcing considers more temporary supplementary outsourcing due to capacity overload that exceeds the company's current capacity, to fulfil within time limits a demand that requires the firm to turn to an outside source (Harrison and Kelly, 1993, p. 216). In this way, outsourcing could offer increased responsiveness (Quinn and Hilmer, 1994; Cánez et al., 2000; Gilley and Rasheed, 2000) and higher operational volume flexibility (Hendry, 1995). In addition, the lead time for certain products can be reduced, by not being limited by a bottleneck or operation constraints in the in-house production (Cánez et al., 2000).

Concentrate on Developing Internal Core Competencies

As often argued in literature outsourcing will allow companies to focus more resources on enhancing their core competencies and leverage other peripheral activities by outsourcing agreements (see e.g. Venkatesan, 1992; Quinn and Hilmer, 1994; Hendry, 1995; McIvor et al., 1997; Bragg, 1998; Greaver, 1999; Quinn, 1999; Gilley and Rasheed, 2000; McIvor, 2000a; Insinga and Werle, 2000). The outcome should be to create a competitive advantage for the company by focusing on core activities and outsourcing non-core, see figure 2-2.

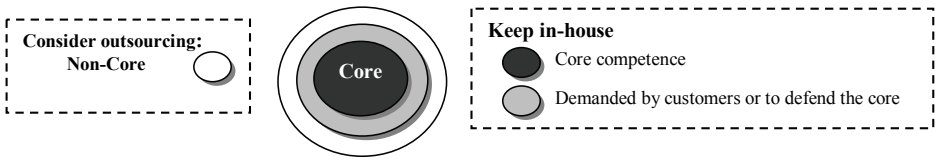

Figure 2-2. Concentrate on core and outsource other non-core (Adaptation bases on: Quinn, 1999, p. 12)

Already by 1955, Higgins emphasised that the notion of buying instead of making, will make it easier for firms to focus more available resources on their speciality (cf. focus more resources on core competencies). Financial aspects and the focus on core competence go hand-in-hand, and in this way outsourcing provides the possibility to reduce investments in certain assets and focus these resources on the core competencies of the corporation (Greaver, 1999). Thus by outsourcing, companies can maximise returns on internal resources by concentrating on what the firm does absolutely best (Quinn and Hilmer, 1994; Venkatesan, 1992).

Utilising and Accessing Competencies from External Sources

Through a large empirical survey, Harrison and Kelly (1993) suggest that high labour cost is only one of several driving forces for initialising outsourcing. Instead they suggest that a main driving force for initialising manufacturing outsourcing is having access to specialised skills which are not available in-house. In the survey presented by Deavers (1997), access to World-Class-Capabilities is one of the top five reasons for firms initialising outsourcing. Accordingly, access to specialised skills or equipment not otherwise available, is one of two main drivers for outsourcing (Harrison and Kelly, 1993; Fine and Whitney, 1999). Similarly, the main communicated argument by Quinn (2000) is that contemporary companies that expect to sustain competitive need to continuously tap the capabilities of external sources.

> *"… no one company acting alone can hope to out-innovate every competitor, potential competitor, supplier or external knowledge source around the world… but there is hope… strategically outsourcing innovation – using the most current technologies and management techniques – can put a company in a sustainable leadership position" (Quinn, 2000, p. 13)*

Thus, outsourcing allows for the possibility to fully exploit the competencies and technologies of the outside sources, which would be difficult and costly to develop internally (Venkatesan, 1992; Quinn and Hilmer, 1994; McIvor et al., 1997; Bragg, 1998; Quinn, 1999; Cánez et al., 2000; Gilley and Rasheed, 2000; Quinn, 2000). By this, outsourcing can contribute to enhancing the quality of products (Cánez et al., 2000; Fill and Visser, 2000) and also enable product diversity to increase by buying complete products instead of developing them internally (Harrison and Kelly, 1993; Cánez et al., 2000). Rothery and Robertson (1995, p. 32) summarise this by saying that outsourcing is a "*mechanism for acquiring new dialogue, ideas, creativity and potentiality*" Similarly, Linder (2004) claims that contemporary firms more use outsourcing as an important instrument for partnering with an external source to facilitate organisational change and to launch new strategies rapidly. In this sense, outsourcing offers an opportunity to learn from business partners and also to accelerate benefits from reengineering (Rothery and Robertson, 1995; Deavers, 1997).

2.3 Key Factors Addressed when Considering Outsourcing

In this section I will look at previously defined key factors that are addressed when considering outsourcing. The starting point will be from literature discussing the outsourcing decision and outsourcing strategies.

The outsourcing decision is not easy. Fine and Whitney (1999) and Wasner (1999) even suggest that the make-buy decision process should be considered as a core competence of the corporation. In line with this, skilful governance of outsourced activities can be a competence by itself (McIvor, 2005). To get an overview of factors often considered in an outsourcing decision as well in a make-or-buy decision, a literature review has been done, see appendix 3. The outcome of this review is that a common similarity among the models often has their starting point in the firms' existing internal resources, where the outsourcing decision should be made on the premises of the company's core competencies on a strategic level. This is thus very much influenced by a resource-based perspective (cf. McIvor, 2005, p. 47). Another finding is that the outsourcing decision can be analysed on different levels and in this section the outsourcing decision will be addressed on three related levels: (1) activity, (2) technology and (3) component. Thus, the main difference for the outsourcing decision lays in the choice of the unit of analysis of the developed frameworks. In addition, risks related with outsourcing will be addressed. The above structure is in line with previous literature that states that an outsourcing decision analysis should include a strategic perspective to decide what is core and non-core, capability considerations, associated risks as well as supplier influences (e.g. McIvor et al., 1997; McIvor, 2005).

2.3.1 Activity Level Outsourcing

When considering outsourcing certain activities, the central strategy should be to focus resources on activities that are essential for the firm (Quinn and Hilmer, 1994; McIvor et al., 1997; Insinga and Werle, 2000; Fill and Visser, 2000; McIvor, 2000a; Gottfredson et al., 2005). The main factor for deciding what to outsource is the notion of core competence.

> *"…by strategically outsourcing and emphasising a company's core competencies, managers can leverage their firm's skills and resources for increased competitiveness" (Quinn and Hilmer, 1994, p. 43)*

Thus, the activities that create a basis for differentiation, customer value and competitiveness must be kept in-house, while other non-core activities should be considered as potential for outsourcing with a varied degree of external relationship. In addition, to the main question of the particular activity potential, two other questions seem important:

- *Capability benchmarking:* the firm's internal capability to perform activity in comparison with potential suppliers' (McIvor et al., 1997; McIvor, 2000a) and/or competitors' (Insinga and Werle, 2000; Gottfredson et al., 2005). Thus, benchmarking internal capabilities with external sources.

- *Vulnerability of outsourcing:* Potential strategic vulnerability that could arise if the specific activity is outsourced (Quinn and Hilmer, 1994). According to Quinn and Hilmer, this dimension needs to be considered because sometimes internal governance for the activity can be suitable even though the activity considered for outsourcing is not considered as a core competence. This is because of the risk of needing to develop a weak supplier to required performance levels, which could result in costly investments and

increased costs. Other strategic vulnerabilities include loss of control of the supplier where there is a risk of the supplier bypassing the buyer it once served (Ibid.).

This question is closely related to the supply base impact on the outsourcing process, which McIvor (2000a) and McIvor et al (1997) consider a central final step when analysing the outsourcing decision. Here, the number of compatible suppliers must be evaluated and the firm needs to filter out unsuitable suppliers. This is to avoid outsourcing when there are few suitable suppliers available or if there is a risk of competitive threat from the suppliers (i.e. strategic vulnerable).

Based on the three respective dimensions the outsourcing decision can be made for certain activities and a firm can map out the position of a particular activity, see figure 2-3.

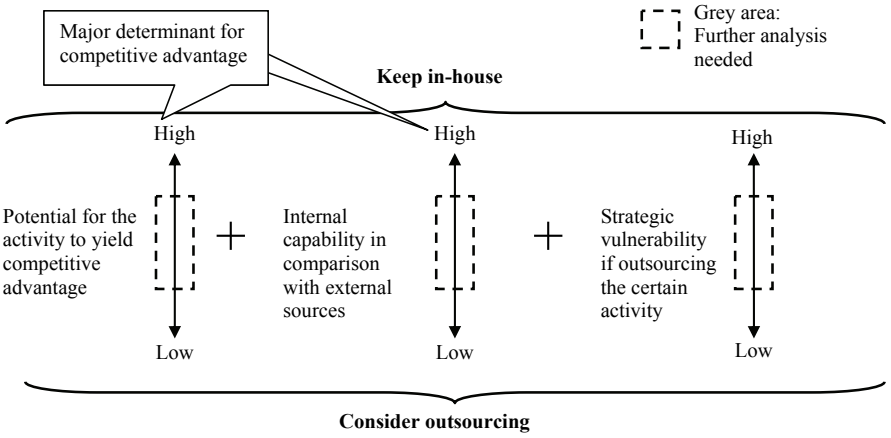

Figure 2-3. A model for mapping a certain activity considered for outsourcing (Adaptation based on: Quinn and Hilmer, 1994, p. 48; Insinga and Werle, 2000, p. 61; McIvor, 2000a, p. 29)

When considering outsourcing, the firm must first decide if the activity is strategic, if it can enable differentiation and if it is a basis for competitive advantage or a commodity that should be potential for outsourcing. *Secondly*, if there is low potential for competitive advantage, and the internal capability to perform the activity or the risk for strategic vulnerability is also low, the activities should not be handled in-house and outsourcing at an arms-length basis is best suitable (Quinn and Hilmer, 1994; Insinga and Werle, 2000; McIvor, 2000a). *Thirdly*, when the potential for a competitive advantage for certain activities is at a medium level and either the internal capability (Insinga and Werle, 2000) or the strategic vulnerability (Quinn and Hilmer, 1994) is of medium value, internal governance is not necessary. Instead some kind of collaborative outsourcing agreement should be selected. When the activity considered for outsourcing becomes a grey area between these dimensions, further analysis may be needed to really decide if outsourcing should be done.

To further develop the above discussion the authors' frameworks can in more detail be addressed. McIvor (2000a) suggests a four-stage conceptual framework to help companies formulate an effective make-or-buy decision including defining core activities, thorough cost analysis and an analysis of suppliers' capabilities. This model addresses, what he considers to be, three key aspects of the outsourcing process: (1) the company's value chain; approach the

outsourcing decision on value-adding activity basis, (2) core competence of the corporation; relate core competence with the value chain perspective and (3) the supply base impact on the outsourcing process; considering the number of compatible suppliers and filter out unsuitable suppliers. By using this framework, McIvor states that firm can both consider cost aspects and maintain a focus on the strategic issues of the outsourcing decision. But the focal point of this model is to understand the contribution of certain activities to building the company's core competencies, and thus, evaluate whether a long-term sustainable competitive advantage can be achieved by performing the activity in-house. While Insinga and Werle (2000) do not to any large extent consider costs aspects, Quinn and Hilmer and McIvor are clearer about the necessity of cost analysis when considering outsourcing. When firms make an outsourcing decision based on inadequate costing analysis or do not comprehend the strategic importance of an activity, there is a large risk that the wrong decision will be made (McIvor et al., 1997; McIvor, 2000a). Albeit, a somewhat missing focus in the frameworks developed by McIvor (2000a) and McIvor et al (1997) is how the firm accurately, and without bias should assess the contribution of particular activities to competitive advantage and at the same time judge the firm's capability to perform the activity in comparison with suppliers or assess any potential strategic vulnerability.

As a development to the discussion above, McIvor (2005) in his recently published book suggests a six stage model for outsourcing evaluation and management. This model considers many of the issues discussed above. For example, similar to the outsourcing decision models suggested by Quinn and Hilmer (1994), Insinga and Werle, McIvor (2000a), McIvor et al (1997), McIvor (2005) early in his framework considers the level of importance of activities involved in creating and delivering organisation's range of products and services (e.g. p. 72). Here, a critical activity has a major impact upon the ability to create a competitive advantage. Along similar arguments as provided by McIvor (1997; 2000a), he further discusses the firm's internal capability to perform activity in comparison with potential suppliers. Here, the firm should relate activity importance (critical to competitive advantage vs. not critical to competitive advantage) and relative capability (less capable vs. more capable). This stage relates well to the above discussed dimensions of the potential for an activity to yield competitive advantage and the internal capability of the firm to perform the activity in comparison (benchmarked) with competitors. This stage is closely related to a resource-based view of the firm. However, in comparison to earlier publications (1997; 2000a), McIvor (2005) warns more clearly for defining non-core activities as those outsourced to more capable suppliers or competitors. McIvor says that activities are of strategic significance if they are important in the eyes of the customer. With this reasoning McIvor argues that activities outsourced to a more capable supplier can still be of strategic importance if they are important in the eyes of the customer (p. 50); thereby, such activity cannot be termed as non-core. Thus, it is important to know the determinants of competitive success in the specific industry, both long-term and current (McIvor, 2005). This framework also gives a clearer discussion of supply market risks. If an activity is not critical to competitive advantage and high supply market risks there is a need to secure supply (McIvor, 2005). This is also related to the potential strategic vulnerability that could arise if a specific activity is outsourced, which will be further discussed in the coming section 2.3.4.

2.3.2 Outsourcing on the basis of Technology Differentiation

Brusoni et al. (2001, p. 597) define technologies as something that "*can be understood as the bodies of knowledge, understanding and practice, that underpin product design and manufacturing*". Technology considerations can work as a key aspect when formulating outsourcing strategies, and based on this, firms need to access or develop technology to create a basis for sustaining a competitive advantage.

> *"...the decision as to which technologies should be developed in-house must be made on a selective basis that ensures support for sustaining competitive advantage" (Jennings, 1997, p. 93)*

Likewise, Brusoni et al. (2001) emphasise that firms are in need of several technologies which require them to have a broader knowledge base of technologies than they need to manufacture in-house. In this sense, the authors argue that there is a difference between considering outsourcing production and the decision to outsource technological knowledge. Starting from the firms' competitive advantage, internal development for all technology is not necessary and can be very costly and sometimes contribute little to increased competitiveness (Jennings, 1997; Piachaud, 2005). Therefore, the firms must properly evaluate which technologies should be important for internal development and which have a potential for being obtained by outsourcing. This is closely related to the strategic outsourcing that Quinn (2000) suggests as a strategy to tap the latest technologies and innovations from external sources, especially to help the firm attain a leadership position. Performing an activity in-house is based on the availability of technology necessary for the operation. However, the unit of analysis will be different when the outsourcing model is based on technological considerations.

When considering outsourcing technology, Jennings (1997) and Piachaud (2005) suggest utilising Welch and Nayak's (1992) guidelines for evaluating. Welch and Nayak advocate the idea that the firm needs to both consider strategic and technological factors in conjunction with a traditional cost analysis of an outsourcing decision. Here, they emphasise that it is not enough to only consider production costs and all the factors involved in bringing out new products, but it becomes central to evaluate the technology position in relation to other competitors. Three main strategic variables need to be considered when analysing the outsourcing decision, according to Welch and Nayak (1992):

1. *Process technology*: the foundation for sustaining a competitive advantage, or for providing a competitive edge,

2. *Competitive comparison:* the comparative process technology position of the firms' competitors. Here, the firms must benchmark their internal technology level/advantage with their competitors on the basis of several different parameters as costs per unit or other related metrics as quality.

3. *The maturity of process technology*: must be evaluated for the whole industry, consequently using benchmarking to avoid development of already available technology. A mature technology can be considered to be one that is readily available for all companies. On the contrary, developing (growing) technology should be kept internally and can embody the core competencies of the firm. However, only focusing on certain technologies would give rise to increased technological uncertainty that can raise costs when future developments make that technology obsolete and mature (Walker and Weber, 1984; Walker, 1988).

The starting point of above variables 1 and 2 seem somewhat similar whether evaluating the outsourcing decision on an activity or a technology level. Here, a difference in the model suggested by Welch and Nayak is to not focus on costly investments on developing technology which is already readily available. Based on Welch and Nayak's framework the outsourcing decision can be made:

- *Keep In-house*. If the technology is expected to be a major determinant for competitiveness in the future and there is low maturity of the technology, outsourcing is not a suitable solution. In this case, it is better to benefit from keeping the technology internal and thus not make it readily available for competitors; such process technologies should be considered as core competencies. Here, outsourcing is only suitable to avoid investments in mature technology that is easily available from external sources.

- *Outsourcing is preferable*, according to Welch and Nayak, when the significance of process technology for competitive advantage is low (base technology), independent of the relative position to competitors or the maturity of the technology in the whole industry. Mature technology that is readily available for everyone in the industry but which in the future may become very important for competitiveness should be outsourced, but the firm should work closer with their partner and take greater responsibility to develop this supplier (Welch and Nayak, 1992). Partly initialising outsourcing programs is preferable when the process technology as an instrument for competitive advantage can be considered as key technology. But this should only be done where the maturity of the technology in the industry is high.

2.3.3 Component Level Outsourcing

If the unit of analysis is aggregated, the outsourcing decision could as well be considered on a component or subsystem level. In line with previous discussed approaches, Venkatesan (1992), for example, emphasises that the components that are critical for competitiveness of the corporation should not be outsourced. What separates this from the discussion above is that a component cannot be considered as a core competence, because a component is an inanimate thing (Hamel and Heene, 1994; McIvor, 2005). Nonetheless, the manufacturing of the component could be considered as a core competence (cf. Hamel and Heene, 1994; Quinn and Hilmer, 1994). Tayles and Drury (2001) state that firms are increasingly paying attention to outsourcing components.

In an automotive context, Fine and Whitney (1999) develop a framework for an outsourcing decision for specific components or subsystems. From an automotive context, the authors structure that the two main dimensions to consider when assessing the outsourcing decisions are: (1) if the company will either be dependent on the external source knowledge or capacity and (2) the possibility of the component/ subsystems to be decomposed from the system of components that forms the final products. Outsourcing is more suitable when the company is only dependent on the supplier for capacity and the component can be decomposed from the system that forms the product. Outsourcing because of the need for knowledge is hazardous and should be avoided (Fine and Whitney, 1999). Venkatesan (1992) suggests that a company's strategy for outsourcing decisions is to (1) focus on those components that are critical to the product and (2) outsource other components to suppliers with comparative advantages. Simplifying Venkatesan's (1992) presented framework, it can be interpreted that a firm should consider two main dimensions: 1) the determinant of competitive advantage and 2) if the manufacturing can be considered as a core competence, see figure 2-4.

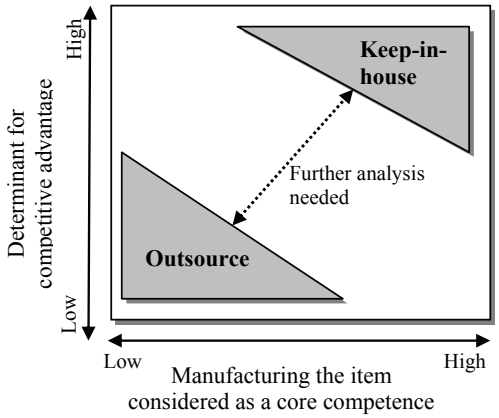

Figure 2-4. Two major dimensions to address when considering outsourcing a subsystems/ components (Adaptation based on: Venkatesan, 1992, p. 103)

These two dimensions are in line with previous discussions about making the outsourcing decision on an activity level or technology level, what is different is the level of analysis. Based on his developed framework, Venkatesan also claims that managers often incorrectly make outsourcing decisions about individual components and neglect the fact that a manufactured product is made up of a number of systems and subsystems which themselves comprise of subassemblies of components (cf. also Fine and Whitney, 1999). Here, a risk is that firms outsource those components that are problematic to work with and keep those that are easy to manufacture (Venkatesan, 1992). Therefore Venkatesan (1992) in his strategic outsourcing process model argues that the analysis should not be considered as a one-shot deal but rather as an ongoing process. In this strategic process, the key concept is to break down subsystems into families of components to identify if they should be considered as strategically important for the business or instead a commodity that should be outsourced. The reason to group single components into families of components is because they are often related, based on similarity of the process technology used. To assess when these families of components should be considered strategic and thus indispensable to the company's competitive situation, Venkatesan claims that they must offer high customer value, provide differentiation and should not be readily available for competitors.

> *"The first thing to decide is what subsystems will be indispensable to the company's competitive position over subsequent product generations…. Subsystems should be classified as strategic when… have high impact on what customers perceive as the most important product attributes… [and] require highly specialised design and manufacturing skills… [and] involve technology… which there is a significant likelihood of gaining a clear technological lead" (Venkatesan, 1992, p. 101)*

Non strategic components are potential objects for outsourcing. Thus, Venkatesan's approach for the outsourcing decision includes the necessity of assessing which technology is needed to create customer value. This is closely related to Welch and Nayak's (1992) suggested approach to analysing the outsourcing decision, which was previously discussed. In addition, Venkatesan argues that specialised manufacturing skills are needed and this is linked to the potential for a company to achieve a competitive edge for certain activities (cf. Quinn and Hilmer, 1994; Jennings, 1997; Insinga and Werle, 2000; McIvor, 2000a). This implies that both the technologies needed to perform the component and also those activities that the

component comprises of must be considered if the outsourcing decision is to be analysed accurately.

2.3.4 The Risks of Outsourcing

Accompanying outsourcing strategies are several intrinsic risks that need to be handled to ensure that expected benefits of outsourcing can be materialised, which are elucidated here. The section is divided into three parts: 1) the risk of only looking at cost reduction potential when outsourcing, 2) the risk of outsourcing critical activities and 3) supplier related risks.

Accompanied Risks when Staring Blind on Costs Reduction

Too many firms have not made sufficient cost analyses to understand the implications of outsourcing.

> *"…it is surprising – given all that has been written on the dangers of using headcount criteria for outsourcing decisions, and the many examples of failure – that firms stills base their decisions on these factors… the most serious risk of outsourcing in this way is that it can lead the firm outsourcing its core activities" (Lonsdale and Cox, 1997, p. 33).*

Only basing the decision on cost can have a very negative effect on both customers and the strategic objective of the company (Rammohan, 2004), and can even result in declining competitiveness for the firm (Blaxill and Hout, 1991; Welch and Nayak, 1992; Bettis et al., 1992). Along similar lines, McIvor (2005) states that there are several examples of organisations that have outsourced to achieve cost reductions, however, the outsourcing has sometimes not led to decreased costs as expected and in some cases costs even increased. This is also supported by Berggren and Bengtsson (2004), Poopo et al (1998), Davis (1992) and Higgins (1955), who argue that the complexity of a make-or-buy decision, and that a better comprehension of the organisations costs (and hidden costs) is needed to more accurately decide whether to make or buy. This is not always straightforward.

> *"…figuring your inside costs is not simple" (Higgins, 1955, p. 112)*

Here, additional (hidden) costs that have not been considered in the outsourcing analysis can make the actual cost reduction much lower then expected, see figure 2-5.

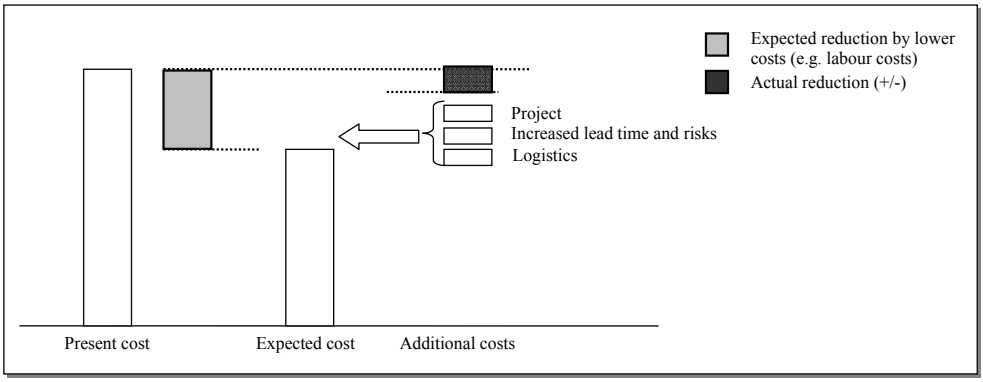

Figure 2-5: Expected cost reductions are lowered by additional costs (Bengtsson, 2005, p. 63)

Similarly, firms also have difficulties estimating the total costs (cf. Walker and Weber, 1984; Walker, 1988) of initialising outsourcing because of their inadequate costing systems (Davis, 1992; Ellram and Maltz, 1995; McIvor et al., 1997; McIvor, 2000a). The outcome can be that firms overestimate the potential cost savings that can be made by outsourcing and decide to buy rather than to make (Davis, 1992; McIvor et al., 1997; Barthélemy, 2003). If considering outsourcing only as an instrument to reduce costs, there is a risk that the firm will fail to include all the costs and the consequence can be loss of expected cost savings and sometimes the costs can even be increased if the administrative costs that are accompanied with an outsourcing decision are not assessed (Garaventa and Tellefsen, 2001). In addition, many organisations fail to account for future costs in general and costs for managing the outsourcing process in particular (e.g. resources needed for managing the relationship with the supplier) (Barthélemy, 2003; McIvor, 2005, p. 24). Other costs associated with outsourcing, which companies fail to account for, can include costs for searching suppliers and contracting (McIvor, 2005). On top of that the administrative cost seldom gets reduced when outsourcing production (Bengtsson, 2005). Here, an outsourcing decision based on reducing production costs (cf. Walker and Weber, 1984) as well as realising production cost efficiencies can be considered too narrow a decision criteria because of the complexity of the outsourcing decision (Lonsdale and Cox, 1997; Fine and Whitney, 1999; Fill and Visser, 2000). Davis (1992) well summarises the above discussion by stating that "*the predominant focus on costs in these [outsourcing] decisions is questionable*".

Another aspect is that outsourcing decisions too often are based on headcount and cost-cutting (cf. balance-sheet-management) to be employed as an accounting and financial mechanism. This method does not take into account the long-term strategic effect of the decision, supplier-relationship and the risk of supplier failure (Lonsdale and Cox, 1997; Lakenan et al., 2001). Turner and Crawford (1994) argue that there is a risk when outsourcing decisions are based solely on factors such as price or investment requirements and with little consideration given to competencies. Here, the authors state that the central issue must be which competencies that are most important for keeping and developing competitive advantage.

Thus, while outsourcing may be an attractive tool to lower costs and enhance a firm's financial performance (Gilley and Rasheed, 2000), the decision at firms too often lacks a strategic point of view (Blaxill and Hout, 1991; Welch and Nayak, 1992; Probert, 1996; Brandes et al., 1997; Jennings, 1997; Lonsdale and Cox, 1997; McIvor et al., 1997; Wasner, 1999; Fill and Visser, 2000; McIvor, 2000a). For example, Blaxill and Haut (1991) argue that just cutting overhead is not the way to improve competitiveness and requires in-depth analysis to assure that sustainable cost reduction can be realised. By this an outsourcing decision based disproportionately on inside and outside unit cost comparison and financial arguments has limitation though it does reflect the intangibles which can affect long-term desirable action (Higgins, 1955).

Outsourcing Problematic or Long-Term Critical Activities

According to McIvor (2000a), distinguish between the company's core as certain activities and other activities as non-core is not simple, and needs to be considered from a long-term strategic perspective.

> *"A core activity is central to the company successfully serving the needs of potential customers in each market… perceived by the customers as adding value and therefore being a major determinant of competitive advantage" (McIvor, 2000a, p 29).*

Lonsdale and Cox suggest that companies often define their core competencies as "*those things which we do best*" (Lonsdale and Cox, 1997, p. 33) and outsource other non-core activities; which can be hazardous.

> *"…just because it is problematic does not mean it will never be an activity critical to competitive advantage" (Lonsdale and Cox, 1997, p. 33)*

Thus, companies with such a view often consider outsourcing as an opportunity to outsource activities which they believe they have problems with and do not accurately revise how these may contribute to long-term sustainable competitiveness (Lonsdale and Cox, 1997; Abrahamsson et al., 2003). However, these activities may well contribute to the company's competitive advantage and have contributed to distinguishing them in the market place (Lonsdale and Cox, 1997; McIvor, 2000a; Doig et al., 2001; Beattie, 2005).

This view is supported by McIvor (2000b) who has studied a case that has adapted a core competence strategy where non-core activities are outsourced. The findings from his study indicate that the firm utilises this strategy to outsource more difficult activities to suppliers. Here, the firm has based the outsourcing decision solely on considering the outsourced activities as having no strategic advantages. McIvor (2000b) emphasises that this strategic outsourcing may well cause loss of critical key skills, especially when the core competencies of the firm should be revised on a continuous basis. Thus, the problem here is how to know an activity's contribution to present and future competitiveness. At the same time literature gives little guidance of how close to the core and how much organisations should outsource (Harland et al., 2005). Lonsdale (1999) refers to this as the risk of outsourcing critical activities and should be a main issue for a firm to evaluate when conducting an outsourcing analysis.

The risk of companies defining their core competencies as those things they do best is related to the notion that outsourcing may decrease innovation and affect the corporation's ability to develop cross-functional skills between strategic business units (Quinn and Hilmer, 1994; Lonsdale and Cox, 1997). Another problem is that it may create a situation where the company will lose critical skills that can undermine the long-term competitiveness (Prahalad and Hamel, 1990; Quinn and Hilmer, 1994; Arnold, 2000; Doig et al., 2001). This risk includes the organisation's learning capability that can be lowered by not working closely enough between a firm's strategic business units (Hendry, 1995). Even the influential article by Prahalad and Hamel (1990) is sceptic to too much focus on outsourcing.

> *"… the embedded skills that give rise to the next generation of competitive products cannot be rented in by outsourcing and OEM-supply relationships… outsourcing can provide a shortcut to a more competitive product, but it typically contributes little to building the people-embodied skills that are necessary to sustain product leadership" (Prahalad and Hamel, 1990, p 84).*

Likewise arguments are found as well in (Barney, 1991), where it is argued that sustained competitive advantages cannot be purchased, and that instead, competitive advantages must be found within the firm and must be imperfectly imitable and is heterogeneous. In this sense, the firm's abilities to sustain its competitive advantage are dependent on how fast other firms can imitate its strategy (Grant, 1991). This transparency of firms' strategies makes them possible to imitate, which could cause difficulties sustaining a competitive advantage. Therefore, outsourcing does not necessarily imply increased competitiveness by focusing only on the firm's core competencies and could instead result in a competitive decline (cf. Bettis et al., 1992; Porter, 1996). Based on such arguments, Porter (1996) criticises the extended focus on outsourcing and even suggests that outsourcing causes convergence of different strategies that diminish firms' competitive advantages.

> *"The more that rivals outsource activities to efficient third parties, often the same ones, the more generic those activities become. As rivals imitate one another's improvements in quality, cycle times, or supplier partnership, strategies converge and competition becomes a series of races down identical paths that no one can win" (p 64).*

Through this he argues that operational effectiveness is necessary but not sufficient, as it is thus too easy for competitors to imitate which makes it into a zero-sum competition which in fact can be destructive for the entire industry. From the same perspective, Hendry (1995) put forward that outsourcing can reduce companies' long-term responsiveness, especially when a core competence should be revised on a continuous basis and is very dynamic.

Supplier Related Risks with Outsourcing

The previous section has discussed the risk of outsourcing activities critical for a competitive advantage and/or only basing the outsourcing decision on those activities that are considered problematic to handle in-house. This section focuses on the supplier related risks. This is an important area because one main risk with outsourcing is selecting the wrong supplier to take over the outsourced activities (Barthélemy, 2003; Power et al., 2004; McIvor 2005).

> *"One of the most common fears expressed by managers when considering outsourcing is the risk associated with using an external supplier. When performing an activity internally, companies believe that they can exercise greater control over an internal function and there is less chance of failure of supply than when using an external supplier. For example, companies have natural fears of being held to ransom by a powerful supplier." (McIvor, 2005, p. 196)*

Previous studies have shown that often only a handful of companies achieve the expected benefits when outsourcing (see e.g. Lonsdale, 1999; McIvor, 2000; Gilley and Rasheed, 2000). In a larger survey of Swedish industry companies, it was concluded that many companies' expectations on cost reduction and increased flexibility when outsourcing had not been materialised (see Bengtsson et al, 2005); especially in logistical performance and quality where the companies dissatisfied (Ibid.). Consequently, an evaluation of supplier performance based on quality, delivery, service and ability to reduce costs is critical (cf. McIvor, 2005). By this the outsourcing company can analyse suppliers' potential and developed competencies to keep supplier related risks at a low level and to assure that the supplier can perform as expected (cf. Spekman, 1988; Jennings, 1997; McIvor, 2000). McIvor (2005, p. 25) argues that supply market risks in outsourcing arise because of the inability of organisations to understand that managing a supplier requires different competencies in comparison with managing an internal process. Thus, outsourcing exposes the company to threats from suppliers and the notion of confidentiality is at stake (Lonsdale and Cox, 1997; Doig et al., 2001) or diffusion risk in term of having innovative product or process technology imitated

(Walker, 1988). Here, an intrinsic risk becomes loss of control of the supplier (Walker, 1988; Quinn and Hilmer, 1994; Gilley and Rasheed, 2000; Ellram and Billington, 2001), where the supplier tries to bypass their buyer to become closer to the end-customer. Moreover, emerging companies from low-cost-countries can utilise an increased cooperation to gain financial support and access to new markets.

> *"Cooperation becomes a low cost route for new competitors to gain technology and market access…" (Hamel et al., 1989, p. 133)*

If the supplier's priorities do not match the buyer's requirements or if there is a lack of supplier commitment, this can result in a deteriorating supplier relationship or supplier failure (Walker, 1988; Quinn and Hilmer, 1994; Lonsdale and Cox, 1997).

Outsourcing increases supplier dependence (Walker, 1988; Lonsdale and Cox, 1997; Fine and Whitney, 1999; Ellram and Billington, 2001). By lock-in risk a shift of the power in favour of the supplier can occur (Stuckey and White, 1993; Lonsdale and Cox, 1997; Lonsdale, 2001; Cox et al., 2003). Hence, even though outsourcing may increase operational and financial flexibility (Hendry, 1995; Wasner, 1999; Gilley and Rasheed, 2000), depending on selected contractual agreements outsourcing would decrease contractual (sourcing) flexibility and may even demand greater need for coordination (Hendry, 1995; Kern et al., 2002). In this sense there would be a need to evaluate the cost for switching supplier (Jennings, 1997). When considering outsourcing by price comparison it is essential to note that the external source will also demand profit on value-added that would normally be retained if the activities are performed internally (Sink et al., 1996; Ellram and Billington, 2001; Abrahamsson et al., 2003).

> *"…as outsourcing has increased, an unanticipated problem has come to light for many manufacturers: as they reduce their purchase volume with their materials and parts suppliers for inputs to items that are now outsourced, these manufacturers lose their volume and price leverage for the inputs… as a result, they may have to pay more for parts and materials that they continue to buy from suppliers" (Ellram and Billington, 2001, p. 15)*

This risk must be correctly managed to avoid losing purchasing leverage when outsourcing activities to external sources (Ellram and Billington, 2001).

Supplier appropriation is linked to the risk of ending up in a situation where the supplier can raise prices (Walker, 1988). One example of this would be if the supplier applies "*loss-leader tactics*" because of the strategic opportunity that arises from the buyer's outsourcing (Lonsdale and Cox, 1997; Lonsdale, 2001). This would imply that a supplier intentionally or unintentionally (e.g. by inadequate cost-calculations) during a competitive bidding will offer too low a price. Later, this supplier will need to raise the prices to the buyer, who could now be in an inflexible contractual relationship. Here, the buyer needs to consider how prices will be lowered if the supplier intends to perform the same activity in similar ways, e.g. can the supplier offer better economies of scale or a lower cost structure (Greaver, 1999; Abrahamsson et al., 2003).

Alexander and Young (1996) state that even though an external source may be more cost efficient it is not certain that any such cost savings will be passed on to the outsourcing company. Even worse is if the supplier uses lock-in effects caused by the outsourcing to further increase prices (Alexander and Young, 1996). Another risk related to dependency is outsourcing is lacking supplier performance. Outsourcing often means extending the supply

chain by one or several links of suppliers, i.e. stretching the supply chain. This means that supply reliability or quality problems at one stage can cause multiple problems for a company later in the supply chain (Beattie, 2005).

What can be seen is that the supplier related risks of outsourcing very much relates to the risk of increased dependency (also cf. Lonsdale, 1999; 2001).

> *"There are a number of ways in which dependency can emerge: outsourcing into a limited supply market, poor internal alignment, and contractual incompetence in the face of different degrees of asset specificity" Lonsdale (1999, p. 179)*

In line with this, Lonsdale and Cox (1997, p. 34) make the assumption "…*that managers will think twice before outsourcing into a supply market containing only one, or very few, feasible suppliers*". McIvor (2005) says that the number of suppliers is the most important analysis area when considering supply market risks. If there is not a competitive supply market a company should only outsource if internal governance is impractical (Lonsdale, 1999). In line with this, Abrahamsson et al. (2003) emphasise that if there is a no developed supplier market and only one available supplier there would be a small chance that an external supplier would be able to perform the activity better and in a more efficient way than the outsourcing party. Therefore, Lonsdale and Cox as well as Abrahamsson et al state that there is a need for a well developed supplier market when outsourcing. The risks of losing control of the supplier appear larger when there are only a few suppliers available and this augments the danger that suppliers will act opportunistically (cf. Williamson, 1979; Williamson, 1985). Together with bounded rationality this would increase the uncertainty and increase the hazards in the contracting process. Here, a main risk can be seen as increased dependency (cf. Lonsdale, 1999). Linked to the issues is the reversibility of the outsourcing decision that a firm needs to consider. Supplier risks will complicate the outsourcing and are likely to impede the initialisation of outsourcing programs.

2.4 Outsourcing from a Supplier Side

This section starts with defining outsourcing from the supplier side. Secondly, the supplier strategy will be considered as a basis for the analysis of key factors to be addressed from a supplier side, which is addressed finally.

2.4.1 Defining Outsourcing from a Supplier Perspective

As seen earlier in section 2.1, outsourcing can be defined as transferring an activity from internal governance to external control. In this sense, outsourcing can be considered as vertical disintegration of an internal activity that will instead be acquired from an external source (Wasner, 1999; Gilley and Rasheed, 2000; Harland et al., 2005). For the upstream supplier taking over the outsourced activities this implies downstream vertical integration in the supply chain[6]. Heavy outsourcing where firms apply "me too" strategies have resulted in a new sub-sector: contract manufacturing where new firms have developed (Harland et al., 2005). Harrigan (1985, p. 398) says that: *"...vertical integration is a way of increasing a firm's value-added margins for a particular chain of processing from ultraraw materials to ultimate consumers*".

Vertical integration refers to the division of activities between a firm and its supplier and customer (Porter, 2004) and encompasses both forward (i.e. downstream) and backward (i.e. upstream) integration (Porter, 1998; Lonsdale and Cox, 2000). In a simplified way upstream integration can be considered as a rather defensive move to reduce costs or lower appropriation risk while forward integration can be considered a more offensive move to improve market position (Hayes and Wheelwright, 1984). A broadly integrated firm can be seen as an entity performing many upstream or downstream activities in-house and firms performing few can be considered as a firm narrowly integrated (Harrigan, 1984, p. 641).

Vertical integration is sometimes defined more in terms of owning upstream or downstream companies that are totally physically interconnected. Harrigan (1984; 1985) argues that such view where this means 100% owned operations to supply 100% of a firm's need, is outmoded. However, forward integration in literature often takes the starting point from moving towards distribution to absorb the distributor's margin (see e.g. Hayes and Wheelwright, 1984; Barnes and Sinclair, 1985; Cohen and Sinclair, 1992). In this thesis vertical integration is instead considered in terms of expanding the firm's boundary by handling a customer's outsourced activities. Bain (1968) relates to such vertical integration by vertical growth/extension via integration of succeeding productive processes. For such strategy, Scherer and Ross give a useful definition:

> *"Firms integrating downstream, or forward, move towards further finishing of semifabricated products" (1990, p. 94)*

From an outsourcing perspective, a similar definition for vertical integration can be found in the recently published book by McIvor (2005, p. 7), where the author refers to vertical integration as the level of ownership of activities either backward or forward towards the customer or end user of the product or service. Hayes and Wheelwright (1984) argue that

[6] Porter also uses the term value system.

vertical integration will enable a firm to increase the value added component that can help such firm to achieve higher control over costs, selling prices and profitability.

A customer outsourcing some component manufacturing where the supplier is considering taking over this manufacturing and going from supplying raw material commodities to a component manufacturer in terms of forward integration, can in this context be defined as a value-adding strategy (vidareförädlingsstrategi), which is a term used in the context studied (cf. Nord, 2005). Thus, outsourcing to a supplier means that the outsourcer lets the supplier take a larger responsibility for the value-adding (i.e. moving some of the value-adding activities to an external supplier that now delivers more added-value products in comparison with delivering raw material commodities). From a vertical integration perspective, Vesey (1978) gives an understanding of this:

> *"Simply stated, vertical integration is a measure of the amount of value which is added to a product by a particular business. For example, if raw material is brought into a manufacturing business at a cost of one dollar, and the subsequent processing and distribution operations add and additional cost of two dollars to the raw material (by direct labour, overhead, selling and administrative costs etc.) then the amount of value added to the product is two dollars" (p. 11)*

With the starting point from forward integration and moving downstream, Nord (2005) uses a similar logic when discussing value-adding strategies for sawmills. The above discussion is also in line with Roos et al. (2001, p. 190) that in a sawmill context, argue that such strategy has included: "*…several measures, such as faster and more exact lengths according to customer needs, planning, extra drying, production of engineered wood*" (see also Roos et al., 1999; 2002). It is interesting that a raw material supplier starting to make components by taking over outsourced activities may mean entering a new business area, i.e. needing to be able to handle the manufacturing of components. This is in line with Porter (1998), which considers downstream or upstream vertical integration a special but common case of a general strategic option to enter a new business. Such integration can mean a need for developing new capabilities (Hayes and Wheelwrigh, 1984).

2.4.2 A Supplier Strategy when Taking over Outsourcing

For a supplier it can be critical for their survival to adapt to the current environment in terms of providing the capabilities that their customers want (Janicki, 2001). Discussing the concept of supply strategy and with a reference to Normann (1984), Harland et al (2005) state that a continuous challenge for firms is to find new ways of adding value by either improving performance or augmenting the product offer.

The Role, Resources and Position of a Supplier

A supplier's development is affected by their relationship to the end-product manufacturer (vertical dimension) and horizontal influence from other suppliers (Lilliecreutz, 1996). In the vertical dimension the buyer will, by their conditions and demands, change the relationship between the buyer and supplier. Here, for a buyer dominated relationship, a supplier strategy means to adjust to the buying company's situation, and the buyer may also require the supplier to develop independent strategies (Lilliecreutz, 1996). The concept of a supplier strategy is multi-faceted and similar to outsourcing; the term is often defined by the user (Ibid.). In his dissertation, Lilliecreutz (1996) states that a supplier strategy consists of three main components: vertical position, role and base of resources, see figure 2-6.

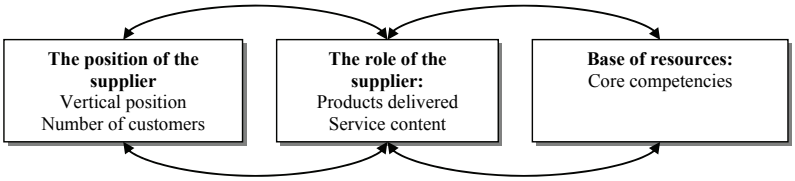

Figure 2-6. Three main dimensions in a supplier strategy (Lilliecreutz, 1996, p. 57)

The supplier's position in the supply chain decides the function of the supplier. The possibility for the supplier to change and develop is mainly linked to the needs of the buyer and what resources the supplier can offer. A change of the resource base of the buyer, according to Lilliecreutz (1996), enables a change of the supplier's position and role. One possible way for the supplier to develop is in fact that the buyer changes the degree of the vertical integration (Lilliecreutz, 1996). Here, outsourcing can be seen as an opportunity for the supplier:

> *"Reduced vertical integration by means of, for example, outsourcing increases the opportunities for a supplier to take on added responsibility for product development, production testing etc. Outsourcing can lead to altered dependences, where the buyer increases his dependence on the supplier" (Lilliecreutz, 1996, p. 269)*

Thus by outsourcing, the role of supplier (in terms of products and service delivered) and the position in the value chain will be changed and the supplier's resource base is also required to change (Lilliecreutz, 1996). To handle this and to create sustainable strategy there could be a need to achieve cost efficiency but also create a unique position (cf. Abrahamsson and Brege, 1995). This subject is discussed in terms of creating operational effectiveness below.

Creating Operational Effectiveness

Sawmills often focus on volume output and high yield in their manufacturing of sawn timber (Nord, 2005). According to Porter (1996), just offering high operational effectiveness is not enough to create a competitive advantage. When it is too easy for competitors to imitate it, he sees it as necessary but not enough. In this sense, Porter considers operational effectiveness almost as a commodity that can be bought on the market and available for competitors. According to Porter, a strategy should instead involve the creation of unique position, which compared to competitors includes performing different activities. By this Porter (1996) defines that "…*operational effectiveness means performing similar activities better than rivals perform them… strategic positioning means performing different activities… or performing similar activities in different ways*" (p 62). Thereby, a company must choose what activities they will perform. The important issue regardless of the strategic positioning is choosing activities that are different from competitors (Porter, 1996). By this the supplier can create differentiation and a unique position. Thereby, strategic positioning requires trade-offs, where the strategic choice for the firm is to decide what to do and not to do. Here competitive advantage will arise through fit between activities and not by solely focusing on increasing operational effectiveness or focusing alone on core competencies (Porter, 1996). In this sense a firm will likely have a better chance of creating a sustainable competitive advantage if it creates a difference that can be kept.

According to Abrahamsson and Brege (2004), the system of activities that Porter (1996) states will create sustainable distinctive strategy, overlooks operational aspects. The authors suggest that Porter, in his article from 1996, miss the importance of the linkage between strategic positioning and operational effectiveness (OE), thus, considering operational effectiveness as

a given and viewing strategic positioning and operational effectiveness as autonomous strategies. Instead, operational effectiveness should work as a platform for supporting the positioning strategy, where a company must manage the interaction between these two areas (Abrahamsson and Brege, 2004). Wrong focus will lead to sub-optimisation, where companies become efficient in marketing/sales and/or operations but a main problem is that activities within these areas are performed independently from one another (Abrahamsson and Brege, 2004). Instead the challenge is to combine operational effectiveness in all their processes that can support a well developed strategic positioning, where there needs to be continuous interaction between marketing and operational strategies (e.g. logistics). The convergence and divergence of the authors are summarised in table 2-4.

Table 2-4. Two views of creating a competitive advantage

Author:	**What is emphasised:**	**Why is it important:**	**How:**
Porter (1996)	Competitive advantage arise by fit between activities	OE is almost seen as given	Create a unique position
Abrahamsson and Brege (2004)	Manage the interaction between the strategic position and operational platform	Operational aspects link with supporting the strategic position	Combine operational excellence with market leadership

Arguments in line with Abrahamsson and Brege (2004), could already be found in 1969, Skinner says that the link between the operational side (as manufacturing) and corporate strategy is very strategic important. He states that different marketing strategies (i.e. the position strategy) will result in different requirements of manufacturing (i.e. the operational side). For example a low-price manufacturer of wood furniture will require different demands on the operational side in comparison to a high-priced, high-style furniture manufacturer. The purpose of manufacturing, according to Skinner, is to serve the company and to achieve a sustainable profit and growth. However, in short: "*manufacturing affects corporate strategy, and corporate strategy affects manufacturing*" and it is too easy to only say that low costs and high efficiency should be key manufacturing objective (Skinner, 1969, p. 137).

A company that achieves an interaction between marketing position and operational effectiveness while at the same time has a system perspective of the organisation can create a platform for dynamic effectiveness, which Abrahamsson and Brege define as "… *how fast and well a company can go from one strategic position and productivity frontier to another*" (p. 21). Here, achieving dynamic effectiveness can be illustrated as the firm moves closer toward a productivity frontier. Companies developing a dynamic effectiveness have succeeded with the challenge of combining a well working operational platform with market leadership to create higher profitability and long-term growth than their competitors (Ibid.). A critical element is to successfully manage the interaction between marketing strategies and operations, which reinforce each other. Based on this Abrahamsson and Brege (2004) present a model where the different states can be identified and positioned (see table 2-5).

Table 2-5. Considering different company's state on the basis of strategic vs. operational and dynamic vs. static (Adaptation bases on: Abrahamsson and Brege, 2004, p. 23)

State:	**Optimisation**	**Rationalisation**	**Positioning**	**Dynamic**
Focus:	Operational and positioning under a static interface	Operational capabilities (operational focus)	Strategic capabilities (strategic focus)	Operational excellence with market leadership
Characteristics:	Rationalisation and positioning are statically integrated=> static situation with little flexibility	Production oriented => focus on productivity and low operating costs => limited by strategic resistance	Sales oriented => working for segmentation and marketing strategies => operational resistance	Rationalisation and positioning reinforce each other => change a natural part of the business environment => strategic flexibility/ repetitiveness
Outcome:	Static effectiveness	Operational effectiveness	Strategic effectiveness	Dynamic effectiveness
Business environment:	Static ← → Dynamic			

As seen in table 2-5, the authors have combined the two dimensions of operational/strategic and dynamic/static. For the rationalisation and positioning state there is a risk of operational and strategic resistance, which is related to the issue of sub-optimisation where one unit is working for operational effectiveness while the other is working for strategic positioning yet as they were independent units. By having a dynamic approach a firm can create opportunities for long-term superior growth and better profitability than competitors positioning in other corners in the model.

Supplier's Influencing Ability

Customers should be considered as key strategic resources of the business, and the business's cores skills should therefore be defined by the customers, not by factories or products (Webster, 1992). Here, Webster (1992) and Anderson and Narus (1991) emphasise the importance of customer relationship and to shift the role of marketing from transaction focus to buyer-seller relationship focus. Creating well working relationships is also important for the outsourcing part. A company that decides to use an external source instead of in-house manufacturer must, according to Lamming (1993), assure collaboration to guarantee added value. Here, the author says that in an automotive context vehicle assemblers and component manufacturers have always had important relationships, where the introduction of new concepts, for example, lean production has required these relationships to be developed further.

When many suppliers need to work with just a few main customers, well working long-term relationships are critical (Ford et al., 2003). This will mean closer collaboration between the supplier and customer. Authors with another theoretical frame of reference in comparison with transaction cost theory, argue that a supplier and customer will develop relationships in terms of bonds, ties and links (see Johanson and Mattsson, 1987; Ford et al., 2003). In this sense the flow of products between two products is more than just a flow of products. This is a different perspective, where the socioeconomic bond is important to lower uncertainty,

where firms are expected to invest in the relationships with other firms to create long-term relationships and mutual trust (IMP-Group, 1982; Johanson and Mattsson, 1987). Here, the relation between the buyer and seller on an industrial market is considered more complex and long-term (Ford,1980; IMP-Group, 1982). From this perspective, the long-term goal for a supplier is to make profits by selling products or services at a price that exceeds the costs (Håkansson et al., 1976). To handle this and at the same time create supplier-customer relationships, a supplier can take advantage of the customers' uncertainties and develop an influencing ability.

Håkansson et al (1976) state that customer companies are focusing on avoiding uncertainties and try to manage three types of uncertainties: need, market and transaction uncertainty. Market uncertainty refers to sourcing alternatives in terms of heterogeneity of possible suppliers and how these change over time (Håkansson et al., 1976; Ford et al., 2003). Transaction uncertainty refers to problems in getting the products. This can be because the customer does not trust the supplier, which results in a need for parallel suppliers or the need to concentrate on developing closer relationships with a supplier (Ford et al., 2003). Non-standard products will lead to more transaction uncertainty (Håkansson et al., 1976). Finally, need uncertainty implies that the customer does not know the exact need or requirements (e.g. need for material) (Ibid.). Need uncertainty will likely lead to closer relationships with already existing suppliers (Ford et al., 2003).

A supplier has two main strategic options to take advantage of the customer's different uncertainties: (1) increase the customer's need or market uncertainty (e.g. increase need uncertainty by advocating that a purchase is much more complex than it is in reality), and (2) influence a customer by offering its abilities. (Ford et al., 2003) By this, a supplier must offer a solving ability to satisfy the customers need and a transfer ability to transfer the solution (Håkansson et al., 1976; Ford et al., 2003). While high transfer ability will influence customers with high transaction uncertainty, problem solving ability will influence customers with high need or market uncertainty (Ford et al., 2003). A supplier can have different roles towards the customers, which can be divided depending on these two main dimensions. Here, the supplier could be better than its competitors by either being generally superior in some aspects or have a better ability to adapt (i.e. adaptability) to the buying company's demands (Hammarkvist et al., 1982.p 32). Based on these two dimensions the supplier's role is depending on the problem solving and transfer ability, which can be divided into different supplier positioning possibilities (p. 31-32, free translation), see figure 2-7:

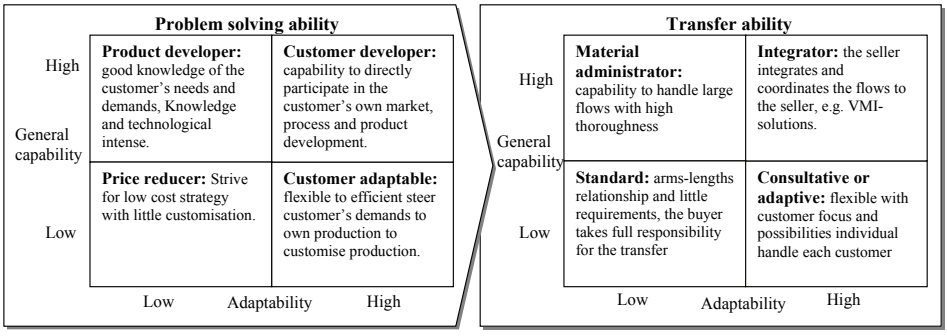

Figure 2-7. The supplier's problem solving and transfer ability as a market positioning strategies (Adapted from: Hammarkvist et al., 1982, p 31, free translation).

If the supplier attains a high problem solving ability it can satisfy and find solutions to its customer's demands and needs (Hammarkvist et al., 1982). High transfer ability means that the selling company has an ability to transfer the problem solving to its customers. Thus, depending on these factors the supplier will have different roles in a buyer-seller relationship. By this the supplier can also strive for combining the problem solving and transfer ability when considering to vertically integrate downstream towards an outsourcing customer to make an interesting offer (Hammarkvist et al., 1982). This is in line with Lilliecreutz's (1996) model of supplier strategy where a supplier could likely attain different roles based on products delivered and the service content. While developing problem solving capability can require high investments in sales and customer support, transfer ability can raise high investment costs to ensure a well working logistical platform (Ford et al., 2003).

Augmenting the Product Offer

While firms' products are becoming comparatively equal in attributes, added services and extended product offers become critical to assure long-term customer relationship and competitiveness (see e.g. Christopher and McDonald, 1995); especially in industrial selling where more and more products are offered together with supplementary elements of services (Lovelock and Wright, 2002). Additionally, when taking over outsourcing this is interesting. Here, a company integrating forward can improve differentiation by augmenting the offering and providing services to customers (Porter, 1998). Lilliecreutz (1996) in his dissertation points out that a change in the buyer's surroundings increase focus on purchasing systems from the external suppliers. He also indicates that a reduced vertical integration in terms of outsourcing may increase the possibility for a supplier to attain a role as a system supplier. This means altered dependency where the customer increases its dependency to the supplier (Lilliecreutz, 1996). Similar arguments are raised by Butterworth (1996), which shows that clear trends in an automotive context has increased outsourcing in combination with requirements on supplier reduction and demand for systems (first-tier suppliers become the system provider). To take the above into consideration, the concept of system selling will be discussed below.

Mattsson (1973) was one of the first, from a market strategy perspective, to advocate system selling during the beginning of the 1970s (Günter and Bonaccorsi, 1996; Azimont et al., 1998). With system selling he suggests that product differentiation and barriers to entry into the market can be created, where *"... the seller provides through a combination of products and services a fulfilment of a more extended customer need that is the case in product selling*" (Mattsson, 1973, p. 108). Here, he emphasises that system selling does not include delivering unique specially made systems to each customer. Instead, systems should mainly include standardised components but it may include some adjustment of the system to each specific customer. Therefore, successful systems should be based upon standardised sets of service components and defined by the supplier (Hannaford, 1976; Mattsson, 1973).

It must be assured that extended services can be priced and not performed for free by the supplier (Hannaford, 1976; Anderson and Narus, 1995). In addition, when the system is design by the supplier the services offered in the system selling are costs of the customer, it can be a challenge for the supplier to achieve customer acceptance (Harland, 1976). Linked to this is an important aspect, system selling firms should not define its business in terms of production technology or products attributes, instead the firm's business should be defined by its customers (Mattsson, 1973). Even though a common consensus of defining system selling as a package of product and service attributes can be observed, a difference of opinion of what system selling intentions can be noted: (1) performs a complex function for the customer

(Hannaford, 1976; Dunn and Thomas, 1986), (2) more team selling as a consultative role to advise customers (Donaldson, 1988; Mullin, 1997), (3) offers a packaged solution to a problem for customers (Mattsson, 1973; Kotler et al, 2001). These views are related to the concept of solutions selling that more and more is addressed in more recently published literature.

Miller et al (2002) suggest that solution selling is driven by declining margins and powerful customers willing to outsource and focus more resources on their core competencies. In line with system selling, Johansson et al (2003) suggest that solution selling in its broadest content is a combination of products and services that add value beyond the sum of its parts. However, more specific, Azimont et al (1998) distinguishes solution selling from system selling and suggests that solution selling can be considered as an extension of system selling to a broader context including a dimension of consultative role where these suppliers increasingly become service companies. Along similar lines, Johansson et al (2003) suggest that solution selling has a certain level of expertise and higher level of technical integration and customisation than only bundles of products and services. Nonetheless, similar with system selling, the concept of solution selling has been noted as a way for firms to maintain margins when their products alone are not enough, and is based on finding a solution to the customers problem or latent need (Foote et al., 2001; Miller, 2002; Johansson et al., 2003). As can be seen, system selling is closely related to solutions selling and can often be discussed somewhat equally. Table 2-6 gives an overview of the similarities and differences between product, system and solution selling.

Table 2-6. Similarities and differences between product offers, system and solution selling (with and industrial selling focus) (Adaptation from Bonaccorsi et al, 1996; Hannaford, 1976; Mattsson, 1973; 1982; 1986; Hammarkvist et al., 1982; Bansard et al, 1993; Millman, 1996; Mullins, 1997; Azimont et al, 1998; Galbraith, 2002; Miller et al, 2002)

	Product Offers	**System Selling**	**Solution Selling**
Characteristics of object:	Single product offers	Standardised product-service package that add value beyond the sum of the parts	Product-service package customised to a problem or latent need that add value beyond the sum of the parts
Offer:	Product	Product and services	Product, services and consultative support
Supplier role:	Flexible	Bundling based on customer's need	Supplier has a consultative role/ high expertise
Focal point:	Product offered	Customer needs, with respect to its production	Customer's latent need or problem (customer-centric)
Supplier's know-how about customer:	Varied degree	Extended	Deeper know-how about latent needs
Buying situation:	Decentralised straight rebuy	Centralised, new task	Centralised and more problem solving
Value of single order	Often low ⟷		Often higher
Purchasing function:	Transaction ⟷		Relational/overseeing
Delivery:	Single products or related families of items (sometimes using intermediary)	Including maintenance, repair and operating	Flexible but often with a consultative dimension and direct channel
Financial/warehousing responsibility:	Often buyers' responsibility	Often suppliers' responsibility (e.g. VMI)	Flexible
Price and costs:	Price as focal point often from pricelists	Improving total cost situation	Improving total costs situation
Technical integration	Low ⟷		High
Heterogeneity:	Low	Medium-high	High
Distribution power:	Customer ⟷		Buyer
Time perspective:	Short-term, caution and risk for distrust	Flexible	Flexible
Success factors for seller:	Often price competitive focus	System design by seller/ standardised components	Seller as consultative role and vision of solution/ latent need
Consultative role:	Low ⟷		High

What can be seen is that creating a product-service package can help to change the traditional roles between suppliers and customers and thereby increasing suppliers' distribution channel power (Hannaford, 1976; Bansard et al, 1993). It is not certain that such situations can be created when only selling products. In this sense system selling relates to solution selling, where the focus shifts from transaction to relationship to add extended value to their customers. However, the degree of customisation, technical integration, expertise and consultative role of the seller seems somewhat dividing these two approaches.

2.4.3 Key Factors Addressed from a Supplier Side

This section will specifically focus on looking at the analysis of outsourcing from a supplier perspective, with the following structure: 1) focus areas for taking over outsourcing, 2) potential cost advantages, 3) business related risks to see what risks arise when taking over outsourcing.

2.4.3.1 Focus Areas for Taking over Outsourcing

Studies of the Swedish automotive industry, including producers and first tier suppliers, note that tough competition (e.g. due to overcapacity) does not necessarily make it more profitable to be a car manufacturer than being an upstream contract supplier of components (Brandes et al., 2005). In general, contract manufacturing in terms of taking over outsourced activities has been on the move the last years; according to a McKinsey analysis this segment has had a ~40% compound annual growth rate for sales from 1995-2000 and from the year 1996-2001 a ~35% total returns to shareholders (Auguste et al., 2002, p. 56). A study by Dun and Bradstreet illustrates that providers of operational services (e.g. provision of extra manufacturing capacity, management of data centres and movement of inventory and goods) took in more than $1 trillion around the world in 2000 (Auguste et al., 2002, p. 53). This shows, according to Auguste et al (2002) that being the provider to an outsourcing company may not necessarily be glamorous but definitely lucrative.

For a supplier considering applying forward integration to take over a customer's outsourcing of business it is important to consider offering something different from the current customer's production (Greaver, 1999; Auguste et al., 2002; Abrahamsson et al., 2003). Otherwise, such forward integration will only result in performing the same activities in the same way as their customers, which will not significantly render any cost savings (Auguste et al., 2002; Abrahamsson et al., 2003). Porter (1998) argues that forward integration makes it especially possible to improve the ability to differentiate the product by controlling more critical elements of the production process.

> *"The basic idea of integration… is to increase value added to provide a basis for differentiation that was unavailable or difficult in the unintegrated unit. In increasing product differentiation, the firm may at the same time increase mobility barriers as well" (Porter, 1998, p. 315)*

Similarly, Harrigan (1984) states that integration can provide opportunities to create product differentiation in terms of increased value added. Applying forward integration can help the company differentiate itself even though the products provided are not superior to that of competitors (Porter, 1998). From a study of forest product firms, Barnes and Sinclair (1985) argue that vertical integration in terms of distribution towards a building material market provides a good management tool for improving the strategic, operating profit margins and financial situation (e.g. return on assets).

Companies that have succeeded with taking over routine operational services, including the provision of extra manufacturing capacity, have according to Auguste et al (2002) handled three main issues successfully:

1. defined the boundaries of activities handled to achieve economies of scale (e.g. decide whether to carry out only a particular activity or handle a whole function of the customer's business),

2. found a suitable pricing strategy, and

3. minimised the customisation to enable economies of scale (e.g. by offering a standardised customisation or a modular set of services).

Thus, achieving economies of scale is a major issue to manage and also to do something different in comparison with the customer. Porter (1998) argues that competitors making widespread integration will tie up many desirable customers. According to Porter this might mean that companies need to defend against foreclosure even though this might mean entering new business areas. In his book about competitive strategy Porter further discusses these issues from a more proactive perspective. Porter (1998) says that a downstream integration helps the company to access distribution channels and also helps to remove possible bargaining power that exists in the channel. Porter even argues that its pays for a company to integrate downstream even if the only saving that will be made is raising price realisations possibilities. At the same time, downstream integration would reduce some uncertainty in the demand flow (Porter, 1998). Barriers to enter will be created if significant economies of scale or capital requirements are needed to integrate (Porter, 1998). In the same lines as Porter, Hayes and Wheelwright (1984, p. 286) state that the main two reasons that firms are attracted to vertical integration are either to increase profit margin or improve control over some part of their business environment. We can see that integration causes lock-in effects that can be beneficial for the provider in terms of reducing possible bargaining power of customers (Porter, 1998), and even shift the power in favour of the supplier (Stuckey and White, 1993; Lonsdale and Cox, 1997; Cox et al., 2003).

2.4.3.2 Cost Advantages when Taking over Outsourcing

Offering cost advantages by forward integration can be defined as economies of integration (Porter, 1998). These cost advantages will be discussed in terms of: (1) economies of scale, (2) economies of combined operations and (3) economies internal control, information and relationships. In addition, economies of scope as well as offering lower factor costs are addressed in this section.

Economies of Scale

Previous studies have shown that economies of scale to reduce costs can especially provide a strong motivation for initialising outsourcing (see e.g. Brück, 1995; Brandes et al., 1997; Bragg, 1998; Greaver, 1999; Cachon and Harker, 2002). A company with the largest capacity will have a cost advantage, which can be considered as economies of scale (Porter, 1998). In line with this, Vesey (1978) argues that vertical integration helps productivity by developing economies of scale. A supplier should not underestimate the economies of scale to be able to reach levels of value that their customers could not reach on their own (Porter, 1998).

Economies of scale are related to a firm's ability to lower the long-run unit cost by operating with larger and larger plants (Bain, 1965; 1968; Scherer, 1975; Chandler and Hikino, 1990). With larger plants or even multiple plants the efficiency can increase and up to a certain point the unit costs can consequently be lowered more and more (Bain, 1968). Chandler and Hikino (1990, p. 17) define economies of scale as: "…. *those that result when the increased size of a single operating unit producing or distributing a single product reduces the unit cost of production or distribution*". In line with this, the benefits of forward integration depend on volume of products to guarantee economies of scale (Porter, 1998). There are several reasons for reducing the unit costs that is enabled by increasing the plant size: (1) specialisation, (2) better possibility to distribute the total costs over larger number of units, (3) lowering purchasing and shipping costs by buying and sending larger volumes (Bain, 1965; Silberston, 1972; Scherer, 1975; Haynes and Wheelwright, 1984). Specialisation is linked to the

possibility for a plant with its workers to become more skilled in performing their operations and in this way create a superior experience and enhance productivity and lower unit cost (Haldi and Whitcomb, 1967; Haynes and Wheelwright, 1984; Christopher, 1994; Bengtsson and Skärvad, 2001).

Large-scale investments and specialised production for economies of scale will mean standardised products in order to actually be able to lower unit costs (Brege, 1979). By this, economies of scale are related to lowering cost by longer run-lengths in the production and avoiding too many changeovers and long run-in time (Haynes and Wheelwright, 1984). Economies of scale can be linked to the collective pooling effects from several customers, that Williamson (1979) claims make market governance favourable if transaction costs are disregarded (see also Chandler and Hikino, 1990). But the increase of plant size will only offer lower unit costs to a certain point (Bain, 1965; 1968). Here, Bain states that the optimal plant size will be between an interval (a minimum and a maximum):

> *"…in general, the size of the plant influences cost and efficiency… Larger plants will result in lower costs up to some critical scale of plant, so that there is some minimal scale of plant which will be more efficient than any smaller plants. But further increases in the size of plant beyond this minimum optimal scale will not result in further increases in efficiency" (Bain, 1968, p. 167)*

Likewise Haynes and Wheelwright (1984) argue that economies of scale can increase other costs such as distribution (e.g. increased transportation costs due to ship output to a larger geographic area) and management/coordination costs. Economies of scale can also result in increased risks due to a single plant being more vulnerable to operational failure, strikes or even natural disasters (Haynes and Wheelwright, 1984). According to Verdin and Williamson (1994, p. 82), a main point to harvest the benefits of a large scale is to operate it in an efficient way:

> *"…this means access to relevant process experience. I also need to be able to sell the mass output of such plant. This may require assets such as access to distribution channels or the consumer brand franchise necessary to overcome customer risk aversion and search cost. Exploiting the benefits of even a relatively straightforward driver like scale is therefore apt to require the services of a complex bundle of tangible and intangible assets as a prerequisite"*

Without the economies of scale there is a large risk that the supplier provides the activities at the same costs as their customers, resulting in a lose-to-lose situation (Auguste et al., 2002). Thus, a supplier needs to extend its services to a number of customers to ensure that costs can be lowered for both parts, otherwise the risk is that the supplier:

> *"…will hit a wall, for eventually individual customers are likely to bring the streamlined activity back in-house and to manage it just as effectively as a specialist would" (Auguste et al., 2002, p. 57)*

Economies of Combined Operations

In the long run, economies of scale are not alone enough for these providers to maintain their advantage over their customers; Auguste et al (2002) argue that these providers must also realise economies of skill, which encompass providers by which their specialisation achieve "*…the focus needed to identify areas that are susceptible to improvements and the knowledge needed to act successfully on that awareness*" (p. 55). This reasoning can also be linked to economies of combined operations.

For a supplier, cost savings can be made by improvements in the production and handling process. Porter (1998) defines this in terms of economies of combined operations, where a firm combining operations together can gain improved efficiency. According to Porter this includes improved production process, reduced handling and transportation costs (e.g. by locating facilities in close proximity to each other).

> *"In the classic case of the hot rolling of steel, the steel billet need not be reheated if the steelmaking and rolling operations are integrated. Metal may not have to be treated with a finish to prevent oxidation before the next operation: slacks input such as the capacity of particular machines can be used on both processes. Facilities can be located in close proximity to each other, as is the case with many large sulphuric acid users (fertilizer companies, oil companies) who have established backward integration into sulphuric acid production. This step eliminates transportation costs, which are substantial for a hazardous and difficult to handle product like sulphuric acid" (Porter, 1998, p. 303)*

Similarly, Silberston (1972) and Harrigan (1984) state that integration economies will arise by linking operations together, e.g. eliminating operation steps. Bain (1968, p. 177) also acknowledge this and argues that economies of integration are especially apparent "*in cases where technologically complementary productive processes can be brought together in a single plant*". In a pulp industry context, one of the most primary strategic benefits with forward integration is the possibility to lower costs by combining operations in pulp and paper production (Rundh, 1992).

Economies of Internal Control, Information and Relationships

Porter (1998) says that forward integration will lead to cost benefits because of more stable relationships which will enable the company to develop more efficient and specialised procedures for dealing with the customer. He refers to this as economies of relationships and this can include specialised logistical systems and special packaging, for example. This is especially relevant for downstream integration:

> *"Stability of the relationship will allow the upstream unit to tune its products (in quality, specifications, etc.) to the exact requirements of the downstream unit" (Porter, 1998, p. 305)*

Here, the great advantage is that the upstream and downstream unit can plan better with a lower risk of interruptions and changes in customers. Porter (1998) argues that this can be especially important for capital intensive companies, for example industries such as petroleum, steel, and aluminium. Comparably, Hayes and Wheelwright (1984) argue that closer contracts will lead to better forecasts that will help to enable longer runs (i.e. better possibilities for economies of scale) and smooth production flow. By this, unnecessary overtime can be avoided with faster and more reliable feedback (Hayes and Wheelwright, 1984).

Another justification for downstream integration can be the easy access to information; Porter argues that this kind of integration improves the ability of the company to access market

information that can help the entire supply chain function more effectively. Examples of economies of information are getting timely information on the size of the demand and reducing costs for collecting information about the market, which is enabled by easier predicting supply and demand when working close with some customers.

Porter (1998) argues that vertical integration will offer economies of internal control and coordination. The underlying rationale for this is due to the costs of scheduling and coordinating operations, and responding to emergencies are likely to be lower if the firm is integrated (Porter, 1998, p. 303). For example, by locating the integrated units in close proximity, costs for coordination and control can be lowered. This would be in line with transaction cost theory where transaction costs will be lower if a transaction is handled by an internal organisation (see e.g. Williamson, 1979; Rindfleisch and Heide, 1997).

Porter (1998) and Bain (1968) also say that vertical integration can enable "economies of avoiding the market", where costs can be reduced by not having any sales force. Thus, no marketing or purchasing department are needed, therefore the most expenses for sales can be eliminated. However, such economies seem less applicable for a forward integrating supplier going from supplying sawn timber to a component strategy. This is when such supplier is likely to still need a sales/market department to manage customers and also find new customers to further improve economies of scale by increasing volume throughput.

Economies of Scope

While economies of scale refers to increasing the size of a single operating unit to increase throughput and reduce unit costs, economies of scope results in lowering unit costs from using processes for a single operating unit to produce more than one product (Panzar and Willig, 1981; Bailey and Friedlaender, 1982; Chandler and Hikino, 1990). Chandler and Hikino (1990) state that economies of scope in production can bring significant cost reductions for a company. This can be done by joint production of a number of different products based on the same raw material with the same production unit.

> *"The increase in the number of products made simultaneously in the same factory reduced the unit costs of each individual product" (Chandler and Hikino, 1990, p. 24)*

The opportunity for economies of scope can be considered as the opportunity to exploit excess capacity (Panzar and Willig, 1981). Economies of scale can be combined with scope. Bailey and Friedlaender (1982) argue that technology development, such as robotics, will provide the flexibility to combine scope with high volume for archiving economies of scale (see also Abrahamsson and Brege, 1995). In terms of producing quite standardised components a supplier would be able to reap the benefits of both economies of scale and scope (Bailey and Friedlaender, 1982). One critical aspect seems to be the combination of the high volume throughput required for economies of scale with the need for being flexible enough to handle different type of components for economies of scope (cf. Abrahamsson and Brege, 1995).

Example of Four Possible Basic Supplier Strategies

For a supplier with a strategic intent to take over outsourced activities it is important to capture values that their customers failed to do (Auguste et al., 2002; Abrahamsson et al., 2003). If a supplier is considering taking over outsourced activities from only one customer it seems less likely that any economies of scale can be achieved in comparison with the outsourcing customers (cf. Auguste et al., 2002). Here, just transferring a component manufacturing to a supplier will result in a similar scale, and the supplier may even be required to make some up-front investments to handle the production (Porter, 1998). Thus, the more customers a supplier can find that outsource the same type of component manufacturing, the higher economies of scale seems possible to be enabled. In line with this, a critical way to create costs savings by scale is to assure efficient capacity utilisation (Brege, 1979; Verdin and Williamson, 1994; Chandler and Hikino, 1990; Porter, 1998). Altogether, this makes throughput and capacity two very important factors for determining the costs and profits (Chandler and Hikino, 1990).

In an outsourcing context, costs can of course be reduced in other ways than economies of integration. A supplier can, for example, have better cost structure by lowering factor costs in terms of lower labour costs or raw material costs (e.g. outsourcing to an offshore-low-cost supplier). Brück (1995) states that the cost advantages by lowering labour costs can be so large that other in-house advantages are insignificant in comparison. An increase in factor costs such as labour, energy or raw material make globalisation more beneficial in terms of the production and distribution configuration (Kanter et al., 1990; Porter, 1998; 1996). A cost advantage strategy can provide entry barriers and help the company to handle tough competition (Bain, 1965; Porter, 1998).

Based on the above discussion and the previously discussed supplier strategy approach (see section 2.4.2), this section refers to the question of how a supplier can take over outsourced activities. This is addressed from the starting point of: (1) a cost advantage on outsourcing taken over and (2) adding additional value and differentiation elements by offering something different/new to the item taken over. Four different example supplier strategies for handling outsourced activities can be identified, see figure 2-8.

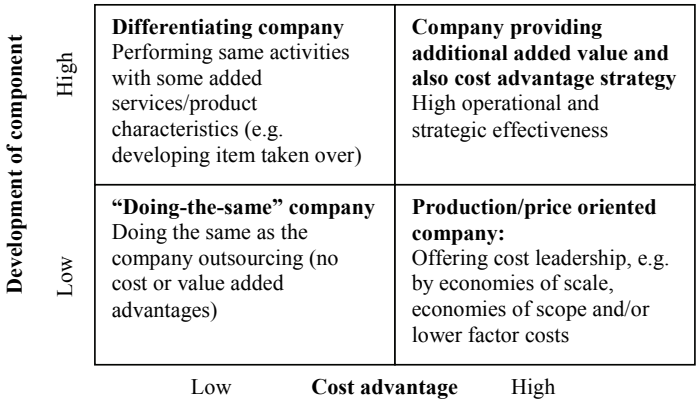

Figure 2-8. Example of supplier strategies for handling an outsourced component manufacturing

A doing-the-same company. If no cost or value added advantage can be offered by the supplier (i.e. *low, low*), the risk is that such outsourcing only results in performing the same activities in the same way as the customer has done. This will likely not significantly create any cost savings and could as well be handled by the outsourcing company or competitors (cf. Auguste et al., 2002). Such strategy will likely neither create entry barriers nor long-term sustainable competitive advantage (cf. Porter, 1998). Thus, defining the boundaries of the customer's business that will be taken over too narrowly, will only result in doing the same job that their customers did. What is needed is, for example, to change the manufacturing process significantly to realise cost savings (Abrahamsson et al., 2003).

A production/price orientated company. Providing the same component as the outsourcing company but at a lower cost can be considered as a cost leadership strategy (i.e. *high, low*). This will be enabled by cost advantage, for example by economies of scale (cf. Bain, 1968; Scherer, 1975; Chandler and Hikino, 1990; Porter, 1998) or lower factor costs (cf. Brück, 1995). A company characterised by high focus on cost advantages and lower prices can be considered to be a production oriented company (Brege, 1979). Such company striving for cost advantage by economies of scale will likely need to offer somewhat standardised products (Brege, 1979; Porter, 1998).

A differentiating company. Providing additional value added differentiation activities but not necessarily any cost advantages (i.e. *low, high*), would be a company that in addition to providing the component, which previously was handled by the outsourcing company, also adds some product/service characteristics (cf. e.g. Mattsson, 1973; Hannaford, 1976; Anderson and Narus, 1995).

Company providing additional added value and also cost advantage strategy. When taking over outsourcing delivering, for example, an upgraded product/additional services but also a cost advantage (i.e. *high, high*) can provide entry barriers by high strategic and operational effectiveness. The challenge is of course to combine operational effectiveness with a sustainable differentiating strategy to assure higher profitability and long-term growth than their competitors (cf. Abrahamsson and Brege, 2004). Here, the operational effectiveness should work as a platform for supporting the companies' positioning strategy. A single focus on economies of scale may not be the right strategy to assure sustainable profit and growth. From this viewpoint operational effectiveness in terms of cost advantages can be considered as necessary but not sufficient (Porter, 1996). To provide entry barriers from competitors the company may be needed to create unique position strategy by performing different activities than their competitors (cf. Porter, 1996). However, companies must not overlook operational aspects as supporting the strategic position (Abrahamsson and Brege, 2004).

2.4.3.3 Risks when Taking over Outsourcing

Taking over outsourced activities may require the supplier to rethink outdated competencies and build new competencies to handle the new tasks. In relation to the need of changing the resource-base there could be a need for the supplier to analyse the existing and potential product portfolio (Lilliecreutz, 1996). For a supplier used to supplying wood commodities that also starts making components by taking over outsourced activities, this may mean entering a new business area, i.e. the need to be able to handle the manufacturing of components (cf. Porter, 1998). Such strategy may very well require the supplier to develop new capabilities. A challenge many companies miss.

> *"All too often a firm's real, though unstated, justification for integrating vertically is the belief that it can manage other business better than can its current managers. While this is sometimes true, particularly if the firm is very successful in some similar activities, vertical integration often requires a company to undertake activities that are very different from those it is accustomed to. Thus, vertical integration usually requires developing superior management skills in a new area, not simply applying existing skills" (Hayes and Wheelwright, 1984, p. 305)*

Moving to new business areas, a company that is considering investments in its skills or products must, according to Klein and Hiscocks (1994, p. 201), analyse three main issues: (1) identify products that the organisation can nearly make, (2) identify what skill shortfalls exist if these products are to be manufactured, and (3) identify new products that could be manufactured if present skills where further enhanced or new skills were to be added. These three issues can be illustrated in a matrix, see figure 2-9.

Existing skills	**Current products produced**	**Latent products:** Products which could be produced with the existing skillbase
Potential skills	**New Processes:** Existing products using new technologies and developed skills	**Incremental products**: Products which could be produced with additional skills
	Existing products	Potential products

Figure 2-9. A matrix for skillbase simulation (Klein and Hiscocks, 1994, p. 202)

Some examples of strategic risks seen when taking over outsourcing concern: (1) entry costs (e.g. overcoming economies of scale and capital requirements as a mobility barrier), (2) flexibility, and (3) ability to manage the integrated firm (see Porter, 1998; Augustson, 1998). In line with this, Porter argues that vertical integration increases the proportion of a firm's fixed costs, which means that such costs must also be borne during market downturns. Based on this, Porter (1998) says that integration increases operating leverages. This means increased business risks in terms of sensitivity for cyclical swings in the customers' demand. Related to this is also an investment risk due to the reduced flexibility when integrating forward. For example, large investments in new machines can fast become inferior because of technology change (Porter, 1998). To decide whether to vertically integrate or not Porter (1998) argues that the returns from such integration must be greater or equal to the firm's opportunity costs of capital.

> *"If its capital needs are likely to be great relative to the ability of the firm to raise funds, the need to reinvest funds in the integrated unit can drain capital needed elsewhere in the company" (Porter, 1998, p. 311)*

Another investment risk is if the forward integration does not yield any entry barriers. If economies of scale or capital requirements are not significant the compulsion to be integrated will have little competitive significance to create entry and mobility barriers (Porter, 1998, p. 308). Porter (1998, p. 322) argues that there are some common misperceptions regarding the benefits about vertical integration:

- A strong market position in one stage can automatically be extended to adjacent business.
    - It is not certain that market power can be extended to create a strong position in the adjacent market. This can mainly be done if the integration per se can produce some tangible benefits that can enable the transfer of the market position.
- It is more beneficial to integrate into a competitive business.
    - Such business areas are often experiencing low returns and high competitive pressure to improve quality and services for customers. At the same time there are a number of competing firms.
- Vertical integration can save a strategically sick business.
    - Porter says that a main consideration is that each stage of the vertical change must be strategically sound. Otherwise, there is a risk that the "sickness" will spread to other healthy units.
- Experience in one part of the vertical chain automatically qualifies for downstream or upstream vertical integration.
    - Here, Porter argues that management's false sense of security by the proximity of the business can lead to destruction of the new upstream or downstream business. This risk occurs if a company applies historical managerial approaches when entering a new business area (Porter, 1998).

We can see from above discussion that a vertical integration strategy has several risks, which often seem related to financial, competence or cost considerations (see also below table 2-7).

Table 2-7. Example risks in terms of taking over outsourced activities (Adaptation based on: Hayes and Wheelwright, 1984; Stuckey and White, 1993; Klein and Hiscocks, 1994; Lilliecreutz, 1996; Porter, 1998; Auguste et al., 2002)

Example risk:	**What does it imply when considering taking over outsourcing:**
Too high fixed cost	Costs must be bear whether the market is on high peak or downturn
Investment risks	Take over customer's investment needs. Investment in technology can fast become obsolete. Investments made may not create any entry barriers. Many available suppliers=> low switching costs for a customer.
Wrong competencies (e.g. capability to manage the outsourced manufacturing)	Historical competencies cannot be applied in new business areas. Experience of one type of manufacturing => not necessarily qualifies further integration (cf. Porter, 1998).
Not being able to capture the value that customers failed to do	Performing similar activities in similar ways as their customers did => will not likely significantly realise any cost savings and/or differentiation.

The above table 2-7 illustrates the increased risks of not creating enough cost advantage when taking over outsourcing, which can make it more difficult to succeed with the intended forward integration. Porter (2004, p. 55) states that whether integration will yield cost advantage or improved differentiation depends on: "…*the firm and the activity involved*".

2.5 Summary and Development of Analysis Model

In this section the theoretical framework chapter will be summarised and an analysis model will be developed. The structure is based on the research questions of the thesis (see figure 2-10), starting with addressing the driving forces of outsourcing.

Figure 2-10. The three research questions as the basis for the structure of the section

2.5.1 Driving Forces for Outsourcing

As discussed in section 2.2 outsourcing offers many potential benefits and there are several previously argued driving forces for outsourcing, which based on the literature review can be divided into five analysis areas, see table 2-8 (also cf. Andersson et al., 2007).

Table 2-8. Five analysis areas for studying the driving forces for outsourcing[7]

	Cost Reduction	**Financial Motives**	**Operation and Capacity Constraints**	**Utilisation of External Capabilities**	**Focus on Core Competence**
Why:	Overall cost reduction	Reducing fixed costs/handling investment risks and improving the use of financial resources	Improving operational flexibility	Exploit external sources, learn from suppliers (finding the best of the breed) and increase product diversity etc.	Improve returns on in-house resources (better focus) and create competitive barriers
What does it imply:	Cut internal costs and also outsource to external sources that have comparative cost advantages	Ease the balance-sheet and improve financial performance	Cope with operation or capacity constraints not justified by costly investments	Access outside sources' competence or technology advantages difficult or costly to attain in-house	Improve focus of resources to develop core competencies
How:	Select supplier with economies of scale, better cost structure by lower factor costs or higher productivity etc.	Convert fixed costs into variable, downsize the organisation and avoid investments	Let external supplier handle operational overload or bottlenecks (e.g. supplier excess capacity)	Choose an outsourcing partner with comparative competence/ technology advantages	Outsource non-core activities and concentrate on core activities

[7] Compilation based on: Blaxill and Hout (1991), Davis (1992), Bettis et al. (1992), Venkatesan (1992), Welch and Nayak (1992), Harrison and Kelly (1993), Quinn and Hilmer, 1994; Brück (1995), Fine and Whitney (1995), Rothery and Robertson (1995), Hendry (1995), Deavers (1997), Jennings (1997), McIvor et al. (1997), Bragg (1998), Greaver (1999), Wasner (1999), Quinn (1999; 2000); Cánez et al. (2000), Fill and Visser (2000), Gilley and Rasheed (2000), McIvor (2000), Linder (2004), McIvor (2005), Carlsson and Lind (2005).

The five analysis areas in above table 2-8 can be linked to transaction cost theory and resource-based theory and be positioned between these two theoretical perspectives, see figure 2-11.

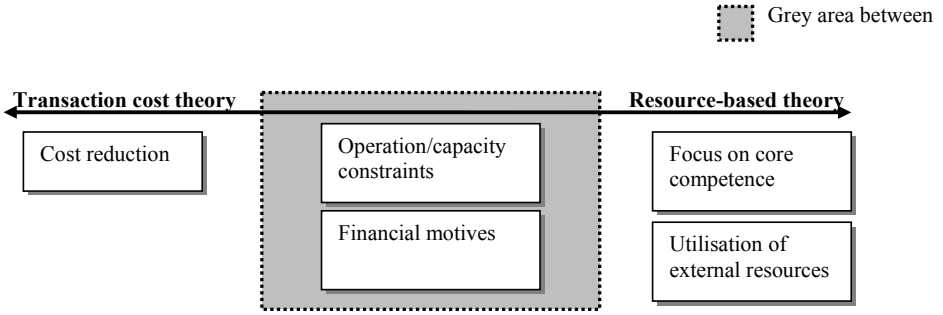

Figure 2-11. Driving forces for outsourcing and their linkage to theoretical perspective

As a start it can be seen that cost reduction motives are linked to transaction cost theory, where outsourcing should theoretically enable access to external sources, which by developing economies of scale and collective pooling effects, will provide lower production costs (cf. Williamson, 1979; 1985; Reve, 1990). On the other hand resource-based theory is more concerned with resource uniqueness, where the resources distinguish a firm from its competitors (Wernerfelt, 1984; Barney, 1991; Penrose, 1995). Here, outsourcing will provide better focus on core competencies and also enable access to external resources (see e.g. Quinn and Hilmer, 1994; Insinga and Werle, 2000; Quinn, 2000), thereby increase competitiveness to create revenues and maximise business profitability.

As seen in the figure 2-11, operation/capacity constraints and financial motives are situated more in a grey area. Here, outsourcing will help to free up more resources for competitive leverage and also avoid investments in activities with little potential for creating competitive advantage, where both can be linked to a core competence approach (cf. Quinn and Hilmer 1994; McIvor, 2005). On the other hand, outsourcing for financial motives as well as operation/capacity constraints can be driven by a willingness to lower overall costs by, for example, using excess supplier capacity (i.e. related to transaction cost theory). Thus, there are arguments for outsourcing from both a cost efficiency perspective based on transaction cost theory, and a resource-based theory perspective based on more resource focus and customer value-adding factors to maximise returns.

2.5.2 Key Factors Addressed when Considering Outsourcing

More models need to be developed to provide managers with support when considering outsourcing (Lonsdale, 1999; Insinga and Werle, 2000; Lonsdale and Cox, 1998; Harland et al, 2005); this has been an issue that has been addressed in section 2.3.

From a starting point of considering the outsourcing decision, literature has previously defined several factors that need to be addressed when outsourcing, to ensure that expected advantages of outsourcing can be materialised and simultaneously keep the risks associated with outsourcing at a low level. However, as seen earlier, outsourcing is not simple and it is not always clear cut whether or not to make or buy (Lonsdale and Cox, 1998). One problem is that firms too often base their outsourcing decision solely on short-term cost improvement and balance sheet management factors, such decisions often lack a long-term strategic view (see section 2.3.4). In addition to that, as illustrated in section 2.3.4, it is important to properly evaluate what should be outsourced and not assume that activities that are considered as problematic can simply be solved by outsourcing (Lonsdale and Cox, 1997; Lonsdale, 1999; McIvor, 2000b; Abrahamsson et al., 2003; McIvor, 2005). Here, there is also a risk that companies consider their core competencies as rather static and only includes existing skills (Lonsdale and Cox, 1997; 1998). This runs a risk of either losing activities that can be critical for long-term competitiveness or decreasing the innovation and cross-functional skills of the corporation leading to diminished market responsiveness (Lonsdale and Cox, 1997; McIvor, 2000a; Doig et al., 2001; Beattie, 2005; McIvor, 2005).

The outsourcing decision can be considered on different levels where the choice of the unit of analysis differs. As previously discussed, outsourcing decisions on the premises of core competencies can be made on both an activity and technology level to leverage competitiveness and outsource non-core (see section 2.3.1 and 2.3.2). However, the outsourcing decision can just as well be considered on a component level (section 2.3.3). What distinguishes this from addressing the outsourcing decision on an activity or technology level is that a component should not be considered as a core competence. Nevertheless, the manufacturing of the component could be considered as a core competence and a component can be a major determinant for competitive advantage and therefore not suitable for outsourcing to an external party. These three approaches converge by all benchmarking capability in relation to external parties and by assessing the potential for acquiring a competitive advantage (cf. Welch and Nayak, 1992; Venkatesan, 1992; Quinn and Hilmer, 1994; McIvor et al., 1997; Insinga and Werle, 2000; McIvor, 2005). Accompanying outsourcing are also intrinsic risks such as inadequate cost analysis, a lack of supplier performance or lock-in risk and there could also be a power-shift in favour of the supplier (e.g. Lonsdale and Cox, 1997; Lonsdale, 1999; Abrahamsson et al., 2003; McIvor, 2005; Bengtsson, 2005). As illustrated in section 2.3.4, supplier related risks are often more or less related to dependency.

Based on the review of literature, the key factors addressed when a customer considers outsourcing in a context of the WPM sector will be analysed by looking at three main analysis areas (also cf. Lonsdale, 1999; McIvor, 2000a; 2005), see table 2-9.

Table 2-9. Three main areas for companies to analyse when considering outsourcing[8]

Area:	Focus areas – component importance	Capability Benchmarking	Supplier related risks
Why:	Understanding determinants for competitive advantage and focus areas for outsourcing (core vs. non-core)	Making the cost analysis and benchmarking competitiveness in relation to external parties	Outsourcing increases dependency resulting in supplier related risks, which needs to be addressed
What does it imply:	Analysing competitive driving priorities and the risk of outsourcing problematic activities	Capability benchmarking related to cost and non-cost (e.g. quality, delivery, experience and service) factors	Analysing risks related to supplier dependency
How:	Revise the basis of sustainable competitiveness and not just consider problematic things as non-core	Benchmark and look at the internal cost calculation reasoning and capability aspects	Evaluate both day-to-day and more long-term supplier related risks

The success of the outsourcing will be dependent on how managers address the above issues, which require thorough *ex-ante* consideration (cf. Lonsdale, 1999; McIvor, 2005).

2.5.3 Outsourcing from a Supplier Side

The strategic decision to take over some outsourced component manufacturing can be considered as a case of forward integration. However, discussing forward integration, the literature often takes the starting point from a firm that manufactures a complete product, where forward integration evolves moving towards distribution to absorb the distributor's margin (see e.g. Hayes and Wheelwright, 1984). Instead, this thesis considers forward integration from a raw material manufacturer that also intends to become a component producer by taking over outsourcing. Taking over outsourced activities will affect the role and position of the company and may also require a new base of resources (Lilliecreutz, 1996). As Lilliecreutz emphasises, in a buying dominating context, the possibility for the supplier to change and develop is mainly linked to the needs of the buyer and what resources the supplier can offer. A supplier supplying raw material starting to make components by taking over outsourced activities may result in entering a new business area (cf. Porter, 1998). This will require new competencies and a supplier should not assume that existing skills can just be applied in new business areas (Hayes and Wheelwright, 1984; Lilliecreutz, 1996).

[8] Compilation based on: Welch and Nayak (1992); Venkatesan (1992); Quinn and Hilmer (1994); Turner and Crawford (1994); Fine and Whitney (1995); Sink et al. (1996); Lonsdale and Cox (1997); Insinga and Werle (2000); McIvor (1997; 2000a; 2000b; 2005); Gilley and Rasheed (2000); Cánez et al (2000); Arnold (2000); Lakenan et al. (2001); Doig et al. (2001); Lonsdale (1999; 2001); Abrahamsson et al. (2003); Berggren and Bengtsson (2004); Gottfredson et al. (2005); Bengtsson (2005)

As discussed in section 2.4.3, there are several different ways to create cost advantage when considering taking over outsourced activities, which are mainly linked to economies of integration (see table 2-10) (Porter, 1998).

Table 2-10. Cost advantage possibilities for a supplier considering taking over outsourced manufacturing[9]

What	Why	How
Economies of scale	Lower long-run cost by scale advantages	Larger scale than customers
Economies of combined operations	Reduce cost by improving the production or handling process	Eliminating operation steps
Economies of relationships and information (external)	Stable relationships will enable reduction of cost by better forecast and planning	Develop well working relationships to fine tune the production
Economies of internal control (internal)	Reduce costs of scheduling and coordinating operations will be lower for an integrated firm	For example, coordinate with "new" unit by location
Economies of scope	Multiple types of outsourced items and using the same production process to reduce costs (i.e. broad product assortment)	Exploit excess capacity
Lower factor cost	For example, lower cost for labour or raw material	Low-cost-country sourcing or automated production

Cost advantages can also arise by a supplier having lower factor costs; especially in terms of labour costs that Brück (1995) argues can be so large that other cost advantages can be insignificant. It is not certain that just offering high operational effectiveness is enough. Such narrowly defined strategy can be too easy for competitors to imitate (Porter, 1996). For a supplier looking to take over outsourced activities, it is necessary to create a somewhat unique position that will provide entry-barriers and differentiation (e.g. Ibid). As seen in section 2.4.2 the challenge is combining operational effectiveness with a well developed strategic positioning strategy. A company achieving this can create a platform for dynamic effectiveness, which will assure higher profitability and longer long-term growth than their competitors (Abrahamsson and Brege, 2004).

[9] Compilation based on: Bain (1965); Verdin and Williamson Silberston (1972); Scherer (1975); Panzar and Willig (1981); Bailey and Friedlaender (1982); Hayes and Wheelwright (1984); Harrigan (1984); Chandler and Hikino (1990); Abrahamsson and Brege (1995); Porter (1998)

Based on the review of literature, the key factors addressed when a supplier considers to take over outsourcing in a context of the WPM sector will be analysed by looking at three main analysis areas (also cf. Lonsdale, 1999; McIvor, 2000a; 2005), see table 2-11.

Table 2-11. Three main areas for companies to analyse when considering taking over outsourcing[10]

Area:	**Focus areas for value-adding**	**Capability benchmarking**	**Business related risks**
Why:	Understanding the outsourcing intended to be taken over and why	Understanding potential comparative advantages in comparison with the customer	Looking into the risk of going from supplying raw material to taking over outsourcing
What does it imply:	Analysing the downstream or upstream movement	Capability benchmarking related to cost and non-cost (e.g. quality, delivery, experience and service) factors	Analysing dependency, competence base considerations as well as the risk of not capturing the expected values
How:	Assessing the areas in focus	Benchmark and look at the internal cost calculation reasoning and capability aspects	Assessing the challenges of taking over outsourcing

Here, the supplier must first consider what products and services should be delivered to create differentiation and fulfil customer needs (i.e. linked to the expected outcome of taking over the outsourcing). They also must see what prerequisites there are for a supplier to handle outsourced activities (cf. Lilliecreutz, 1996). In a buyer-supplier relation, Cox (2004) is particularly concerned with the likely sustainability of mechanisms such as economies of scale, switching costs and with the costs that a supplier must incur in maintaining these mechanisms.

[10] Compilation based on: Brege (1979); Hayes and Wheelwright (1984); Klein and Hiscocks (1994) Lilliecreutz (1996); Porter (1996; 1998); Augustson (1998); Greaver (1999); Abrahamsson et al. (2003); Stuckey and White (2003); Abrahamsson and Brege (2004).

2.5.4 Development of an Analysis Model

This section will link the specific context studied with the theoretical framework to create an analysis model. With help from my review of literature, I have been able to create three analysis areas that can be used to answer the research question formulated, see table 2-12.

Table 2-12. Linkage of research questions with respective analysis area

Research question	**Analysis areas**	**Reference table**
RQ1: Driving forces for outsourcing	Five theoretical driving forces: (1) cost reduction, (2) financial motives, (3) operations/capacity constraints, (4) utilisation of external capabilities and (5) focus on core competence	Table 2-8
RQ2: Key factors addressed when considering outsourcing	(1) focus areas for outsourcing - component importance, (2) capability benchmarking and (3) supplier related risks	Table 2-9
RQ3: Outsourcing from a supplier side	(1) focus area for value-adding, (2) capability benchmarking and (3) business related risks	Table 2-11

The research questions and analysis areas are discussed below and linked to the context, to finally form an analysis model.

RQ1: Driving forces for outsourcing

The driving forces for WPM firms outsourcing will be analysed with the help of the five analysis areas developed. In comparison to other industries such as IT, telecom and automotive (cf. Augustson, 1998; Lonsdale and Cox, 1998; 2000; McIvor, 2005), there is as of today no developed sector to manage outsourced component manufacturing for WPM firms. Under such circumstances, Abrahamsson et al. (2003) and Lonsdale and Cox (1997) argue that there would only be a small chance that an external supplier would even be able to perform the activity better and in a more efficient way than the outsourcing party. This is an interesting starting point, especially when access to external sources' competencies is a major driving force in previous studies (see e.g. Rothery and Robertson, 1995; Deaver, 1997; Linder, 2004). With these considerations it will be interesting to see how the driving forces in WPM sector will relate to theoretical driving forces derived from studies in other industrial settings.

RQ2: Key Factors Addressed

Key strategic and operational factors that are addressed when WPM firms consider outsourcing, will be analysed by looking at three main areas: (1) focus areas for outsourcing - component importance, (2) capability benchmarking and (3) supplier related risks.

The focus areas for outsourcing will be addressed by looking at if the components considered for outsourcing by the WPM companies are in line with the literature's view. By this I mean if they consider the focus to be on core activities and to outsource other non-core activities in order to decide what to outsource (see Venkatesan, 1992; Quinn and Hilmer, 1994; Jennings, 1997; McIvor et al., 1997; Fill and Visser, 2000; McIvor, 2000a). At the same time, there is a risk of outsourcing problematic activities that in fact can contribute to the WPM firms' competitive advantage, which needs to be addressed (cf. Lonsdale and Cox, 1997; McIvor, 2000a; Doig et al., 2001; Beattie, 2005; McIvor, 2005).

When considering outsourcing, the capability in comparison with external sources should also be evaluated (e.g. Spekman, 1988; Venkatesan, 1992; McIvor et al., 1997; Jennings, 1997; Insinga and Werle, 2000; McIvor, 2000a; 2005). This will be considered by analysing cost and non-cost factors (cf. McIvor, 2005). Here, cost benchmarking will refer to the analysis of cost reductions needed to initialise outsourcing and the WPM firms' view of suppliers' cost advantage possibilities (mostly studied in the two in-depth case studies). The capability analysis also includes the costs that are considered and the case studies' reasoning regarding cost calculations when outsourcing (see McIvor et al., 1997; McIvor 2005); thus, analyses how the cost analysis is approached and also compares in-house capability with externals'. Altogether, this is in line with McIvor (2000a; 2005), who argues that a critical step in the outsourcing analysis is to benchmark the in-house capability with suppliers' along a number of selected measurements.

While cost benchmarking will help the company to understand the type of advantage, understanding of how the advantage is created will help to decide the source of advantage (McIvor, 2005, pp. 146-148). If one does not understand how to approach internal cost analysis, there is a risk of misleading outsourcing decisions (McIvor et al., 1997). However, just staring blindly at cost reductions can have negative effects on the company (Blaxill and Hout, 1991; Welch and Nayak, 1992; Bettis et al., 1992; Rammohan, 2004). In a larger survey of Swedish industry companies it was concluded that most companies' expectations on cost reduction when outsourcing had not been materialised (see Bengtsson et al, 2005). This illustrates the importance of making sure that costs really can be reduced when outsourcing, thus not overestimating the potential saving but also considering supplier related risks (cf. Quinn and Hilmer, 1994; Berggren and Bengtsson, 2004; McIvor, 2005).

Non-cost benchmarking includes the suppliers' competence position from a customer perspective (e.g. quality, delivery, experience and service) (cf. McIvor, 2005). Referring to the context, the WPM firms have traditionally been raw material focused and fairly integrated by managing most manufacturing activities in-house. At the same time, suppliers from the primary wood industry have traditionally supplied sawn timber considered as raw material commodities. This means that is it not necessary that a long-term experience of component manufacturing is developed at the supplier. The lack of a developed supplier market can cause challenges to finding capability advantages (cf. Quinn and Hilmer, 1994; Abrahamsson, et al., 2003), which is also linked to increased supplier related risks (Lonsdale and Cox, 1997; Lonsdale, 1999).

The supplier related risks can arise because of the inability of the supplier to manage the outsourcing taken over (Lonsdale, 1999; Abrahamsson et al., 2003; McIvor, 2005). More specifically, supplier related risks will analyse the increased dependency that could arise if they were to outsource to a supplier market with little experience and few developed suppliers. In this context there is not necessarily any given outsourcing partner, and few available suppliers can put the outsourcing in a vulnerable situation with the risk of supplier appropriation (Walker, 1988; Lonsdale, 1999). Therefore both the supplier competencies and substitutability of components outsourced, need to be addressed. This is also linked to the importance of analysing the number of available suppliers on the market (cf. Lonsdale and Cox, 1997; McIvor, 2005).

RQ3: Outsourcing from a Supplier Side

Similar to the customer perspective, the focus areas and capability will be analysed from a supplier side. The focus areas for the value-adding (i.e. the outsourcing intended to be taken over) are linked to the position in the supply chain and the need for deciding the suitable level of integration. As a result, finding a suitable competitive situation and define the boundaries of activities handled (cf. Lilliecreutz, 1996; Augustson, 1998; Auguste et al., 2002) and by this create a position that guarantees profitability (cf. Porter, 1996). This includes also deciding what type of products should be delivered (cf. Lilliecreutz, 1996) and if more service elements should be added (see e.g. Hannaford, 1976; Mattsson, 1973; 1982; 1986).

In the literature, one main motive of initiating outsourcing is to lower costs. At the same time a main argument for forward integration is to enable some kind of cost advantage (Porter, 1998). To create necessary cost advantages, sawmills may need to consider certain mechanisms (e.g. economies of scale and/or competencies, ability to learn) and the long-term sustainability of those (cf. e.g. Lilliecreutz, 1996; Augustson, 1998; Auguste et al., 2002). This can be considered as the supplier's capability to perform an activity in comparison with the outsourcing company. This will be especially interesting when studying suppliers that traditionally only have delivered products considered as raw material by the WPM firms. Here, a challenge can be to capture the value the customers failed to do (cf. Auguste et al., 2002). The supplier cannot neglect their own resource base and must evaluate which competencies are needed and should not assume that traditional competencies can just be applied in a new type of business area (Haynes and Wheelwright, 1984; Lilliecreutz, 1996; Porter, 1998). Thus, a customer that moves towards an outsourcing strategy, affects the current suppliers that would be required to change their resource base (otherwise they will likely not remain as a supplier) (cf. Lilliecreutz, 1996). Forward integration not only increases the internal value-adding it also more or less increases the proportion of a firm's fixed costs that must be borne during market downturns, which means increased dependency risks (Porter, 1998).

The Analysis Model

With the starting point from the three research questions formulated and the above discussion, an analysis model can be compiled to support the upcoming analysis, see figure 2-12.

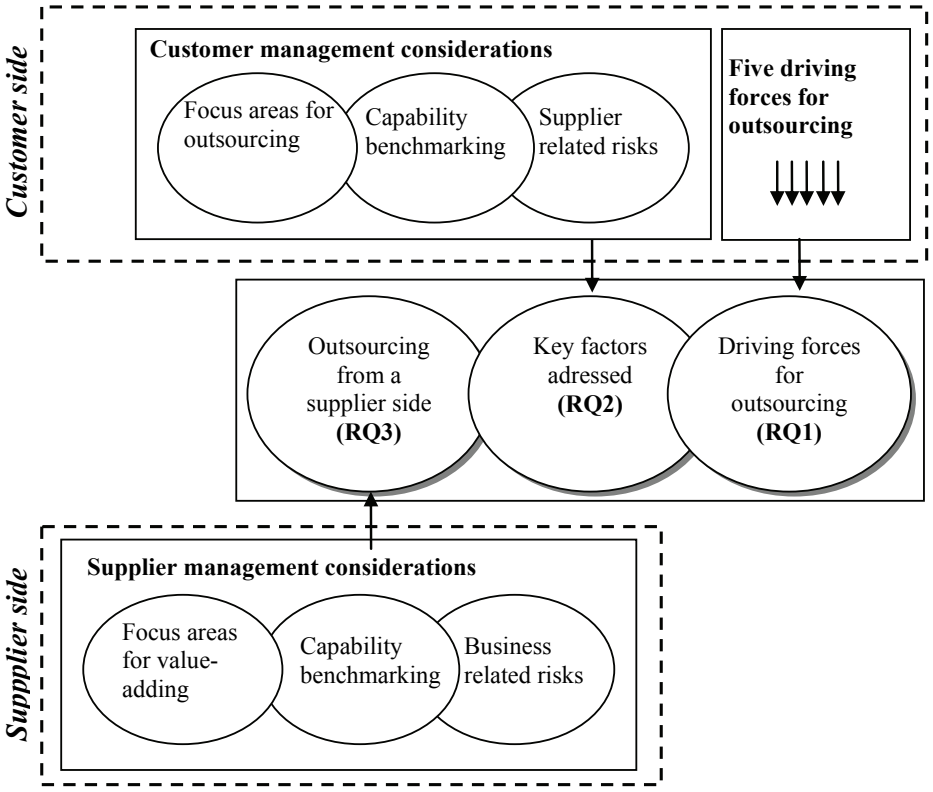

Figure 2-12. The analysis model[11]

With the help of this analysis model it can, for example, be investigated if there are enough prerequisites for WPM firms studied to move from an in-house governance to outsourcing. At the same time study if the stated need for sawmills to increase their value-adding by integrating forward to start manufacturing more value added products can be fulfilled.

[11] The overlap of in each analysis element in figure 2-12 is intended to illustrate that it is not always easy to separate them apart. In line with this McIvor et al (1997) argue that it will always be some kind overlap for firms when conducting the outsourcing analysis.

3 Research Methodology

In this chapter the research methodology is addressed. Firstly, an overview of the research process and strategy is given. Secondly, the chosen research approach is presented. Thirdly, the selection, collection and analysis of data are addressed. Finally, the chapter will end by summarising how I have worked for assuring a high quality of the research.

3.1 The Research Strategy and Process

A way of expressing the research is by looking at my overall research strategy, see figure 3-1.

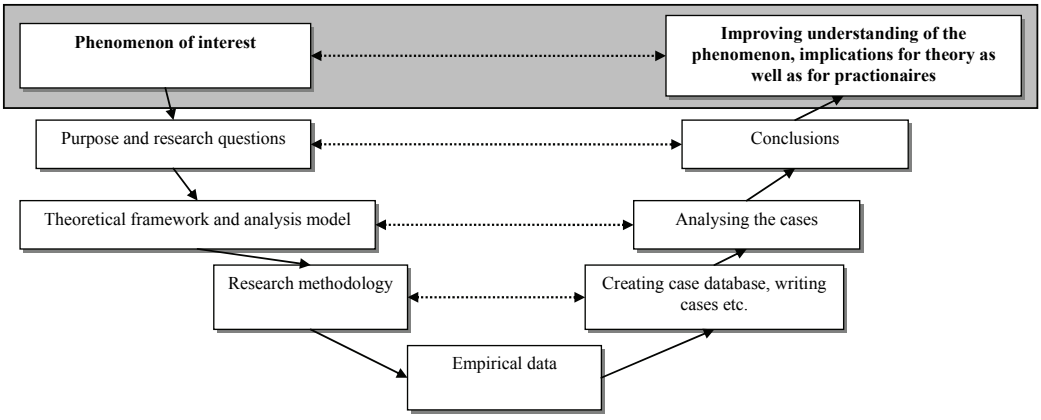

Figure 3-1. Research strategy (Adaptation based on Lekvall and Wahlbin, 2001)

The starting point is the phenomenon of interest, with corresponding purpose and research questions (chapter 1). The theoretical framework with the accompanied analysis model has been used to analyse the cases studied. The research methodology becomes ”*the manual of the thesis*”(Merriam, 1994). The cases have been written on the basis of the collected empirical data. Answering the purpose and research questions refers to the conclusions of the thesis (see chapter 6 and 7). The conclusions are the basis for improving the overall understanding of the phenomenon of interest and the theoretical and practical implications/contributions (cf. Lekvall and Wahlbin, 2001). Here, we can see that different areas/chapters support later chapters (indicated by the dotted double headed arrows in figure 3-1). Capturing the research process of this dissertation is more complex with many parallel activities, see figure 3-2.

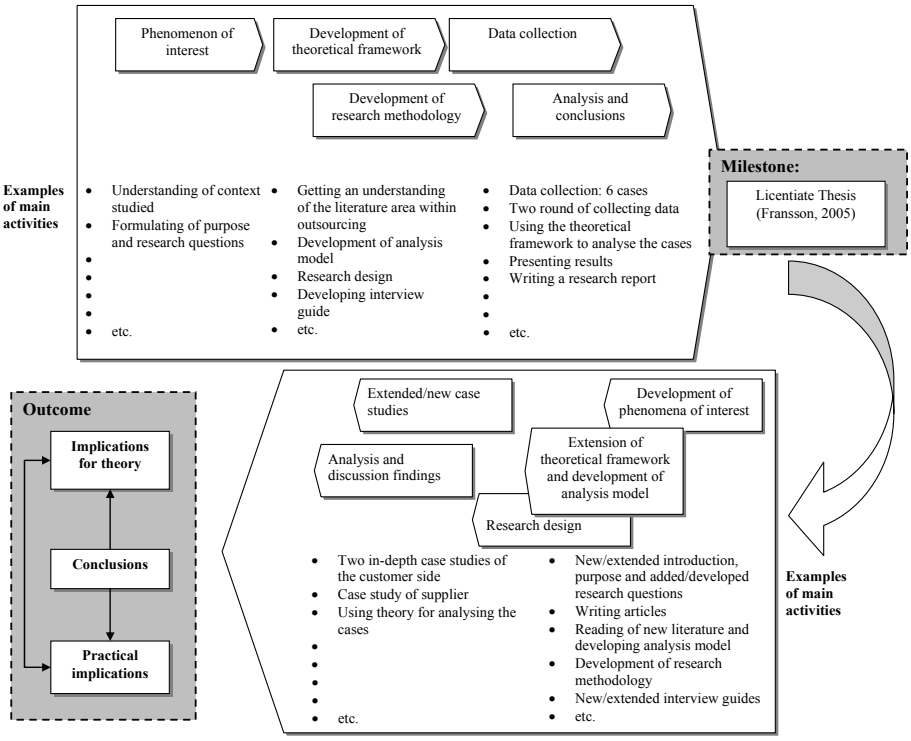

Figure 3-2. The research process

Yin (1989) states that the formulation of research questions is one of the most important steps in the research process. In general I have put a lot of effort and thought work into the development of purpose and research questions. My first milestone was my Licentiate Thesis and two things helped me to get a good start for doing that:

a) In the beginning of my studies as a PhD candidate I took a course in outsourcing, which was a very good introduction for orientating and understanding the literature field.

b) Before starting with this research I wrote my Master's thesis with a close linkage with research conducted at the Marketing Logistics Research Group (see Fransson, 2004). The thesis helped me to better understand the work of research and was like a jumpstart for starting my PhD studies. In my Master's thesis, I studied DIY retailers and builders' merchants and their supplier demands. This gave me improved understanding of the business context (e.g. the retailers studied have suppliers from door, window and floor suppliers as well as suppliers of sawn timber from the primary wood industry).

Following purpose and research questions was the development of the theoretical framework and research methodology. Developing the theoretical framework has been an iterative process in terms of reading and writing and then going back to read more and so on. The data collection included two rounds and parallel analysis, which are discussed in more detail in section 3.4 and 3.5. Halfway through I presented my licentiate thesis (Fransson, 2005). After

this "pit-stop" I started to further develop my research areas. This included adding the supplier side of outsourcing and also a more in-depth study of two of the WPM cases studied, see figure 3-3 (see also further section 3.3 about the selection of case companies).

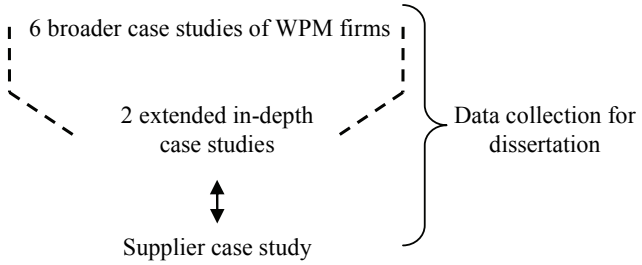

Figure 3-3. Scope of data collection

To be able to do this I extended my theoretical framework by further reading of literature in the field of outsourcing. In addition, a framework for the supplier side has been developed. Parallel with the empirical collection was the start of the analysis of the cases studied, which is discussed in section 3.5. The outcome is the conclusions of this thesis which includes both theoretical and practical contributions. My view is that practical implications also can mean theoretical implications and vice versa (which is symbolised with the double headed arrows in figure 3-2) (also cf. Brehmer, 1999). With the starting point from my work of this thesis, I have together with my supervisors written several articles and two research reports to test, confirm as well as develop the results of my research (see section 3.6 about improving the overall validity).

3.2 Applying a Multiple Case Study Research Strategy

As been noted, this study applies a case study approach for studying both the customer and supplier side in outsourcing. This section will be the introduction to why case study has been chosen and what a case study implies.

Why Case Study and not a Survey Approach?

Greaver (1999, p. 3) claims that there are too many "reasons to outsource surveys floating around", which make case studies more preferable. Case studies can be suitable in the early stages of research for topic areas that have been little researched before and can have a theory building purpose (Eisenhardt, 1989). In addition, a case study approach can provide a new perspective to well researched topics and be very helpful for developing descriptions which are both wide-ranging and deep in character (Eisenhardt, 1989; Bengtsson et al., 1997). By studying outsourcing in a different type of context and also providing a supplier view of outsourcing manufacturing activities, the latter are in line with my research agenda. Looking at my formulation of research questions, the choice of research strategy is also supported by Yin (1989). He states that a case study can be the preferable approach for a thesis with research questions that focus on "what" questions and where such questions are of an exploratory type (see chapter 1 for the formulation of research questions).

A main driver for choosing a case study is the complexity of the outsourcing concept. Studying outsourcing is a multifaceted phenomenon and in many ways a survey approach seems limited, for example: (1) the utilisation of the concept of outsourcing is defined by the user and (2) regarding the driving forces it is necessarily not based on any clear cause and

effect relationship (cf. Greaver, 1999; McIvor, 2005). In this sense, studying outsourcing strategies by a survey study approach could be hazardous due to the risk of respondents misinterpreting the survey questions, e.g. defining outsourcing more as procurement decision and answering questions based on this interpretation. This would make a case study research strategy more suitable, which provides good opportunities to ask follow up questions and let respondents' answers evolve. This allows descriptions with both a width and depth to describe and analyse outsourcing strategies to be developed. Thus, in comparison with a survey approach, a case study seems to offer a better ability for a deeper understanding of the WPM sector and more specifically the WPM firms' recent focus of outsourcing strategies (cf. Eisehardt, 1989).

A case study is also applied for the supplier side where such research approach offers the possibility to link the customer and supplier side, i.e. "study both sides of the same coin". In line with previous arguments, studying value-adding strategies that also are defined by the user could just as well include the risk of misinterpretations, which makes a survey approach somewhat limited. This seems especially important when previous studies have shown that sawmills' definition of value-adding strategies could vary from quite standardised activities (e.g. planning) to extra processing activities for manufacturing components (see e.g. Roos et al, 2002). Therefore, a case study approach seems more suitable for studying the supplier side in outsourcing and a natural extension of when a case study approach is applied for the customer side.

What is a Case Study?

Yin (1989; 2003, p. 13) states that a case study is a comprehensive research strategy that investigates a contemporary phenomenon within its real-life context. In line with my study, the boundary between the phenomenon and context in a case study is not clearly evident (Yin, 1989). Yin says that the strategy for collection and analysing the data inquiry is a situation built on multiple sources where there will be more variables of interest than data points (Eisenhardt, 1989; Yin, 1989). The starting point for collecting data should be findings from previous studies (Yin, 2003). Table 3-1 gives an overview of the main elements of a case study.

Table 3-1. Scope of the case study as an empirical inquiry (Adaptation based on: Yin, 2003, p. 13-14; Eisenhardt, 1989)

Research focus:	**Scope of the case study research strategy:**	**Addressed in section:**	
Investigated study object	Empirical investigation	3.3	Assuring quality of the research: section 3.6
Boundary of study object	Phenomenon and context cannot just be separated	3.3, 3.4	
Scope of data collection	Many different variables and multiple sources of evidence (e.g. can be both qualitative and quantitative)	3.4	
Guiding data collection and analysis	Prior development of analysis model; using the theoretical framework to analyse the cases	3.5	

The scope of a case study as defined by Yin and Eisenhardt is in line with my thesis and the above parts in table 3-1 will be addressed in coming sections. I will start by looking at the selection of case study objects.

3.3 Selection of Case Companies

This is a multiple case study where the primary unit of analysis is the organisation that is studied (Yin, 2003). For a case study, the case companies should be selected for being interesting from theoretical and empirical perspectives rather than to achieve a certain level of representativity, which is often the object of a survey approach (Bengtsson et al., 1997). Similarly, Yin (1989) argues that case studies should not be considered as samples. This has been the starting point in this thesis when selecting the number of cases. Here, I have not looked to create a high statistical significance by selecting as many cases as possible; instead, I have looked for case descriptions where enough breadth and depth could be created to make a contribution to both the theoretical and empirical field.

My research project has been mainly financed by Skogsägarna Norrskog Research Foundation, where the board of the project included company executives from the primary wood industry, university representatives and also a representative from the Invest in Sweden Agency (ISA). The selection of case companies for this thesis has been done on the basis of dialogue with this board. More specifically, the selection has been discussed with the following "outside experts": (1) the CEO of one major supplier of sawn timber to WPM sector, (2) Director in the forest industry and board member in the Foundation (3) the Director of ISA's wood processing business area and (4) a technical consultant with specialisation on wood processing techniques. All these have great knowledge of the context and contributed with good advice in the choice of cases. In addition, the WPM sector has been studied before in two market studies lead by my supervisor (see Brege et al., 2004a; 2004b). Altogether, this has been a helpful guide in the selection of suitable case companies to study.

The starting point for my selection of case companies were the cases studied in my Licentiate Thesis. Here, the intention was to get a broad understanding of outsourcing in the WPM sector by studying several companies. The WPM sector is in general fragmented with many small local/regional players (cf. Brege et al., 2004a; 2004b). Here, the selection needed to be linked to finding companies with big enough for dealing with outsourcing strategies. The intention was to "pick-out" the top two companies in Sweden/Scandinavia in three WPM industries (door, floor and window), see table 3-2.

Table 3-2. Selected case companies

Sub-industry:	**Floor**	**Window**	**Doors**
Case companies:	Kährs	Elitfönster (Inwido)	Vest-Wood
	Tarkett Wood	Svenska Fönster	Dooria Kungsäter

The selected WPM firms are closely related by having the same type of suppliers for their purchase of wood raw material (the primary wood industry) and mainly the same type of first tier customers (e.g. DIY-retailers, builders' merchants, construction companies and modular house manufacturers) (also cf. Fransson and Rehme, 2005). Each sub-industry can be defined by the competition that exists between the companies within the respective industry (cf. Bain, 1968). After discussion with the board about my research project it could be concluded that all companies are good examples of companies in their first step of outsourcing.

While a single case study can be the most suitable choice when having a unique critical case, a multiple case study can make the whole study more robust (Yin, 1989; 2003). However,

even though a multiple case study has the advantage of robustness due to breadth of its empirical material, it may lack depth in a specific outsourcing consideration which a single case study could offer (Eisenhardt,1989; Yin, 1989). To improve the depth of key factors that are addressed when considering outsourcing (e.g. how the cost calculation is done and further discussion on supplier related risks), the case studies have been extended by two in-depth studies (cf. Eisenhardt, 1989). The in-depth studied companies are the window manufacturer Elitfönster and the floor manufacturer Kährs. Both cases are in stages where several thorough outsourcing analyses have been done or are currently being conducted. The selection of two cases is related to the opportunity to find patterns in comparison with a single case study (cf. Eisenhardt, 1989). In addition, the selection was linked to the upcoming study of the supplier side: 1) Kährs has negotiated with the large sawmill company (Norrskog Wood Products) about wood component outsourcing; 2) Elitfönster has outsourced parts of their window blank manufacturing to a larger forest product company.

To understand the supplier side in outsourcing, a supplier case study has been done. The company chosen is Norrskog Wood Products (NWP), which is a large supplier of sawn timber to industrial end-users in the WPM sector. The choice of NWP was rather straightforward due to the outsourcing project together with the floor manufacturer Kährs and the linkage with the research project. Here, there are very interesting possibilities to study the same outsourcing project from both a customer and supplier perspective. Due to the linkage to the research project, the access for interviewing staff at the company has been good.

3.4 Collection of Data

Data collection has been done from spring 2004 until winter of 2006 and in total 48 interviews have been conducted, see table 3-3.

Table 3-3. Time perspective on the data collection (see also appendix 1 for a list of interviewees)

Case study:	**Time period:**	**Number of Interviews:**
Case studies for the licentiate thesis	April-August and October-November (2004)	21
In-depth case studies	September (2005)–February (2006)	14
Supplier case study	February-June (2006)	13

In addition, I have collected complementary information by e-mail and telephone as well as been trying to also use secondary data when available (see appendix 1). The discussion below of collection of data is divided into three main sections: (1) the licentiate thesis, (2) in-depth case studies and (3) the supplier side study. In general the data has been collected with focus on the content of the cases companies' outsourcing strategies not so much on the process side of conducting outsourcing (e.g. I have not studied who made what decision and the internal decision making processes etc.).

Data Collection for the Licentiate Thesis

Data collection for the licentiate thesis was done over two separate rounds. For the first round, outsourcing was approached from a broad perspective, although, outsourcing strategies were still discussed from the case companies' standpoint.

Based on the first round of interviews a research report was composed and an executive summary was also written, and sent to the participating companies. Through this the companies could get feedback from the first round of interviews and these findings were the basis for the upcoming round of interviews. The objective of the second round was to discuss the findings from the first round with the respondents, and when possible, with a wider range of executive managers (e.g. discussion was held with the management groups at Tarkett Wood and Dooria). In this way it could be established if the company agreed or disagreed with the initial findings and on this basis new information could be collected.

The second round also concentrated on discussing key factors addressed when considering outsourcing in more detail based on the findings from the first round of interviews. For example, the discussion included the cost and capability analysis of the supplier and accompanied risks when considering the outsourcing. It also contained more focus on areas for outsourcing and the characteristics of the items considered for outsourcing. This research strategy has several advantages when the cases are analysed (see later discussion in section 3.5). The differences between round 1 and 2 are also transparent in the ways the interviews were carried out. The first round was more semi-structured and open approached compared to the second round which was more structured interviews. In addition, when performing the second round of interviews, the objective was to ensure that breadth and enough depth could be achieved to get data that had a degree of saturation (Leininger, 1994).

The interviewees for the cases were selected with the objective being to get a clear overview of the respective company's outsourcing strategy. For this reason the interviews were carried out on an executive management level (see appendix 1). While the advantage of interviewing at an executive management level is that a clear strategic view of the intended and realised outsourcing strategies can be attained, the disadvantage is of course related to the risk of getting a too political view of the firm's outsourcing strategy.

To select suitable interviewees for the first round, the presumptive respondents were first contacted. Here, they received information about background of the study, purpose, research questions etc. They were also notified about their and the company's possible participation in the study and asked about their willingness to take part. All presumptive interviewees asked showed a great interest in this study and all were willing to take part. During this initial contact they were also asked if they considered themselves as the most suitable interviewee for this study, or if they would rather recommended another person at the company.

The interviews were carried out in the respective interviewee's offices[12] and lasted for about 1.5-2 hours. After approval from the respondents, the interviews were recorded and later transferred to written form for further compilation. Notes were also taken during the interviews. For both the first and the second round of interviews, an interview guide was used. The objective with the interview guide was to create some kind of standardisation of the interview, and in this way create a possibility to replicate the different interviews (Lekvall and

[12] Except for the second interview round with Vest-Wood, where long distances to their offices made it more suitable to have a telephone interview.

Wahlbin, 2001; Patel and Davidson, 2003). However, the structure and content of the guide varied. The first interview guide contained prepared standard questions along with some specific questions for different case companies, (e.g. depending on what type of products the company manufactures) and in general were more open ended. This can be compared with the second round of interviews where the interviews were more focused (cf. Yin, 1989), with the starting point from the results of the first round. The interview guide for the second round also had several sub-questions to each main question, to avoid sidetracks that have little connection to the research focus. After the interviews for the first company studied were completed, for both the first and second round of interviews, a draft of this case was compiled. Through this, the research guide's layout, suitability and validity could once again be evaluated (Yin, 1989; Lekvall and Wahlbin, 2001). Visits at the case sites also included walking around in the production area to see and understand the setup and production flows.

For both the first and the second round of interviews some complementary information was collected by e-mail and telephone; this was done to fill eventual gaps or question marks. Mainly primary data collection by interviews has been utilised, but when secondary data has been available it has been used to increase the validity of the study (see later discussion in section 3.6). Examples of secondary data is confidential internal material, such as overall business and strategic plans for initialising outsourcing strategies, but also annual reports, press releases and company information at their websites (see appendix 1). The secondary data has been helpful to understand the overall company strategy but also helped identify specific focus areas for outsourcing (e.g. studying the business plan of Vest-Wood and Kährs' outsourcing strategies by receiving internal material). Nevertheless, most texts in case descriptions originate from the interviews and are symbolised by the use of citations.

Data Collection for the Continued In-Depth Case Studies

The starting point was the contacts with management that was built during the data collection for the Licentiate Thesis. The collection of data was done during the autumn and winter 2005/2006. Fourteen additional interviews together with complementary telephone calls were made. For the extended case studies the interviews were generally longer, sometimes even reaching up to 3 hours (including tours of the plants). For the in-depth data collection there has been an increased focus on understanding the cost reasoning when conducting the outsourcing analysis. This has offered a good amount of data about the capability benchmarking process of the cases studied.

The interviews have continued to be on an executive level and have been extended to include some more people in the organisation (e.g. Purchasing Director and Plant Manager). The interviews were carried out in the respective interviewee's offices and were when possible recorded (e.g. after approval of the respondents). Notes were also taken during the interviews. At all the interviews an interview guide was used. The interviews included additional walking around in the production area to discuss setup and flows to further understand the challenges and possibilities of outsourcing strategies For example, Elitfönster illustrated the difficulties of receiving outsourced components of insufficient quality, which lead to a risk of production interruptions due to the need for puttying and other costly activities. At Kährs, the large flows and limited ability to expand the production site make it difficult to build safety stocks on large component flows.

Often there were a few weeks between every interview. One main advantage with this approach is that during that time I could take time to transcribe the recorded interviews and think about how to analyse the data. By doing this, I could prepare new questions that I wanted to ask for upcoming interviews or once again discuss previous subjects that needed

more clarification. This resulted in some interviews having been more focused on one type of subject and others with a broader approach. That is to say that some interviews were more of an open-ended nature and others more focused (Yin, 1989). This approach was very helpful when doing this kind of in-depth studies (cf. Eisenhardt, 1989).

Some secondary data from the floor manufacturer Kährs, such as updated outsourcing strategies and intended changes in the value chain, have been available and used, and has increased the validity of the study. In addition, I have had the opportunity to see their cost estimates/analysis as well as internal/supplier-benchmarking analysis for the outsourcing project of a specific component. However, this material has such a high degree of confidentiality that it could only be mentioned but not be presented in any way in this thesis. Nevertheless, this material could still support my own reasoning, e.g. when analysing suppliers' additional investments costs if starting up outsourcing. To the same extent as the received business plans in the first collection of data (from Tarkett Wood, Vest-Wood and Kährs), this has been very helpful in providing support for the analysis and findings of this thesis.

Data Collection for the Case Study of Supplier Side

The case study of NWP has offered opportunities to interview managers at different levels, where all were linked to taking over outsourced activities. With the starting point of my developed interview guide, the selection of suitable interviewees at the company was made together with the CEO of NWP. In total 13 interviews have been made that when possible were recorded (after approval by the respondent). Notes have also been taken at the interviews. The interviews have been approximately from 1-2.5 hours. In addition a seminar/presentation has been held for the management to further discuss possibilities for taking over outsourcing in the WPM sector. Due to the longer distance to NWP, data has been collected over three different occasions where each occasion included making the interviews over 1-2 days. Between each round I had the possibility to transcribe the collected data and start writing the case description and initiate the parallel analysis.

Compilation of Cases

The cases have been compiled using the recorded interviews and notes from the interviews as the starting point and written with focus on the content of the cases' outsourcing strategy. In addition, the cases have not been written on longitudinal bases that present the events in chronological order, but instead have been structured with starting point from the analysis model (see section 2.5). The customer case studies have the following structure:

1. *Introduction* - short introduction to the company
2. *Market and Customers* – describing the market characteristics and main customers
3. *Products and Production Setup* – giving an overview of products manufactured and production setup (including main wood component manufacturing)
4. *Driving Forces for Outsourcing* – describing the driving forces for outsourcing
5. *Key Factors Addressed when Considering Outsourcing* – in line with the analysis model this section is further divided to three parts a) focus areas for outsourcing, b) capability benchmarking and c) supplier related risks

As seen in point 4 to 5, the case descriptions can be considered as a first level of analysis (cf. Yin, 1989). The supplier case has also been structured in line with the analysis model. The main advantage with this approach is that the cross-case comparison between the cases should be more transparent. By this it should be easier to replicate the analysis of the cases (cf. Yin, 1989; Lekvall and Wahlbin, 2001).

Citations are utilised to a large degree to strengthen the empirical data descriptions and avoid subjective interpretations in the written cases (Yin, 1989). To better capture the strength and validity of a citation the respective position for the interviewee at the company is given (e.g. CEO or Group Director). The cases have been worked through several times to ensure that interviewees' opinions were transparent for an external reader. The case descriptions have been sent to each company for control, feedback, and also for approval to use the case in this thesis. In doing so, the risks for errors or misunderstandings should be lowered.

3.5 Analysis of the Collected Data

Theory has been used as the main tool for analysing the cases, and this is linked to the overall importance of a theoretical framework.

> *"The use of theory, in doing case studies, is not only an immense aid in defining the appropriate research design and data collection, but also becomes the main vehicle for generalizing the results of the case study" (Yin, 1989, p. 40).*

Similarly, Eisenhardt (1989) argues the importance of comparing the findings with existing theories, in order to see what is in line with previous findings and what is contradictory. A main tool has been the analysis model developed. By using this model I could structure the analysis and also provide the theoretical discussion based on the analysis elements (see section 2.5). The analysis has the following structure:

1. Driving forces for outsourcing
2. Key factors addressed from a customer perspective
3. Outsourcing from a supplier side and key factors addressed
4. Combining the analysis of the customer and supplier side

The starting point was an analysis of the different cases by using a replication logic approach (e.g. drawing cross case conclusions) and linking and mapping data to theory (e.g. linking the driving forces of the cases with the theoretically composed forces which could be considered as some kind of pattern-matching and cross case analysis) (Yin, 1989; 2003). By using a replication logic, there is a possibility to see if results from one case are also apparent in another case (Bengtsson et al., 1997).

Having both a width by six case studies and a depth by the extended study of two cases provided a good start for the analysis of outsourcing in this context. The analysis of the supplier is based on the NWP case. The sawmill company has recently worked with an outsourcing project with the floor manufacturing Kährs and offers a broad data amount about taking over outsourcing in general as well as more focused discussions of the specific project. This offers the opportunity to also analyse an outsourcing project from a supplier view point. In line with the analysis of the WPM firms, the analysis model developed has been the basis for the analysis of the supplier case study.

The analysis of the data collected has started simultaneously with the compilation of collecting data. This strategy for analysing the cases is supported by Eisenhardt.

> *"Overlapping data analysis with data collection not only gives the researcher a head start in analysis but, more importantly, allows researches to take advantages of flexible data collection" (Eisenhardt, 1989, p. 539)*

This research strategy gives a better convergence of evidence (Yin, 2003). This is because the different data collection periods can be used as a quality check and also as a possibility to collect new information from more interviewees. In this way it could be established if the interviewees agreed or disagreed with the initial findings. Support for the analysis of the empirical material has been to write articles with my thesis as the starting point (see section 3.6).

3.6 Considering the Quality of the Research

An important aspect is of course to ensure the quality of the research strategy. Insufficient quality in a study is linked to the risk of low validity and reliability and this results from having a research design that is carried out poorly (Lekvall and Wahlbin, 2001). Yin (1989; 2003) states that some logical tests should be applied to maximise the quality of the study. Table 3-4 relates the applicable logical tests to my case study tactics and during which phase in my research they have been applied.

Table 3-4. Logical tests for maximising the quality of the case study (adaptation based on: Yin, 2003, p. 34)

Test:	**Case Study Tactics:**	**Result:**	**Phase:**
Construct validity	Collecting data over several rounds, repeated in-depth and broaden interviews, using secondary data and recording interviews when possible	=> Multiple sources of evidence	Data collection
	Using citations and working through the cases to ensure transparency to external readers	=> Establish chain of evidence	Collection/ Composition
	Sending the case descriptions to the participating interviewees at respective companies for reviewing and comments	=> Trying to avoid misinterpretations	Composition
External validity	Having multiple case studies and relating findings to theory discussed	=> Using replication logic	Research design
Reliability	Assuring that suitable interviewees were selected, keeping risks of stress or uncomfortable situations at low level; working for avoiding getting answers in terms of general opinions; being aware of own bias; open end interview approach; using interview guides; recording interviews	=> Improving repeatability of study	Data collection

In the following section, areas for ensuring quality of the research are discussed in more detail.

Construct Validity - Data Collecting and Interviews

Yin (1989) states that the most important information source of a case study is from the interview. In line with this, mainly primary data collection by interviews has been carried out. This is of course also related to the difficulty of getting access documentation about strategies of the companies studied. With the exception of the floor manufacturer Kährs, in particular calculations of expected cost and financial reduction possibilities have due to confidentiality not been available. This is also the case for cost prices of the products/components or communication with potential suppliers and their respective bids. However, some useful secondary material has been available, e.g. annual reports, company websites, press releases as well as internal material (e.g. business plans from four of the case companies and outsourcing calculations from one case), see appendix 1. This has been used to increase the construct validity.

The research strategy will contribute to improve the construct validity by collecting data over several rounds. Here, data has been collected with the objective to utilise multiple sources and collect data over several periods to increase the construct validity (Eisenhardt, 1989; Yin, 2003). This is closely related to achieving a high confirmability, which Madeleine Leininger, in the book "Critical Issues in Qualitative Research Methods" (Morse, 1994), advocates as one of six criteria to evaluate qualitative studies. She argues that a high confirmability is achieved by repeated affirmations of the information (e.g. using multiple sources and collecting data over several occasions) (Leininger, 1994). Thus, by discussing the results from one round of interviews in the other round of interviews it could be established if the interviewees agreed or disagreed with the initial findings (e.g. with help of the research report written), and this creates a basis for high confirmability. This was especially apparent in the data collection for the Licentiate Thesis but also in the in-depth studies of the customer and supplier side.

While it is difficult to establish a high degree of standardisation for a case study (which lowers the reliability of the study) this approach offers the possibility to ask the interviewee several sub-questions (see also discussion about the interview guide), and the interviewee can expand the discussion about certain questions (Lekvall and Wahlbin, 2001). This can offer increased validity to the empirical data; thus enhance the construct validity. In line with Yin, the complete cases have been sent to each case company for checking and comments, which will improve construct validity and lower the risks for errors or misunderstandings. For most of the cases few changes were needed, which would indicate that the cases match reasonably well with the respondent's view.

Internal Validity

Internal validity considers the potential of establishing causal relationships, but this kind of validity measure is more difficult to link to my study. This is because such measurement is usually related more to explanatory studies (e.g. compared to the empirical pattern with the predicted pattern or having dependent and independent variables) not descriptive or exploratory studies such as this one (Yin, 2003).

External Validity

External validity deals with the possibility to generalise the findings from the case studies. Here, it is important to once again stress that the cases have not been selected to represent "*a priori defined population…*" (Bengtsson et al., 1997, p. 477). To ensure a high external validity, a replication logic can be used to see if one finding from one case can also hold or be found in another (Yin, 2003). By selecting three industries and the top two firms within the respective industry it would be possible to better generalise findings within the three industries studied as well as to the theoretical field, and thus achieve a better external validity (cf. Yin, 1989). This is done by ensuring that the results are not limited to just one sub-industry in the WPM sector. The in-depth case studies provided good opportunities, for example, to compare their analysis of the key factors addressed when considering outsourcing. Similarly, the supplier case study has been made where their considerations, can be related to the customer cases studied. Thus, by applying multiple case research strategy and making cross case conclusions, this can also increase a better understanding of outsourcing strategies beyond the organisation that is being studied (cf. Eisenhardt, 1989).

Improving Overall Validity

To improve the validity of this thesis it would be important to "test" my results by presenting these to external people with insight into the context/research area. By doing this I am assured of getting feedback on my work-in-progress. This has been done in several ways:

Writing a licentiate thesis. Writing a licentiate thesis as a milestone was largely beneficial in many ways. One main advantage was the opportunity to discuss my material with readers such as the pre-seminar opponent (Dr. Dan Andersson from Linköping Institute of Technology) and the seminar opponent at my licentiate thesis presentation (Dr. Chris Ellegaard from Copenhagen School of Business). Other advantages include going through the process of analysing a larger data material and putting it in text format.

Writing paper for conferences and journals as well as research reports. I have attended several international conferences where my research has been presented and commented. This has been done by writing papers together with my supervisors. My belief is that this is an exceptionally good way to interact and discuss applied theory and collected data for my thesis. I have also participated in writing a section in a book publication relating to PhD Candidates' view of non-financial performance measurements and balanced scorecards. This academic work with respective type of publication is presented in table 3-5.

Table 3-5. Writings with starting point from the work with the thesis

Authors:	**Area:**	**Conference**	**Journal**	**Report/ Book section**
(Andersson, et al., 2005)	Outsourcing and supplier market development	X		
(Fransson and Rehme, 2005b)	Increased customer orientation and outsourcing	X		
(Andersson et al., 2006; Andersson et al., 2007)	Driving forces for outsourcing	X	X	
(Brege, Nordigården and Rehme, 2006a),	Outsourcing and supplier related risks	X	X	
(Brege, Nordigården and Rehme, 2006b)	Opportunities with mixed strategies	X		
(Brege, Nordigården and Rehme, 2006c)	Outsourcing in the forest industry and parallel production	X		
(Brege, Nordigården and Rehme, 2006d)	Outsourcing of wood components			X
(Nordigården and Rehme, 2006b)	Developing strategic position and operational platforms	X		
(Nordigården, 2006a)	Outsourcing and balanced scorecards			X

The following can be said about the papers listed above (table 3-5):

- I have collected the empirical data and have in all articles expect one been the corresponding and main author
- My supervisors have been my co-authors
- The articles have been written with the starting point from my work with my thesis. The work of writing has been mainly done by me. Here, I have always provided a first version of the articles. My supervisors and I have then together discussed how to improve and develop the articles.
- The articles submitted have further helped me to "confirm/test" and get reviews of the applicability of theory, analysis approaches as well as results of this thesis.

Based on comments from reviewers, attendees at the conference presentations as well as further work it has been possible to develop two of the conference papers into journal papers. The article about driving forces for outsourcing has been published in the Journal of Forest Product Business Research (see Andersson et al., 2007). The paper about outsourcing and supplier related risks linked to balanced scorecards has been accepted to the International Journal of Knowledge Management Studies (see Brege et al., 2006a). Altogether, the

comments on articles, and also the work have helped me to further develop my thesis (the thesis has always been the starting point when writing the articles, for example, wanting to "test" and get a review of the applicability of an analysis model for the driving forces of outsourcing).

Parallel with writing my thesis, I have increased my knowledge about a related context: the building material market. Here, my Master's thesis (Fransson, 2004) worked as a platform for continuing this research. This has resulted in a research report (Fransson and Rehme, 2005a) that was received with great interest from the industry. Based on this report my supervisor and I have developed a conference article about DIY-Retailers' development and supplier consequences (Nordigården and Rehme, 2006a).

Attending workshops and doctoral courses. Being a PhD candidate in the International Graduate School of Management and Industrial Engineering (IMIE) has also provided many opportunities to present my research and get good feedback. Each year workshops are held where both PhD candidates and Professors read and comment on research done over the year. I have attended and presented my research whenever these opportunities have been given. In the research group WoodWorks that I am a part of, we have had several workshops to present, discuss, give feedback and develop our research. This has included national meetings with the linked research group at Luleå University of Technology and also more local meetings with my WoodWorks colleagues at the department. This has provided opportunities to discuss my research from a broad spectrum with research colleagues with different research paradigms. In this group I also participated as a pre-opponent on a doctoral thesis related to timber frame housing (Sardén, 2005), which further extended my knowledge about the industrial contexts related to wood.

During the doctoral courses taken I have tried to relate my empirical material to the discussed theory to get new perspective and looking at my data material from several perspectives, e.g. product innovation, industrial selling and balanced scorecards. For several of my doctoral course papers I have put so much effort in writing them, that they could later be used as working papers for conferences (e.g. Fransson and Rehme, 2005b; Nordigården and Rehme, 2006a; 2006b; Brege et al., 2006a).

Getting practitioners' view. At the same time, it is important to assure that the findings can be related to practical implications and to get feedback from people in the business context studied (cf. Brehmer, 1999). As discussed earlier, collecting data for my licentiate thesis offered an opportunity to discuss results with company representatives. In addition, at my presentation of my licentiate thesis, company executives from large companies (e.g. SCA, Setra Group and Norrskog Wood Products) as well as representatives from organisation such as Vinnova (the Swedish Governmental Agency for Innovation Systems), Invest in Sweden (ISA), Swedish Forest Industry Federation, and Wood & Furniture Association attended. The seminar offered good possibilities for me to answer question about my results and several of the attendees also asked more follow-up questions after the seminar and gave their view of my results. This provided interesting ideas for continuing my research towards my PhD thesis.

My findings from my research have also been presented and discussed at external seminars. Four seminars can be noted: (1) one large conference (trämarknaden i Karlstad) where both Swedish and international sawmill companies were present. Here, the research of WoodWorks was presented and I was one of six presenters and had about 30 minutes to present my research. In total about 50-60 company representatives attended the presentation. All presentations were also recorded and broadcast to more company representatives sitting in

conference rooms. After the presentation there were opportunities for the company representatives to ask questions and comment on my research. (2) The other seminar I attended was smaller but resulted in longer discussions about the results. This presentation was held for WPM firms located in the North of Sweden. Eight company representatives attended and gave interesting comments and feedback on my research. (3) Presentations of results for the board of my project have been made. These meetings have provided very helpful comments and interesting ideas. Finally (4), I received an award for my research from the Economic Club (Ekonomiska klubben) in Linköping, which is an association of retired Executives and Academics that meet for discussion and presentations. Through my award I got the opportunity to present my research on two different occasions (November 2004 and April 2006), which offered helpful feedback and interesting comments on my ongoing research.

Altogether I think this has helped me very much to improve the validity of this thesis overall.

Reliability

Reliability concerns the possibility to repeat the study and attain the same results (Merriam, 1994; Lekvall and Wahlbin, 2001; Yin, 2003).

For the collection of data, standardisation of the interview becomes central and here the interview guide has contributed to increase the reliability (Lekvall and Wahlbin, 2001; Patel and Davidson, 2003). However, it has been difficult to carry out each interview in precisely the same way. Thus, if the interviewees were stressed, interpreted my interview questions wrongly, were tired or had a lack of interest or competence about the focus area for the study, the reliability might be decreased (Lekvall and Wahlbin, 2001). To minimise these risks I have worked hard during both the planning and data collection phase to create a good interview situation where high repeatability could be achieved, see table 3-6.

Table 3-6. Working for high reliability (Adaptation based on: Yin, 1989; 2003; Strauss and Corbin, 1998; Lekvall and Wahlbin, 2001; Patel and Davidson, 2003)

Lower the risk of:	**Implying:**	**Phase:**	**How:**
Interviewing the wrong person	Finding suitable interviewee	Planning data collection	Asking the interviewee at the initial telephone contact if they considered themselves to be the most suitable interviewee for the study
Stress or uncomfortable situation	Finding suitable place/ time	Data collection	Making the interviews at the interviewee's office at a time suitable for them
Lack of interest	Finding suitable interviewee	Data collection	Finding interviewees with interest for study (all showed a great interest for study)
Getting general opinions or influenced by the interviewer's expected answers	Reliability/ validity in collected data	Data collection/ composition	Listen to the interviewee, being aware of my own bias. Facilitated by having an open end interview approach (cf. Yin, 1989; Strauss and Corbin, 1998)

4 Outsourcing in the WPM Sector from a Customer and Supplier Perspective

In this chapter the case studies are presented. First comes the two in-depth case studies of the floor manufacturer Kährs and the window manufacturer Elitfönster. Then, the cases of the floor manufacturer Tarkett, door manufacturers Vest-Wood and Dooria Kungsäter and also the window manufacturer Svenska Fönster are given. Finally, a supplier perspective of outsourcing will be presented by the case study of Norrskog Wood Products (NWP).

4.1 The Floor Manufacturer Kährs

Kährs was founded as early as 1857 and is today a well established international leader in wood flooring products. The company is a part of the Nybron Flooring International (NFI) group, which was founded 2000 through a merger between Bauwerk (accounts for 33% of the group's sales), Kährs (51%), and Marty (16%). With a ~15% market share the NFI-group is the largest wood flooring company in Europe and the world market leader in pre-finished engineered wood flooring products (see e.g. press release from Nordic Capital, 2005-12-02 and company website). The group's 11 production facilities, located in Switzerland, Austria, France, Sweden and Norway, produce floors for over 40 countries. The group has a portfolio of well established brands that are positioned in the premium segment. While Kährs has more of a global market presence, Bauwerk and Marty are more local brand names[13]. The NFI-group has been owned by HIAG[14] and the private equity firm Nordic Capital, which in 2000 also created the group by acquisitions and merger among the three companies. In December 2005, the private equity firm Vestar Capital Partners[15] signed an agreement to acquire the group. For the period reaching to 2008 the NFI-group formulated 12 corporate missions, where three main missions especially can be mentioned: (a) increase the EBITA margin to least 13%, (b) enhance capital efficiency to achieve at least 20% ROCE, (c) achieve at least 20% Western European market share, (NFI, annual report, 2004, p. 5; company website).

4.1.1 Market and Customers

Kährs alone has a ~7 % market share in Europe. The relatively small total European market share is a consequence of a fragmented market, with many small companies that traditionally have concentrated on serving local markets. Contrary to many other floor manufacturers Kährs has its own global sales companies. While many other wood product manufacturers are dependent on sales to national markets, about 85% of Kährs' sales are in exports. With a large share of their sales on export and own sales companies, Kährs has a structure typical of an international industrial company. Kährs' largest market is the US followed by Germany, Sweden, Norway and Great Britain. The largest market growth is found in the US and the Scandinavian countries. Eastern-Europe is also an emerging market; especially Russia.

In Europe, a main customer group is specialised flooring-stores (i.e. retailers selling wooden floors), that sell the floors to the end-customers (e.g. consumers, professional craftsmen as well as industrial end-users). Kährs' brand name is relatively unknown to the end-customer

[13] Bauwerk's main markets include Switzerland, Germany and Austria. Marty's main markets include France, Spain and Italy

[14] HIAG is a European group in the forest products industry based in Switzerland. The company's activities cover production and marketing of parquet, wood-based panels and doors. (Press release from Nordic Capital, 2005-12-02)

[15] Vestar Capital Partners specialises in management buyouts, growth capital investments and recapitalizations. Investments are focused on companies in the U.S. and Europe with valuations in the €100 million to €2 billion range. (Ibid.)

(e.g. for a consumer, a competitive product can look pretty much equivalent). At the same time, the flooring-stores offer several different brands. Therefore, according to the CEO, it is important that their retailers know that Kährs is a superior floor manufacturer with the highest quality, technology, easiest installation, and has more covering guarantees, good support and informative catalogues etc.

Do-It-Yourself-retailers are not a primary marketing channel for Kährs. These types of retailers have difficulties selling floors from Kährs that are often in the higher price segment. One reason for this is that the staff of most DIY-retailers do not have relevant experience or training for selling wood floors. For example, the DIY staff has difficulties motivating why a customer should buy a more expensive floor from Kährs instead of a low-price laminate or wood floor. The exception is the Scandinavian countries where Kährs sells through DIY-retailers but work with more traditional retailers that have more knowledge about wood products. Increased sales through DIY-retailers are not expected. A problem that would arise if Kährs would start selling more volumes through large DIY-retailers is the risk that this would create competition for their other customers and push down the price levels on the market. Therefore, an important strategy to handle these retailers is to strengthen their position and brand name and also help their other customers to augment their product offer. Here, supply chain development becomes one part.

"Logistics is not an unessential part to develop our customers" CEO

Kährs is currently focusing a lot of resources on the market side. For example, to improve the brand name awareness, the company is focusing resources on developing their product catalogue. The CEO states that the catalogue is known as the best in the industry. Another area that will be developed in the future is to provide better information about the floors to customers who have bought a new house or a newly built apartment. This is something that kitchen manufacturers already have developed. The CEO and Purchasing Director of Kährs say that such information will contribute to more positive postpurchase feeling, brand awareness and also word-of-mouth influence (e.g. communicating about the Kährs floor to neighbours, friends and other family members). Another part of their increased market focus is moving the marketing and sales department and the Swedish sales organisation to Malmö. This is a better geographic location with fast communication to the main airport in Scandinavia (Copenhagen Airport, Kastrup).

4.1.2 Products and Production Setup

Kährs' products are floating which mean that the parquet boards are bonded together side by side and not glued to the underfloor. The products are available in a range of thicknesses; the most popular for the home are 15mm and 7mm (Kährs' catalogue, 2005, p. 76). Kährs' manufactures these floors in 1-, 2[16]- and 3-strip versions, which relates to the width of the wood-strip used in the wear-layer, see figure 4-1.

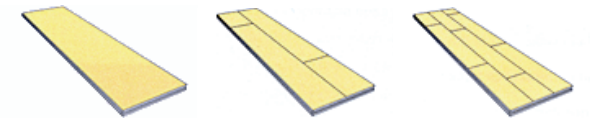

Figure 4-1. Design and patterns of the floors: 1-, 2-, and 3-strip floor (Kährs' catalogue, 2005, p. 11)

Since 2003 the majority of the floors are manufactured with a joint system named woodloc®[17]. For the year 2005, total manufacturing volumes were ~8 million m^2 for parquet and ~1.3 million m^2 for veneer floors (7 mm floors). All the floors have a 3-layer construction, but the component input differs, see figure 4-2.

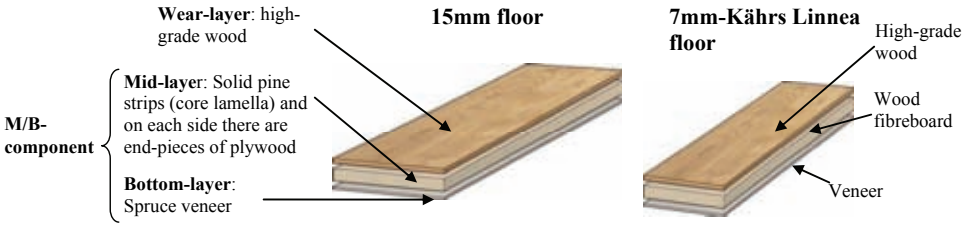

Figure 4-2. Kährs' two main floor types (Kährs' catalogue, 2005, p. 76)

Kährs' 7mm floor, the Linnéa floor, is a veneer product with a thin cut wear-layer, and instead of strips of pine, it has a middle core of high density fibreboard (HDF). The 15mm multi-layer floor's wear-layer comes in a choice of wood species, design and finish and the bottom-layer consists of a 2mm spruce veneer panel. The mid-[18] and bottom-layer forms the M/B-component[19]. Figure 4-3 gives a simplified view of Kährs' production setup for the 15 mm floors.

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[16] The 2-strip version is the latest addition to Kährs' range of floors. For the 2-strip floor Kährs has increased the size of every strip with more than 30% in comparison with the 3-strip version. (Kährs' catalogue, 2005, p 11)

[17] This mechanical glueless joint locks boards together with almost invisible joints. The rows of boards align themselves automatically without the need for gluing. (Kährs' website, 2004-12-03)

[18] The middle core consists of quarter sawn pine fingers that provide stability and shape retention. On the end of each side of the mid-layer board there are end-pieces of plywood. These two components form the mid-layer. In this thesis the middle core and the end-piece component is abbreviated: mid-layer. An abbreviation also used by the company. (Kährs' website, http://www.kahrs.se/, 2004-12-03, 2005-10-19, and from interviews)

[19] The mid-layer and bottom-layer constitute a component that Kährs calls "stomme". In English, Kährs terms this component the core (cf. the Swedish term: kärna). However, to avoid any confusion with core and non-core

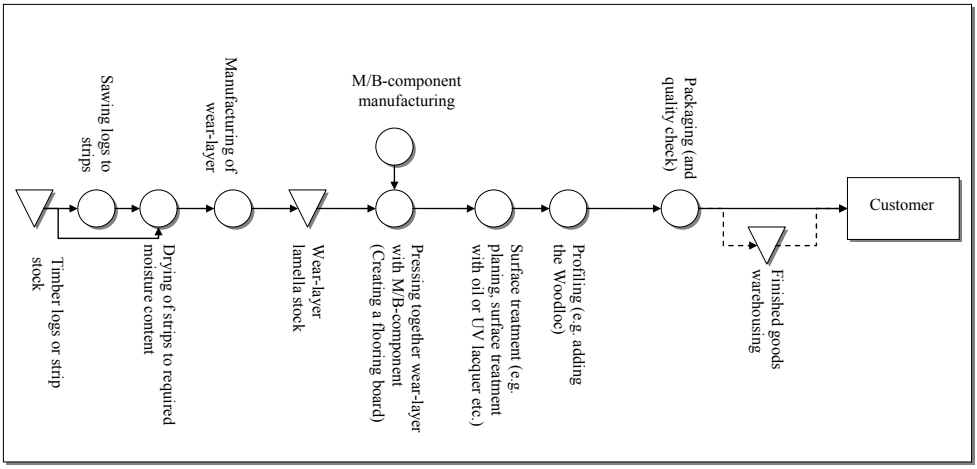

Figure 4-3. Production setup (Based on: internal material from Kährs, 2005)

For the M/B-component manufacturing, Kährs purchases sawn timber. When the sawn timber arrives the first thing Kährs needs to do is stack and dry the timber. After the drying process, the timber is sawed into lamellas that together with the end-pieces form the mid-layer. The M/B-component is formed by gluing and pressing the mid-layer and the veneer panel together. Figure 4-4 illustrates the manufacturing process of the M/B-component.

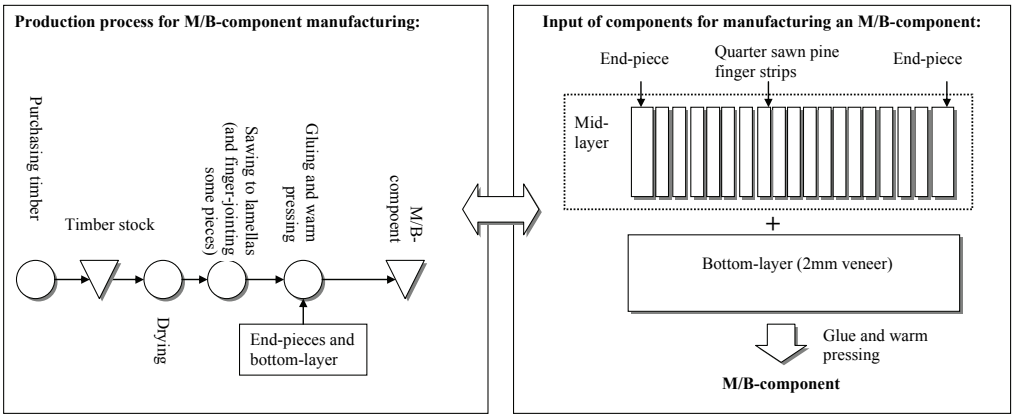

Figure 4-4. Manufacturing the M/B-component

The form in which the raw material for the wear-layers is purchased differ. Most often Kährs buys sawlogs that they dry and saw to strips, which are then planed and sawed to lamellas.

components, this component will be called the M/B-component for the rest of this thesis (i.e. M = mid-layer and B=bottom-layer).

However, sometimes they buy raw material in the form of sawn strips or wood blocks[20], which are then planed and sawed to lamellas. The next step in the production process of the wear-layer is the grading of the lamellas and placing them in suitable patterns (mönsterlägga, author's translation). When the lamellas are glued together they form the wear-layer. After this the M/B-component and the wear-layer is pressed together to form a flooring board. After the surface treatment and profiling, a complete floor has been manufactured. Figure 4-5 gives an illustration of the wear-layer manufacturing process.

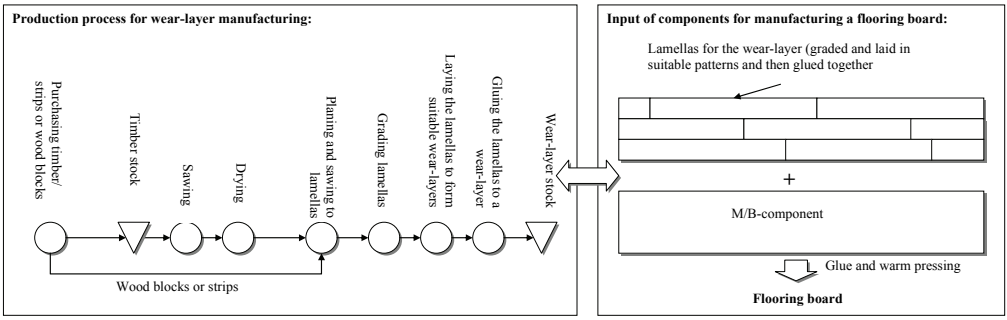

Figure 4-5. Manufacturing the wear-layer and making a flooring board

By processing the input of oak raw material, Kährs doubles the initial value several times: $1m^3sub$[21] will give 50-60 m^2 floor that has a value of more than SEK 10,000 (see table 4-1).

Table 4-1. Increased value by further processing (Internal material from Kährs, 2006)

	Value SEK/m^3
Oak in block (Ek kubb)	600
Sawn hardwood	2,000 – 15,000
Sawn timber of pine wood	1,100
Complete floor from Kährs	10,000 – 50,000

Kährs has four production units: (1) Nybro with a large sawmill and the main floor manufacturer, (2) Ljusdal (with manufacturing of 1-strip floors) (3) Blomstermåla – a sawmill (4) Kährs Brumunddal – floor manufacturing.

[20] Can be considered as a strip that has been sawn to the right length, e.g. for 3-strips floors.

[21] m3 sub means cubic metres solid under bark. In Swedish m3fub= kubikmeter fast under bark (volymmåttet av stocken, m3fub: fast kubikmeter av stocken utan bark).

4.1.3 Driving Forces for Outsourcing

There are several driving forces for Kährs' focus on outsourcing:

Increased Downstream Focus

An important competence for Kährs is to manage customers and meet their needs.

> *"There is no doubt that we focus capital there…we put more and more money on the market side… the costs for the market side is increasing at the same time as I lower [costs] in manufacturing, it is a very clear transfer" CEO*

The CEO states that their core competencies in manufacturing are the surface treatment and profiling. For these activities unique skills and know-how can be developed. The Purchasing Director agrees on this and states that the core is the wear-layer and the surface treatments of them. Here, several new investments (over SEK 200 million) have been made in Nybro over the last few years, e.g. machines for the woodloc profiling, a new production line for the surface treatment, a new production line for 2-strip floors and machines for automatic grading of surface strips. More investments are also on the way where outsourcing will contribute to simplifying the flows in the manufacturing.

As focus shifts towards these areas, sawmill competence becomes less critical. The CEO emphasises that Kährs is a manufacturing company and not a company that should be characterised by a clear connection to the sawmill industry: "*…we are a manufacturing company that manufactures something made of wood, not a sawmill company*". He says that Kährs' business idea is to give value to their customers who are not making the best of the Swedish wood raw material. Earlier Kährs' considered core competencies as having been more related to the handling and transforming of wood raw material.

> *"Kährs' main problem has been that we have not had the strength to change in line with the market [development]… we have spent too much time and resources on power plants and on sawmills and all kind of other things… we have not had the strength to focus on the areas that really give a customer offer". // "For a number of years many people thought that our core competence was in the sawmilling" CEO*

By this the CEO states that Kährs has focused on the wrong activities and tried to do everything in the value chain. For example, small niche-manufacturers have been able to gain quite large market shares in some relatively small but fast growing segments (e.g. 1-strip version segment). These new players have been able to speedily grow on the market when several of the larger wood floor manufacturers have not had enough flexibility to follow the market development. By doing everything the company is too inflexible and has difficulties following market swings.

> *"…the flooring industry sector's business cycle has experienced both upswings and recessions and when you have a rigid machinery you have difficulties to follow… when you are vertically integrated with sawmills and everything it is very difficult to follow… historically we have always had difficulties to follow during upswings and have too large fixed costs during recessions… here you have a value [with outsourcing] you can become more flexible" CEO*

Therefore outsourcing becomes an important tool that will be used to enable improvement of flexibility, follow the market and minimise investment risks. For example, one basic idea with increasing outsourcing is to better manage rapid switchovers to new expanding segments and improve flexibility, e.g. 1- and 2-strips.

Stagnated Market and Increased Competition Calling for Cost Efficiency

The European market for wooden floors has had a long, steady, strong growth rate since the middle of the 1980s and the main problem has been to find enough production capacity, see figure 4-6.

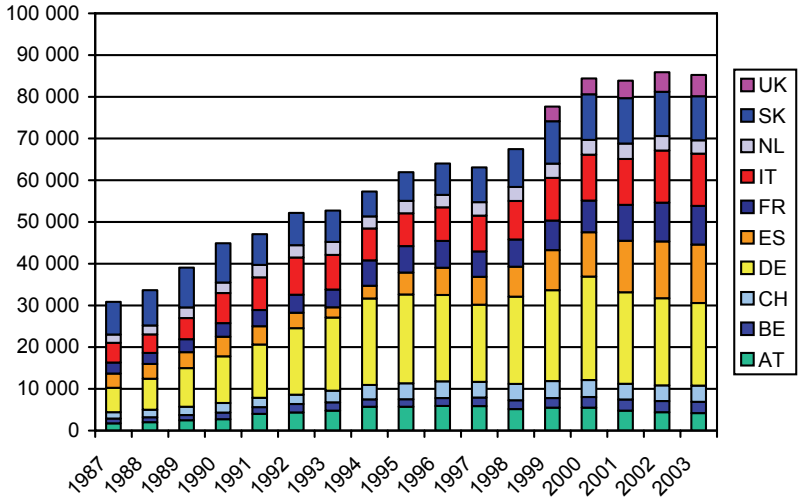

Figure 4-6. European market for wood floors (Internal material from Kährs, 2004)

The US market has had a similar development. While the US market has continued to grow the last years, the European market stagnated in the year 2000.

> *"…the market for wood floors has grown enormously year after year to the year 2000… since then it stagnated… it is a shock for all because everyone has worked for expansion"*
> *CEO*

In addition, the competition has increased from low-cost-countries and substitute manufacturers; in particular the 3-strip version has been under strong price pressure and is very exposed to competition from China, the Baltic States and Poland. The new competitors build new plants and have lower labour costs. The 3-strip floors have traditionally dominated sales and used to be equivalent to ~80% of the total production. However, as a consequence of the increased competition, the figure is today closer to 70%. The CEO expects that 3-strip floors in the future will only correspond to about 50% of the total production.

Due to the tough competition and a stagnated market an important strategy for Kährs has been to create new product life cycles and extend current. Another important factor is to become very cost efficient and that makes outsourcing a focus area. Figure 4-7 symbolises this development.

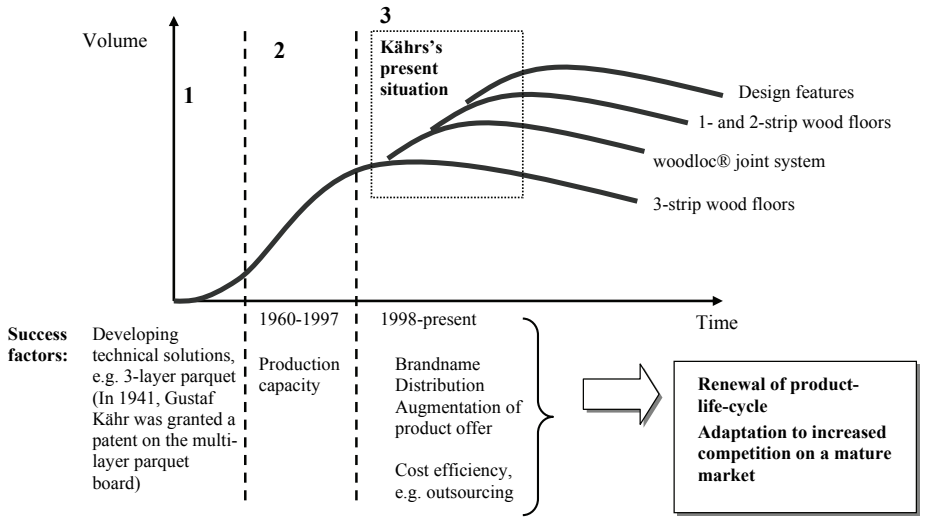

Figure 4-7. Kährs' vision and strategy: going from focus on growth to product renewal and cost efficiency (Based on: internal material from Kährs, 2004)

As seen in figure 4-7, an early success factor was to enable volume growth and find enough production capacity (stage 2). The third stage represents Kährs' current situation where volumes have stagnated on a mature market. Extending current product life cycles are done by adding the 1- and 2-strip versions and focuses on design and product development. It is expected that the 1- and 2-strip versions with distinctive design attributes have a large potential for increase in volume and improve average margins. For the entire market these two versions are expected to grow from ~20% 2003 to ~30% 2007. In line with this, Kährs range of wood flooring products has grown noticeably in recent years. Here, ongoing investments in the product development have resulted in the launch of several new collections of 1- and 2-strip floors. Other important elements are strengthening the brand name; focusing on supply chain and augmenting the product offer. Related to this, the CEO emphasises that outsourcing is driven by a need to become leaner and increase effectiveness. Outsourcing is expected to lower labour cost and provide investment risk-sharing by pushing more responsible and capital investments towards suppliers. The pressed margins that the company is experiencing are also the consequence of insufficient focus on leveraging internal efficiency.

> *"To avoid losing competitiveness against the low-labour-cost industry our goal is to have a sales of at least SEK 2 million per employee… otherwise you become very exposed and it is this that drives a lot of our [focus on] outsourcing" CEO*

An increased focus on outsourcing will enable Kährs to benchmark internal processes against external suppliers'.

> *"When we do not buy anything… we do not know how profitable different parts are… what we do right now is that we buy on all levels… we buy some M/B-components and also some wear-layers… we start with small volumes…and we can see how competitive we are" CEO*

> *"…outsourcing and component sourcing are definitely important areas. They just get more and more important to be able to challenge our costs. If you save on your material you can save a small part. But if you find a solution and source a whole component it is then you*

can make those large steps, so to say. It is absolutely one of the most important areas" Purchasing Director

Thus, outsourcing becomes important for benchmarking in-house production and they can see if the production is cost efficient enough and decide what kind of production should be handled in-house.

Purchasing Harwood Material with Limited Availability

At Kährs, the most used hardwood species for the floor manufacturing is oak, see table 4-2.

Table 4-2. Production unit and the respective use of wood species (Internal material from Kährs, 2006)

	Production unit			
Wood species	**Nybro**	**Ljusdal**	**Brumunddal**	**Total**
Oak	43%	57%	90%	52%
Beech	15%	4%	7%	12%
Ash	8%	2%	2%	6%
Other	34%	37%	1%	30%
Total	100%	100%	100%	100%

The hardwood raw material has a limited availability and the Purchasing Director says that they need to find it to the right price and to get them in the right time: "*It is a combination of securing that we get the input of volumes and that we get it to an economic good price, these sometimes stand against each other*". In addition, there is often a lot of discussion about which types of wood species can be used and what kind of certificates are needed (e.g. environmental certificates for buying exotic wood species), which demand a lot of time and resources. This leads to a focus on outsourcing of such wood components.

The raw material costs for Kährs is a large part of costs of goods sold (about 60-70% of the total direct production costs are raw material costs). Kährs buys a lot of oak and in fact they could, just for their own production, buy all available wood of oak on the Swedish market. In reality this is not possible and not enough oak is felled per year in Sweden. Table 4-3 gives an overview of Kährs need of raw material.

Table 4-3. Need of timber for the year 2005 (Internal material from Kährs, 2006)

	Total	**Sweden**
Timber [m^3sub]		
- Oak:	71,000	14,000
- Beech:	6,000	1,000
- Ash:	7,000	1,000
	84,000	16,000
Sawn hardwood [m^3]	43,000	200
Sawn softwood timber [m^3]	115,000	110,000

Usually about 25% of the oak needed can be bought from Sweden but Kährs would prefer to increase this figure (preferable to 95%). The CEO argues that local procurement of oak and their own in-house manufacturing of the wear-layer of Scandinavian wood species is a preferable strategy for several reasons: (1) oak from Sweden has a good exterior look and can be air-dried (i.e. less need of drying-equipment), (2) buying wood in close proximity will lead to lower transportation costs (Internal material from Kährs, 2006). In addition, according to the CEO, the in-house production of wear-layer of oak can, by investments in one main plant, give economies of scale and an efficient automated production. By taken such actions Kährs can remain competitive in comparison with a low-cost-manufacturer.

However, during the last years Kährs has not been able to buy as much oak from Sweden as they would have preferred. One reason is the big winter storm in 2005 (Gudrun) that drastically reduced the availability. Another problem is that the annual felling of oak has steadily declined in Sweden over the last years (even though the growing stock of oak is steadily increasing). The forest companies in the south of Sweden, according to the CEO, are too softwood focused and do not have the right competencies for supplying hardwood. In addition, for single forest owners the bureaucracy for felling oak trees can be complicated and long-winded. Altogether, the outcome is a limited availability of oak sawlogs. Instead, Kährs needs to import a lot of oak from Germany and Eastern-Europe. A problem here, according to the CEO, is that Kährs needs to know well in advance how much oak wood they can expect to obtain from the Swedish market.

Importing around 80% of the needed oak wood is not a sustainable strategy according to Kährs. Sawlogs have a low volume value and are costly to transport. Outsourcing will lower such transportation costs, which today can easily correspond to at least 10% of the total procurement costs.

> *"Transport costs increase quite rapid today… and they play a certain role [driving for outsourcing], it is relatively large cost with transports… this makes it more interesting to saw where the forest grows… we do not want to transport sawdust" CEO*

Another reason to outsource is lower spillage costs. Kährs' CEO emphasises that when you buy whole sawlogs or sawn timber there is always an uncertainty of what the quality will be

of the output of sawn timber. By sawing and processing the timber close to the location of the raw material (i.e. close to the forest) and buying more components, it is easier to evaluate the expected yield.

If the availability of oak timber on the Swedish market is not improved, the CEO states that Kährs will need to outsource this production to a country with better raw material availability. As a first step, Kährs will move the sawing of logs in closer proximity to the source of wood raw material. If the raw material availability is not improved, the whole manufacturing of wear-layer is at risk of being outsourced to low-cost-manufacturers (e.g. in Ukraine, Rumania, Serbia and Croatia).

Restructuring the Value Chain by not doing Everything

As sales declined in 2000-2001 the profits have also fallen. In line with Kährs' focus on becoming more cost efficient the whole NFI group concluded that the group had too high fixed and financial costs. Therefore, NFI initialised a 97-point action programme to make a turnaround, become more flexible, improve business focus and create a less capital-intensive group (cf. also NFI annual report, 2003 and 2004).

Kährs earlier governed all activities in-house and in addition had other side activities such as owning power plants to supply nearby communities.

> *"…our old thought was that we should do everything" CEO*

However, in line with this 97-point action programme strategy, Kährs has started to restructure the company and will focus more on the core business of the company instead of trying to do everything in the value chain. During 2003-2004 Kährs reorganised its value chain to place more focus on disposing of non-core assets (e.g. the power plant in Nybro and sawmills), reduction of production centres and reducing the size of the staff.

The CEO says that their former production strategy to govern complete processing of raw wood materials has been replaced with a strategy to find the most efficient processing chain as possible (also cf. CEO's remarks for EMAS environmental statement 2003). To focus on the firm's core business Kährs will try to increase operational effectiveness and reduce the operating costs. Surface treatment and profiling are areas where resources at present are reallocated and sawmill related areas become less important.

> *"Here we are focusing right now on [surface treatment and profiling]… it is the most important area, here we do a lot of the customer variants and product renewal, such as new design… here we also create a lot of the quality…" // "…sawmill competence will not be as important anymore… however, surface treatment and profiling competence will be at least as important for us in the future" CEO*

To achieve better economies of scale, the number of production centres has been decreased and Kährs will in the future relocate core activities to the factory in Nybro (e.g. those that demand costly investments in machinery). Non-strategic activities will be outsourced. To decrease the complex production structure and improve synergy effects Kährs has sold their two hardwood-sawmills in Djursdala and Stockaryd. Furthermore, Kährs has relocated the production in Blomstermåla to the factory in Nybro and the initial activities have been outsourced to external sources in Poland (some sawmilling activities still exist in the Blomstermåla factory). Profiling of flooring demands large investments and these will be done in the major plant located in Nybro. The plant in Brumunddal (Norway) and the suppliers from Poland, for example, perform all activities except the final steps consisting of

surface treatment and profiling and are performed at the production plant in Nybro. Figure 4-8 illustrates the new production setup.

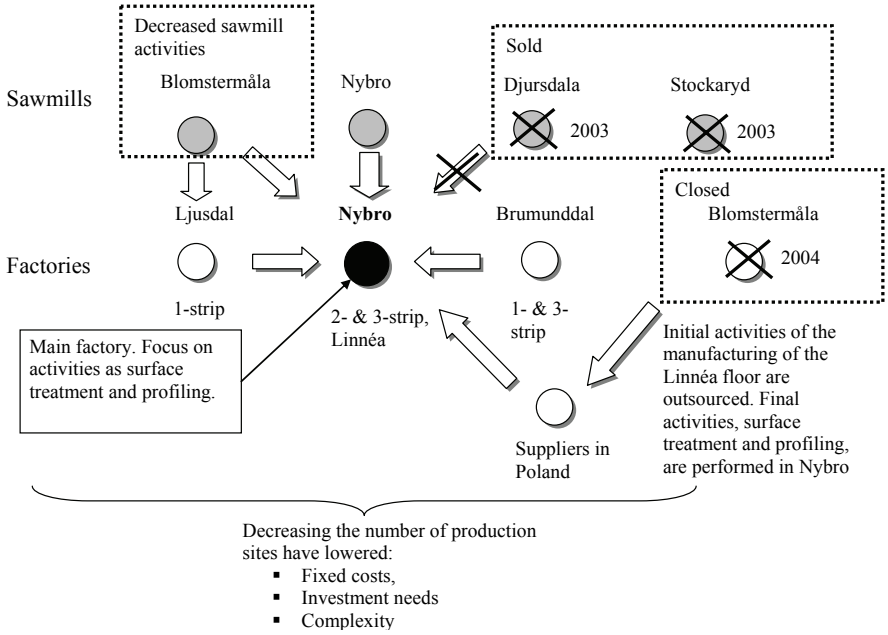

Figure 4-8. Relocating production centres (Based on: internal material from Kährs, 2004)

For Kährs a continuous analysis is needed to see what opportunities that exist to stay cost competitive. By outsourcing Kährs can decrease capital tied up in fixed assets and focus more resources on the core business. There is a need for Kährs to focus resources on activities and components that create differentiation on the market. In line with this, Kährs will unwillingly focus on components that create little visual differentiation on the market (e.g. M/B-components) and by this avoid having machineries in non-core areas that they have invested a lot of capital in during market downturns.

4.1.4 Key Factors Addressed when Considering Outsourcing

According to Kährs, outsourcing in comparison with day-to-day purchasing decisions requires a much more thorough analysis where risks and implementation costs need to be analysed comprehensively.

> *"[The outsourcing decision] is much more long-term and [when outsourcing] other parameters need to be considered and the risk analysis becomes much more important… There are many strategic discussions that comes into the picture [when considering outsourcing] that does not come in the daily work of purchasing" Purchasing Director*

Looking at it strictly, the Purchasing Director says that:

> *"… [purchasing] is operational and the other [outsourcing] is strategic" Purchasing Director*

4.1.4.1 Focus Areas for Outsourcing - Component and Product Importance

Kährs used to handle most manufacturing activities in-house and component outsourcing has previously been negligible, but today it is in strong focus to improve flexibility and reduce investment needs. Kährs' CEO says that almost all component manufacturing could be handled by outsourcing agreements. However, the final steps in the value chain will become very critical and these will be kept in-house (i.e. surface treatment and profiling activities). Overall Kährs' formulated production strategy has a main focus on outsourcing strategies, see figure 4-9.

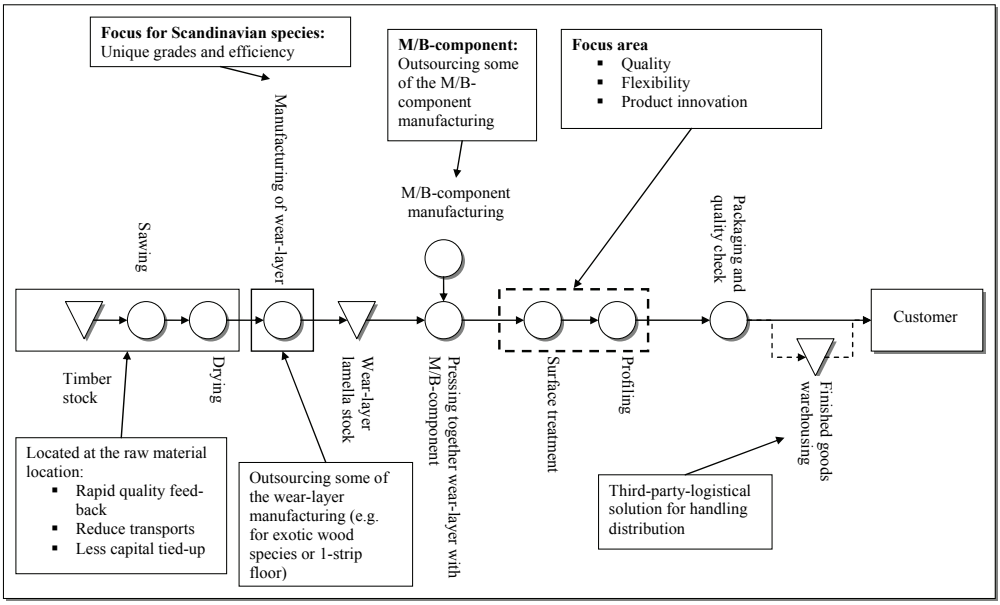

Figure 4-9. Production setup for 15mm floors, including outsourcing strategies (Based on: internal material from Kährs, 2004; 2005)

> *"It is the red areas [market with dashed line in above figure] which Kährs is interested in working with, why should I put money on the manufacturing of the M/B-components [stommtillverkningen, author's translation]… I do not get any market advantage to*

manufacture this component in-house [själv, author's translation]… the only reason that we make this component is that nobody is as efficient" CEO

As seen above, increased focus on outsourcing components is an important strategy. The following focus areas of outsourcing were formulated in 2004:

- 19% of wear-layer demand should be outsourced by the year 2006.

"What we intend to do by ourselves is the surface treatment and profiling for the Scandinavian wood species [e.g. oak and beech], because of the large volumes [largest buyer of oak in Sweden and few suppliers can handle these large volumes] and the interesting exterior [e.g. Scandinavian oak has a different look compared to oak from Central- and Eastern-Europe] we think we have a lot to provide… what influence the product is the surface treatment and the profiling… the rest is not sacred [and could as well be handled by component outsourcing]" CEO

With the present production setup (i.e. sawing is mainly done in Sweden) there are cost advantages in taking the raw material in close proximity to the present wear-layer production. However, Kährs is today experiencing increased difficulties getting enough raw materials from the Swedish market. As a consequence, Kährs tries to obtain more and more raw material in the form of sawn strips (e.g. from Germany and Croatia). By outsourcing sawing and drying to external suppliers the transportation and spillage costs can be considerably lowered.

In the future more of the sawing and drying of the surface-strip will be outsourced to suppliers in close proximity of the wood raw material, e.g. Germany, Poland, Croatia and Ukraine.

"The sawmilling activities should be located where the raw material is located… ~50-60% [of the sawlog] becomes scrap [spillage] when you saw… and if we can also dry it [the strips] locally, we can lower our transport cost and capital tied up in fixed assets but we can also get a quicker quality feedback [kvalitetsåterföring, author's translation]" // "…one choice is to invest in machines to grade the surface strips automatically or another choice is to outsource these activities to Croatia". CEO

Another goal is to increase the purchase of complete wear-layers from suppliers. The most likely development is that the manufacturing of some wear-layers will be outsourced to low-cost-producers in countries such as Ukraine, Poland, Rumania, Serbia and Croatia. Another option could be to procure complete wear-layers from suppliers in Eastern Europe, where these suppliers have purchased raw material for the wear-layer from sub-suppliers.

"For mid-layer the basic idea is that they [the primary wood industry] work with inexpensive excess material to make this component but we also consider the Baltic States because there they could make the component with very small investment… but with higher labour intensity" CEO

Kährs has in fact outsourced limited volumes of complete wear-layers since 2004, in order to develop suppliers, build experience, as well as create comparative cost measurements to benchmark with internal costs.

"The basic idea with this is that we should manage quick changeovers to 1- and 2-strips [follow the market development], increase flexibility, lower investment needs… and also benchmarking; we can measure ourselves" CEO

Kährs is also looking into the possibilities to outsource larger volumes of this component:

"In a longer time perspective I think we should make this [wear-layer] component where the raw material is located, it is too expensive to transport sawlogs. At the same time the wear-layer is quite labour intensive and if the component can be made in a low-cost-country it is no disadvantage. This we are working with…" CEO

The CEO says that the best way for outsourcing these components is to buy wear-layers that can go directly to the pressing stage activity. This will offer advantages in checking the quality of the components delivered, which neither sawn lamellas nor surface-strips could offer.

The company in general has very little to gain by owning sawmills for sawing and manufacturing of hardwood surface strips when they cannot utilise a whole sawlog for just this type of component. Many times the sawn timber of oak (for example) could have a much higher value for furniture manufacturers. This value cannot be captured by sawing hardwood sawlogs to wear-layer. Sometimes Kährs even gets too good quality which does not necessarily fit the manufacturing of wear-layers. By "letting" suppliers vertically integrate forward in the value chain, the CEO and the Purchasing Director emphasise that sawmills can better utilise the whole material and by this deliver other types of sawn timber to other customers (e.g. furniture manufacturers), which will purchase these components for a higher price.

"There should be possibilities to find a solution in some form… where you have somebody that saws to [customers in the furniture industry] and to us, to utilise a larger part of the log…. because we can never pay the same price for the raw material that the furniture industry or that type of industries does… There would definitely be an opening [for a supplier] to be profitable by doing wear-layers" Purchasing Director

However, Kährs has not yet found any suitable major suppliers for large scale manufacturing of wear-layers for the 3-strip floors, the expected outsourcing figure has been pushed forward.

- 24% of the mid-layers should be outsourced by 2006

Kährs intends to outsource about one fourth of the manufacturing of mid-layers, where they will buy the mid-layer together with the bottom-layer as one component (i.e. the M/B-component)[22]. The CEO states that the manufacturing of the M/B-component is not a core activity and would be better handled by external sources. According to the CEO, too many processes are handled by both the suppliers and Kährs, e.g. both stacking and drying the sawn timber prior to sawing. Instead the supplier could, according to the CEO and Purchasing Director, take over the complete drying process to avoid two costly double processes. The CEO and Purchasing Director expect that this outsourcing will decrease transport costs (not transporting sawdust and water), lower spillage, reduce fixed costs and create a better quality feedback for the manufacturing of mid-layers.

"You can save a couple percent on the purchasing price but what you really can save a lot of money on is buying the right material for our equipment [to maximise the yield], you can never save money on the material costs if we get a moderate yield" Purchasing Director

[22] This component is called "stommen" in Swedish and in English the core. However, to avoid confusion with core and non-core components this item will be referred to as the M/B-component (i.e. M = mid-layer and B=bottom-layer). The main outsourcing is the manufacturing of the mid-layer and pressing together of the mid-layer and bottom-layer to the M/B-component (see the production setup). Therefore, Kährs sometimes discusses outsourcing of the M/B-component in terms of outsourcing the manufacturing of the mid-layer.

The manufacturing of mid-layers can be handled by either large scale manually manufacturing or by high automatization. Because the M/B-components are low margin components they cannot be transported any longer distances and outsourcing these components becomes limited to supplier markets in somewhat close proximity. Examples of external supplier markets of interest are particularly in Scandinavia, Poland and the Baltic States.

Kährs' CEO says that the manufacturing of M/B-component will be outsourced if they can buy it for a lower price than the present variable cost. The manufacturing of mid-layers in the plants in Ljusdal and Brumunddal are especially considered for outsourcing because their M/B-component manufacturing is not rational enough. However, for most of the M/B-component manufacturing, Kährs production is very cost efficient.

"…the only reason that we make this component is that nobody is as efficient" CEO

This makes it difficult for a supplier to become more competitive than the present in-house production. Since formulating this outsourcing strategy it has been problematic to find developed suppliers and Kährs is still searching. Here, Kährs has tried to start by outsourcing small volumes to benchmark the production and see what problems arise. The quandary is that there is no developed supplier market for handling the outsourcing of manufacturing of this component. There has been a supplier from the North of Sweden trying to manufacture some M/B-component for Kährs. However, this supplier did not manage to become as cost efficient as Kährs' in-house production. The Purchasing Director says that there probably are sawmills that could start making M/B-components, but not to the same cost levels as Kährs. The results are that Kährs cannot realise M/B component outsourcing strategy as intended (i.e. Kährs will push the full realising of this outsourcing to a later date). Instead, the outsourcing strategy for the manufacturing of the mid-layers is intended to include more non-standard components and for their less rational production sites.

- Birch end-pieces were outsourced in the year 2004.

About 8 million pieces are manufactured per year. Traditionally, the end-pieces have been made of lamella of birch and the manufacturing was handled in-house. However, in the year 2004 Kährs outsourced the end-piece manufacturing and changed the material from birch to plywood. The outsourcing of end pieces for their 3-layer parquet has been made to suppliers in the Baltic States, Poland and Russia. Earlier the manufacturing was handled by a production centre (Wernerträ sawmill). By outsourcing this component and switching the material from birch to plywood the characteristics and quality of the component could be improved.

- The Linnea[23] boards were outsourced in the year 2004.

These floors were earlier manufactured in-house. However, the initial activities of the manufacturing have been outsourced to two suppliers in Poland. Today, Kährs only handles the final production steps for this product (i.e. surface treatment and profiling) in the Nybro plant. The CEO stated that this outsourcing has worked well and he is looking for a third

[23] Veneer product (7mm): three layered laminated wood flooring consisting of a sliced plain-sawn wearing layer in choice of wood species. The floor has a middle core of high-density fiberboard (HDF) and a backing layer of pine. The board is manufactured with the woodloc joint system. (Kährs' Website, 2004-12-03)

supplier to increase the manufactured volumes and lower dependency. Similarly with the end-pieces, the advantage of this product is that it is based on a wood panel construction, which makes it easier to find suppliers.

- Product outsourcing – focus on 3-strip floors

For products that are under strong competitive pressure there is a need, according to the Purchasing Director, to at all time analyse the possibilities to lower costs (e.g. changing suppliers of components, changing material of the products, changing production setup, and/or outsourcing to an external source with comparative advantages). As a consequence of strong competitive pressure, some products (mainly 3-strip floors) will be outsourced to low-cost manufacturers. The location will depend on where suppliers can be found, e.g. China, Poland and/or Ukraine and/or other countries in Eastern-Europe. As a start, Kährs has signed a contract with a Chinese floor manufacturer (also to supply the Chinese market with floors). Today, Kährs takes products from the factory in Nybro to supply the Chinese market but will in the future handle the manufacturing of some of these products at the local site. China is expected to become an important market for both selling and purchasing. In line with this a sales office in China has been opened.

> *"This is so we can sell products with Kährs brand name in China… so we can build up a position there but there is also a possibility to gradually take products from that factory to Europe." // "… the first thing we do is to improve the possibilities to sell in China than we gradually can give a possibility to export" CEO*

A Step towards Outsourcing: Rationalisation of the Purchasing of Wood

As Kährs has begun to reorganise their production strategy they intend to purchase more components by increasing outsourcing. As a start the procurement of wood for their mid-layers in Nybro has been rationalised. While availability of raw material is very important to avoid production interruptions, it is also very significant to get the right quality of wood when buying sawn timber. This is because the quality and the dimensions of the wood raw material affect the productivity and yield output in the production. By getting the right raw sawn timber for the mid-layers Kährs can maximise the yield between input of wood and output of mid-layer components. Here, the CEO suggests that a smaller supplier base and well working communication and feedback to suppliers could generate substantial savings for both parts. For mid-layer manufacturing, both the CEO and Purchasing Director state that they will in the future work towards compensating their supplier based on how much square meters of wood floors Kährs can produce based on the input of the purchased wood; thus, paying suppliers based on the yield of manufactured floors.

For the sawn timber[24] for the mid-layers, Kährs has reduced their supplier base from 16 suppliers (consisting of more than 20 sawmills) to 1. This contract is for three years (signed in 2004). Practically, the supplier receives the production plan and coordinates the upstream flow and procurement of wood from other sub-supplier and sawmills. By doing so the supplier can take responsibility for optimising their own production, but at the same time minimise transport costs. The rationalisation of the purchasing of this type of sawn timber also includes some smaller improvements. For example, when Kährs is focusing on having a high turnover rate of the purchased raw material, the supplier does not need to package the sawn timber in plastic (which costs SEK 1 million per year). Kährs purchases wood for this

[24] Pine wood of quality 6

component for SEK 125 million per year. Altogether, the CEO estimates that they can save 20% of their purchasing costs of mid-layer if realising all these improvements.

> *"…in this supply chain we can certainly save 20% if we carry out these factors… because of bad communication we throw away 20% of the value". // "We will start with just-in-time-deliveries, then we optimise the yield [utbyte, author's translation], then we remove the plastic covers and make the sawmills dry to exact moisture quota, then we will save a lot" CEO*

However, since closing the contract the expectations on the supplier and the expected benefits by reduction of supplier base have not been materialised. The development towards compensating the supplier based on the yield has not been implemented either. One main issue has been to find a suitable price mechanism and Kährs finds their supplier to be too expensive if comparing it with market prices. Their supplier has shown negative results in the last years and changed management just after the contract was signed. The CEO believes that the contract has not been profitable for the supplier.

4.1.4.2 Capability Benchmarking

When considering outsourcing, Kährs would prefer to outsource to cost levels that are below the internal variable manufacturing costs, which make considerations of overhead and similar factors less important (see also figure 4-11). When outsourcing the potential saving must always, according to the Purchasing Director, be weighed together with the costs of implementation and potential risks. There is a need of sufficient cost advantages to make outsourcing interesting and there are a lot of different aspects that need to be included in the analysis: "*It is both an economic and a risk judgement of the availability*" Purchasing Director.

Outsourcing to a Low Cost Supplier

When considering outsourcing the possibility to lower costs and investment needs become the most important factors to address.

> *"…there is no doubt that it comes first [the cost factor]… it is absolutely a condition to lower the cost… then we start to look at factors as supply risks" // "...one thing that I find important: this industry has very large fixed costs and to create a company that is less sensitive to volume changes has an intrinsic value; to get more variable costs but also to become more flexible. Whether the market is exhibiting high peaks or downturns, the floor industry always has trouble to follow. When we are exhibiting downturns we are drained in fixed costs and during high peaks we cannot follow to produce." // "Cost flexibility has a great intrinsic value, there is no doubt" CEO*

It is usually easier for the management of Kährs to analyse the potential of outsourcing when new investments in machinery are needed. If considering the general cost structure by the cost of goods sold as a percent of revenue, the largest part is raw material costs and direct labour costs (about ~50% are direct labour and raw material costs of the revenue). Of these about 75% are raw material costs and 25% are direct labour costs. This is, however, depending on the production mix. Indirect labour costs are equal to about ~20% of the direct labour costs. Another cost item is OVPC (Other Variable Production Costs) that include indirect costs as indirect labour overtime compensation, social costs, machine costs (including maintenance costs) and energy costs. OVPC costs are about ~12% of the revenue. However, these costs vary depending on the volume of production. Other fixed costs represent ~19% and transport costs 5%. Another cost item is market and sales costs which are about 10% of total revenue.

If Kährs would outsource to a low-cost-country the following could be concluded: (1) costs of facilities would be reduced (fixed costs are overall lower), (2) indirect and direct labour would become much smaller costs, (3) costs for machines would decrease because the low labour costs enables more manual work instead of costly automatization, (4) supply chain and logistical costs would be expected to increase, (5) raw material costs would be somewhat the same. Figure 4-10 gives a simplified, but illustrating, view of generally expected cost changes if Kährs would outsource to a low-cost-offshore manufacturer.

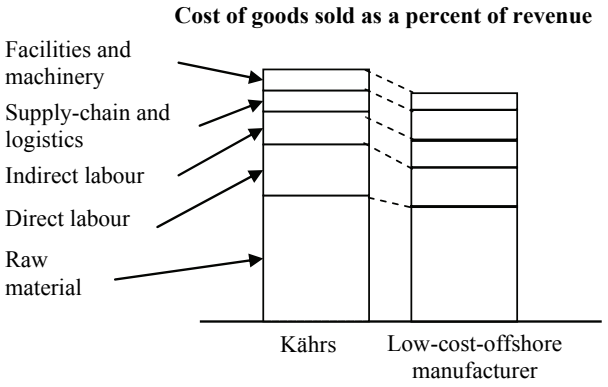

Figure 4-10. A simplified view of changes in cost structure if outsourcing to a low-cost-offshore manufacturer

Requirements on Cost Reduction

The CEO has clear measurements on needed cost savings if outsourcing strategies should be initialised.

> *"As a rule of thumb, if there would be any point to outsource… the costs would need to be reduced by at least 20%, because you always have remaining fixed costs" CEO*

The CEO says that the need for 20% cost reduction is related to the fact that it is difficult to, in a short time frame, remove fixed costs and sales costs.

> *"If the costs are similar [as the costs to manufacture in-house] there is no reason to outsource. If the cost reductions are about 20% it will quickly be outsourced. In a short time frame, from a strict theoretical point of view, if you outsource, your depreciations remain and all fixed costs do not disappear at once. It is also a job to outsource and you also have this with valuating risks and you should have something for it [doing the outsourcing]" CEO*

When outsourcing, Kährs wants to lower their costs but the CEO also stresses that the supplier must make some kind of profit. Included in the 20% cost reduction is also a possible profit margin for the supplier.

> *"If we should outsource there must be a 20% cost reduction, this margin can be distributed among us and the supplier" CEO*

The important thing is that the cost reduction really is 20% or larger. Otherwise the CEO sees no point of realising outsourcing strategies. Similarly, a need for cost reduction is expressed by the Purchasing Director. Here, a sufficient margin is needed because there can also be

hidden costs that first arise when the outsourcing has been done. When the raw material costs are pretty much similar for Kährs, or a supplier in Sweden, or for suppliers in low-cost-countries, the main cost that can be lowered is the labour costs. The CEO states that if Kährs' labour costs in total for a component manufacturing are less then 20% it will be difficult for a supplier to be more efficient regardless of how rational they are.

Making the Cost Analysis

Kährs' CEO says that many outsourcing companies forget overhead costs and the time factor in outsourcing decisions. When considering outsourcing he starts from the following model, see figure 4-11.

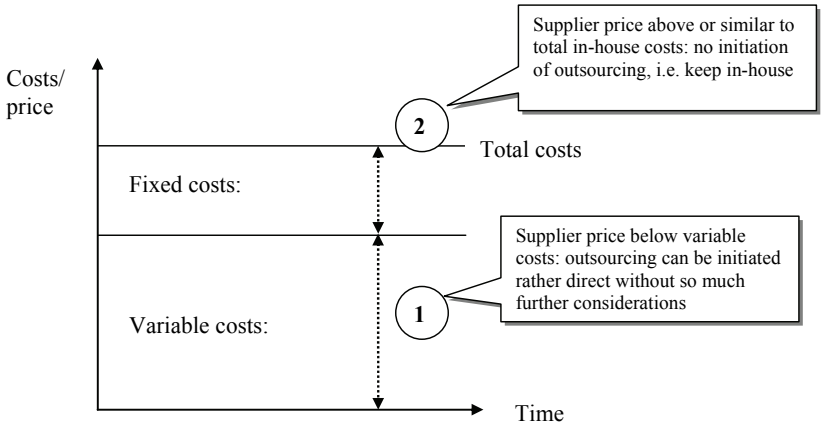

Figure 4-11. Model for analysing the outsourcing decision from a cost point of view

Variable (manufacturing) costs, direct material costs and direct labour costs are included. Costs that will go away directly if production is outsourced should be included as variable costs:

> *"If you stop producing today the [variable] costs should be gone by tomorrow. Direct labour costs are of course dependent on the situation. If there is a small amount of outsourcing it [direct labour costs] becomes variable, because then you just lower work overtime or avoid employing new staff [or transfer staff to other areas in production]" CEO*

Together with fixed costs this gives the total costs for manufacturing. The principal deciding methodology for outsourcing is quite straightforward. If the cost of buying (i.e. the price offered by the supplier) is below the variable costs (marked 1 in figure 4-11), Kährs can take the decision to outsource today. However, if the cost of buying is the same as the current total costs when manufacturing in-house, outsourcing can first be done after an infinite time when the fixed costs are gone (marked 2 in figure 4-11).

> *"The closer you get to your total cost the further away in time that [outsourcing] decision will be. Then you need to take that decision when new investments are needed, where you must buy new plants or if there are [ongoing] structure changes or something similar. However, if I am below the variable costs [marked 1 in figure 4-11] I can take a decision momentarily and keep all [fixed] costs without losing anything. Then I know that these [fixed costs] eventually will be diminished" CEO*

By positioning the cost of buying in the model, a decision on outsourcing or further analysis can be made for all types of components, see figure 4-12.

> *What you can say is that if the cost of buying is larger than the in-house total costs outsourcing is not an option (marked A in figure 4-12). If the cost is lower than your variable costs outsourcing can be done directly (marked B in figure 4-12). Everything between it becomes a decision to see how you can get rid of fixed costs (marked C in figure 4-12)". CEO*

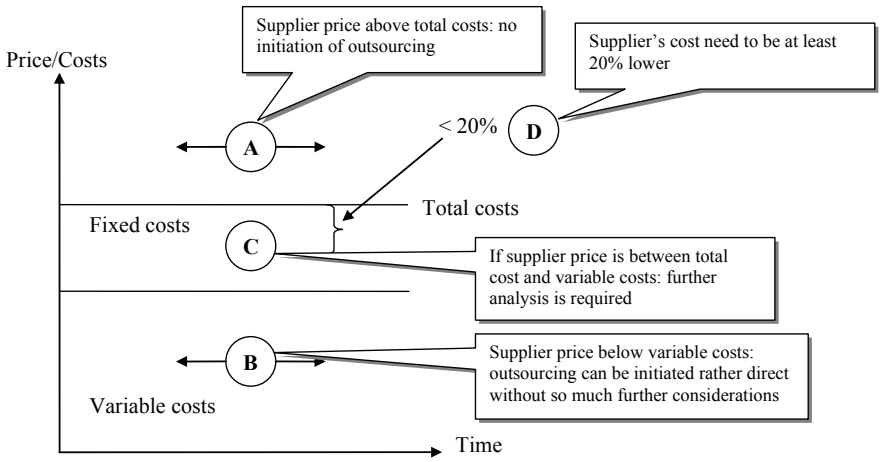

Figure 4-12. Basic starting points for the outsourcing decision when considering supplier's cost

Kährs' CEO says that 99% of all outsourcing seems to be between variable costs and total costs (marked C in figure 4-12). If the cost of buying is above total costs or below variable costs the decision is easy for Kährs. However, between those end-points (marked C in figure 4-12) the decision becomes more difficult and more parameters (e.g. risks) must be considered. If the cost of buying is too close to total costs there must be a new investment decision (old machines need to be replaced) to make this interesting. If considering the suppliers' cost and not the offered price (i.e. not considering the profit margin), and if the difference between total costs in-house and supplier's cost is less than 20%, there is little chance that outsourcing will take place in the near future (marked D in figure 4-12).

> *"You know that you have some difficulties getting rid of all your fixed costs, and they [the supplier] require some profit margin, often you will never get through [establish an outsourcing agreement]" // "If they do not have it [20%] they [the supplier] will never make a breakthrough in the negotiations. This also implies services and maintenance, this 20% is needed, if the money does not exist from the beginning there will not be any [outsourcing]" CEO*

This margin is also, according to the CEO, to cope with hidden costs. For Kährs, an important factor is that the outsourcing needs to be profitable for both parties. The CEO says that if the supplier is not profitable in an outsourcing agreement this is not a durable situation in a longer time perspective. This was a problem with the supplier from the north of Sweden that was trying to handle the manufacturing of some non-standard M/B-components. Here, the supplier had been trying to push their price to the same levels as Kährs.

"They came after half a year and during that time they had not been able to keep the quality… and then they made a 30% increase in the prices, this was not a good way for the continuation" CEO

The CEO says that if a supplier is not profitable they will either give up after a while or try to break back to increase the price levels.

Capability of Sawn Timber Suppliers

For the manufacturing of M/B-components there are large flows. Kährs uses about 115,000 m^3 direct raw material per year to the M/B-components and produces about 450 m^3 per day (or about 30,000 m^2 M/B-components per day). When outsourcing such components the Purchasing Director emphasises that it is important to keep in mind that M/B-component may not be a part of the core business but is a key product for the production to avoid production interruptions. Therefore, it is important to find a supplier that has a working business model for supplying these components and by this guarantee a safety in supplies. Important capabilities the supplier must have are: low cost levels, enough scale, know-how to guarantee supply reliability and high quality of components delivered. Together with the difficulties in finding developed suppliers, a complete outsourcing of the M/B-component is for the moment a less feasible strategy.

"The suppliers do neither have the quality nor the price. We continue instead to make it by ourselves, however, Kährs has made a larger investigation about the M/B-component manufacturing. CEO

It is the purchasing department that has performed the analysis of outsourcing possibilities for M/B-components and compared that with the costs of the in-house production. The higher upstream in the value chain Kährs looks, the larger the raw material costs. In the end of the value chain there are more labour costs and not so much raw material input (e.g. profiling and surface treatment). For the manufacturing of M/B-components at Kährs the largest costs are raw material for the mid-layer and other direct raw material (i.e. veneer for the bottom-layer and end-pieces). Then comes labour costs as the second largest cost item. Raw material costs and labour costs constitute altogether more than 75% of the total costs. Other costs include OVPC, transport costs and fixed costs for the manufacturing. Two things are critical for the manufacturing of cost competitive M/B-components or more specifically the mid-layers:

- Acquire the wood cheap. The wood quality for the M/B-component manufacturing is in some sense a residual product from the primary wood industry. If the manufacturing can be handled in close proximity to the sawmill, the sawn timber can be obtained very inexpensively

- The manufacturing of the component must be done at a very low cost by either low labour costs or high automatization (i.e. small work force in production). If the outsourcing is done by domestic suppliers then there is a need of a more automated manufacturing to avoid too high labour costs. In Eastern Europe the manufacturing could instead be handled more manually due to lower labour costs.

The outsourcing analysis investigation of the M/B-component compared Kährs' own cost structure with the component price of different sawmills in several countries (Sweden, Estonia, Finland, Ukraine and China):

"The problem is that the raw material has about the same price everywhere and in the M/B-component there is a lot of raw material. There are three main elements: (1) raw

material, (2) labour cost and (3) transportation cost. Then you can work more or less rationally with investments" CEO

The raw material is even expected to be a bit higher for manufacturing in China. Even if labour costs become very small in China, the transportation costs increases a lot. Altogether, in comparison with their own in-house manufacturing, this makes China a somewhat more expensive choice for manufacturing. High transportation costs also make countries such as Ukraine less suitable for manufacturing M/B-components (even if labour costs are negligible and raw material costs are somewhat lower). The further away Kährs considers outsourcing, the higher the transportation costs are expected to be. If comparing with Kährs own manufacturing, greenfield investments, similar labour cost levels and need for supplier profit margins make outsourcing to suppliers in Sweden or Finland (that also have some higher raw material costs) less sustainable from a cost view point.

"We have made quite a few calculations on this and you could say that if a supplier has a lot lower labour costs than he might be able to compete. Hypothetically, you could consider M/B-component manufacturing in the Baltic States, then the labour costs are low enough and you have access to raw material, and in close proximity to us. We made the conclusion that the north of Sweden is not possible [for outsourcing], because then you have the same labour costs and the transportation costs increase. Nobody is as large as us and then it is difficult [for them] to become rational." CEO

This is connected to the small margins of M/B-components, and makes it more difficult to transport them longer distances. The results of the cost investigation of the M/B-component is that some volumes either can be outsourced to suppliers in the Baltic States (if suppliers are developed) or Kährs should continue to manufacture everything in-house because they are very cost efficient.

"We are having trouble finding [as efficient suppliers], where possibilities exist in the Baltic States [where transport costs can be kept on enough low levels and the labour costs are lower] CEO

The lack of efficient suppliers puts the outsourcing decision of any larger volumes on hold. Of course there are several sawmill companies in Sweden that are interested in taking over some of the M/B-component manufacturing. However, according to the CEO, the sawmills are not efficient enough and points to the investigation made that shows the higher costs for a sawmill in Sweden. According to Kährs, the question is if it is any logical reason that makes Swedish suppliers suitable manufacturers of M/B-components.

"You have to find a basic logic that reduces the costs by 20% if you outsource. What should these 20% cover? Well, they should cover remaining fixed costs that we cannot get rid of at once [when we outsource], they should cover risks and the profit margin for the supplier who manufactures. If this 20% do not exist then it [the outsourcing] will not be possible to carry through" //"If you compare, what could a Swedish supplier be better then us? The labour costs are not lower, he has smaller scale than us, and not lower raw material costs… then it is difficult. The only opening for a Swedish supplier is to do something that is special for us. If you look at M/B-components this is exactly what it is all about." CEO

The M/B-component cost study also included looking at other raw material, which the CEO sees as a possible alternative to handle some of the outsourcing. Here, the study has investigated the cost for making the mid-layer of M/B-components in plywood or HDF/MDF-material. The conclusion is that alternative raw material as plywood for the mid-layer is too expensive. In comparison with the present used raw material, the price is almost 185% higher.

However, in a longer time perspective, Kährs' CEO states that plywood could be a very competitive alternative material.

Capability Analysis for Non-Standard M/B-Component Manufacturing

As result of not finding enough developed suppliers, Kährs is more interested in outsourcing M/B-components with non-standard dimensions (non-standard width and length), which, together with the standard component manufacturing, currently are manufactured in the plant in Ljusdal and also Nybro. These components do not fit the large scale manufacturing that exists in the present M/B-component manufacturing.

> *"Even in large volume production you have some items that differ, and those you can consider to outsource. It is those [components] that we, to begin with, consider [to outsource]. Here, perhaps a Swedish supplier could compete" CEO*

This is linked to different efficiency of the plants that today manufacture M/B-components. In total Kährs have 5 lines for manufacturing M/B-components: three lines in Nybro (one very rational and two more manual with potential for streamlining) and two less rational at the two other production sites that more and more are considered for outsourcing (Ljusdal and Brumunddal), see figure 4-13.

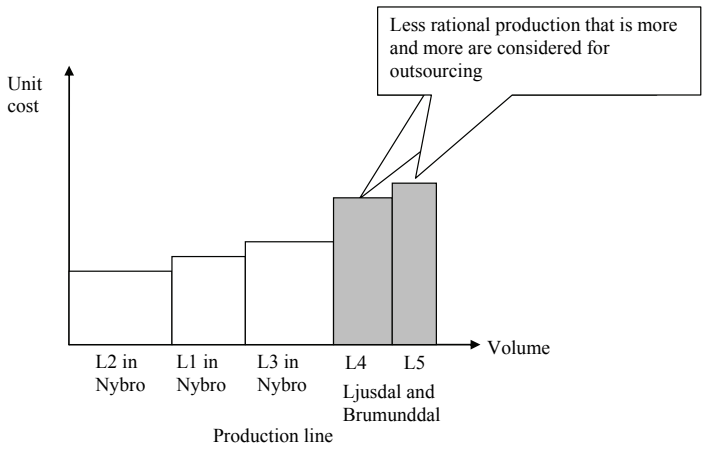

Figure 4-13. Five lines with different efficiency (illustrative)

To take advantage of economies of scale in the production, Kährs would prefer to only manufacture M/B-components with a fixed length and width, thus only one measurement. However, now Kährs has started to make shorter M/B-components in the Nybro plant and the plant in Ljusdal manufactures thinner M/B-components in several different lengths. Overall, the production in Ljusdal is less rational than the one in Nybro, which makes outsourcing of this production interesting. Here, a supplier would be able to compete with a nightshift in the Ljusdal plant, if that supplier manufactures M/B-components in the daytime. The logic to this, according to the CEO, is that Kährs' unit costs do not decrease with increasing output volume when there is a need for one more nightshift or weekendshift, see figure 4-14.

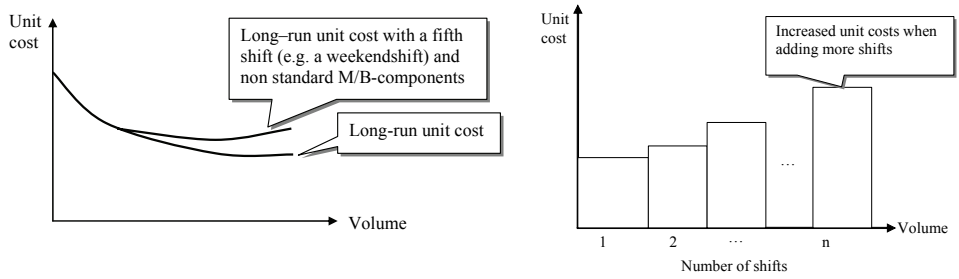

Figure 4-14. Kährs' long-run unit cost when there is a need for an additional workingshift

> *"Most manufacturing equipment is optimally to be used during 2- or 3-workingshifts. However, we often manufacture during a fourth or fifth shift. When we manufacture during night and weekends it becomes quite expensive…" CEO*

Here the manufacturing costs increase in step with each shift that is added. Another problem is the high rate of utilisation (e.g. the need for a fifth shift) results in loss of production in the other shifts and increases total labour costs.

> *"One thing is that labour costs are higher during the last shifts. The other thing is that you lose production on other shifts if you manufacture during night and day. This is because you do not have time for maintenance. If you are needed to do maintenance, say that your machine breaks down or something like that [i.e. other operational disturbance], you are forced to do that during normal uptime. If you have 2-shifts then you can do the maintenance during the night and if you have 3-shifts you can do it during weekends. The marginal volume you gain is decreasing the whole time" CEO*

Manufacturing M/B-components with too many shifts and having some lines that are not as efficient can, according to the CEO, be illustrated with a cost curve, see figure 4-15.

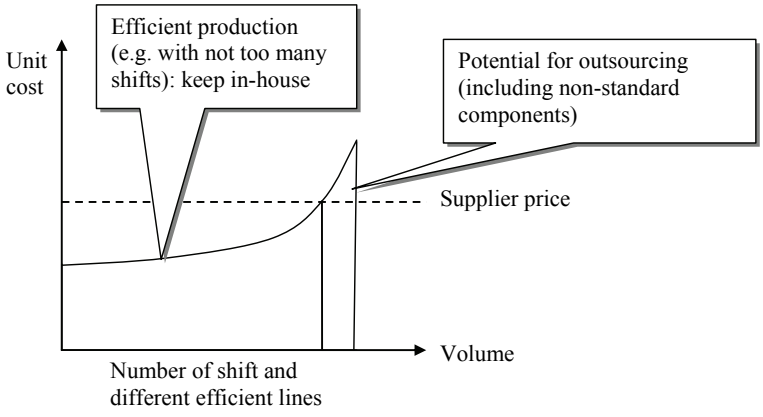

Figure 4-15. Cost curve for M/B-component manufacturing

As seen from figure 4-15, the CEO states that they would consider outsourcing to a cost that may be higher than their most efficient line in Nybro.

"The consequence is that my marginal cost becomes higher than my average cost in the production [for the M/B-components]. A reason to outsource could be to avoid the volume up here [refers to the unit cost with a fifth shift]" CEO

The reason is that they would still make a cost saving in comparison with the in-house production (e.g. outsourcing components manufactured in a night shift in the Ljusdal plant). In this sense, Kährs could outsource this production while keeping most of the standard M/B-component manufacturing in-house. Another advantage with such strategy is that suppliers' manufacturing could be benchmarked against the in-house manufacturing. This means that the fixed costs for the present manufacturing remains but new investments can be avoided and Kährs can have a more normal rate of utilisation of the machinery.

"We would go from 5 to 3 shifts" CEO

"The thought is that we should built up a part [i.e. a supplier] to complement [the current production]" Purchasing Director

The CEO states that one option is of course to invest in the present plants to increase capacity. However, the reason for not doing this is that Kährs would not like to have too much fixed cost; it becomes, according to the CEO, a balance.

"The choice we have made is to not invest… [but] we do not use the factory optimally today. We drive it to hard… I perhaps should increase the capacity in this factory [Nybro plant] with 25-30 %, but we have decided not to do that. Instead we will consider taking in low-cost-producers and buying" CEO

Another reason is that the Kährs does not prioritise investments for the M/B-component manufacturing.

"…we have areas in the production that we consider strategic and others non-strategic. The less strategic the more unwillingly I put money in that area, [for those areas] I'd rather buy. I have no willingness to focus money on sawmills" CEO

A solution is not to create another intermediary. Kährs' CEO emphasises that one more intermediary after the primary wood industry to handle the M/B-component manufacturing is not a suitable development, because this would increase the buying price by, for example, demanding more transportation.

"For sawmills these are pieces that they get as residual products and you cannot afford to transport these things, thus you cannot afford to handle these components with an additional middleman". // "If you put in an additional intermediary which would handle this product you get one more that you have to transport the product to, during transports it is not the distance that costs but the transit of goods" CEO

4.1.4.3 Supplier Related Risks

More outsourcing together with more supplier responsibility in the development of components can be a way of creating more cost flexibility. Kährs has not worked earlier with their suppliers to develop suitable systems and solutions. By increasing outsourcing, the Purchasing Director states that Kährs in the future will try to work closer with their suppliers to deliver better products to the end-customers. However, the CEO says that an important question is how to put a price on risks and the needs to consider dependency. Going from buying raw material commodities to a component strategy by outsourcing puts new demands on the purchasing department. The Purchasing Director says that such strategy increases the need to make sure that the components are delivered in the right volume, with the right quality

and at the right time. Otherwise there are risks of unnecessary stops in the production, which creates bottlenecks.

The CEO says that companies in many other industries outsource to an established specialised provider that many times is larger than the outsourcing company. For Kährs it is much more complicated.

> *"Often you have a business that is small at your company and you outsource to someone that is larger. At Kährs it is the opposite, you have to outsource to someone that is much smaller than us. This makes it difficult" CEO*

> *"…the problem is that there is no supplier structure [compared with the car- and high-tech/IT industry] these strong [developed] suppliers do not exist… joinery factories work with much more expensive products so they are not in the cards… then there are sawmills that often lack everything… in the best [sawmills] there is a saw or planing machines… the first thing they cannot manage is the drying process… it is most critical for the quality of our floors… an ordinary sawmill does not have a chance to manage our requirements on drying to required moisture [fuktstyrning, author's translation]… they cannot actually make any components for us if they cannot fix the requirements on drying to required moisture quota" CEO*

The lack of suppliers and supplier structure is exactly what Kährs' CEO states as the main problem when considering outsourcing:

> *"… there are no large supplier groups developed… often small sawmills… you rather have to work with building suppliers". // "We talk about small suppliers which often lack capacity and do not have financial capabilities" CEO*

> *"Take this with [the M/B-component], that is something we are looking at [to outsource], but… there are no suppliers that manufacturer it today. Instead you have to develop suppliers… There are some difficulties for us in finding a candidate that can make it"// "It is not as easy in other industries where you can go out and ask on the market and have four [or] five alternatives that say that they are interested. That possibility does not exist" Purchasing Director*

Thus, for Kährs there are no established suppliers of the M/B-component. Sawmills exist but, according to Kährs, they do not either have the capacity or the competence for this component manufacturing. The question is why there does not exist any for either wear-layers or the M/B-components:

> *"There are some parts that are missing. The first that is missing is the competence of drying the sawn timber to required moisture, the most technical difficulty is actually the drying. The secret about floors and to get a good quality is very much about the moisture quota. It is the whole secret. If you look at Eastern-Europe they do not have any drying equipment at all, they air-dry the wood. This is their big limitation and even in Sweden you do not have dryers to handle the requirements we have. This is the big limitation. To handle this they must build better plants and learn more to be able to dry the timber to exactly the right moisture [Kährs dry their sawn timber to about 6-7%]. However, the difficulty is not to reach the low levels, it is having little variety in all of the pieces [i.e. keeping a constant high quality and little variation in the moisture quota of the dried timber]." CEO*

An example of the above is when Kährs buys sawn timber for the mid-layer. Here, the first thing Kährs does when receiving the sawn timber is to once again dry the timber (the last thing the supplier does before delivering the wood is also dry the timber). The CEO says that suppliers of wood have normal know-how of drying timber but lacks the special competencies required for handling wood for floor manufacturing. This also means that if a supplier would

take over the manufacturing of some M/B-components it would require some "greenfield" investments:

> *"Per definition it is required when there are no suppliers today. For M/B-components, if you look at one sawmill, they must invest in drying equipment. Then they must get sawing equipment that can saw [the timber] to lamellas. Then they must either manually or by machines put these lamellas [the mid-layer] on the backing spruce veneer layer [bottom-layer]. Then they need a press. So at least a lamella saw and press." CEO*

From Kährs' viewpoint it seems as this manufacturing cannot be outsourced without Kährs effort and involvement in developing suitable suppliers, which right now complicates and impedes the realisation of their intended outsourcing strategies. In this sense, Kährs outsourcing has little to do with obtaining a better product or a product with high quality characteristics. Instead Kährs will probably need to help their future outsourcing partners with investments and machinery to ensure the same quality and cost efficiency as the present in-house production.

Dependency by Outsourcing to Single Source

A complicating factor with a single source becomes dependency. When Kährs considers outsourcing and looking at contract time, the CEO says that they will unwillingly write contracts for more than 3 years. The choice of suitable suppliers for all component outsourcing for Kährs depends on costs and development of the supplier market. If Kährs develops a supplier that only delivers to them, the lack of available suppliers creates a risk of being too dependent on one source. The problem is that they are often larger than their suppliers, which means that if Kährs develops a supplier he will most likely only work for Kährs:

> *"…that is a problem; we would prefer if the supplier would work for several others so he can spread his risks" CEO*

Here, there is a risk that the supplier will be doing the same job that Kährs has done and the result will be that they will have little chance to create any cost savings or become more efficient.

> *"…otherwise he will not gain anything, because then we just move the investments and then he [the supplier] also needs to cover his risks" CEO*

Therefore, it would be better if a supplier could deliver components to several outsourcing partners. The CEO says that dependency, such as with the previous M/B-component supplier, is not good from either Kährs' or the supplier's view-point. According to the CEO it is optimal to have several suppliers and not outsource more than 20-25% to one of these suppliers. By doing this Kährs is still a main customer and gets the necessary attention, but at the same time he is not buying too large volumes to create a too much dependency on one single supplier (i.e. lower the risk of having a supplier that is totally dependent on the volumes from Kährs).

Linked to this is also the need to have a high reliability in supplies from their supplier. This is critical for Kährs when considering outsourcing. For example, the Linnéa board is handled by two suppliers and to avoid too much dependency Kährs will add one more supplier. Also the outsourcing of end-pieces is given to three suppliers to manage the dependency and large volumes. On the other hand, Kährs does not want 15 minor suppliers and instead prefers 2-3 main suppliers. In the future they will have some primary suppliers and require much more of these suppliers, e.g. VMI-solutions, and Just-In-Time-deliveries, as well as coordination of

the upstream flow of wood from sub-suppliers. Suppliers will therefore need to integrate forward and work closely with Kährs to develop a well working relationship.

The CEO says that dependency and lack of alternative suppliers are problems, especially when Kährs is such a large manufacturer it becomes a problem.

> *"…to become too dependent on a supplier is dangerous" CEO*

A purchasing example of this is the bottom-layer of veneer. Kährs purchases their veneer from a supplier in Finland which supplies most of the floor industry in Europe with their veneer and is the largest supplier of this component. Thus, Kährs has only one supplier of this component. During the summer of 2005 there was a large strike in the wood industry in Finland that almost resulted in a stop of Kährs' whole production.

> *"When the sawmills stopped they [the supplier] did not get any raw material to their plant and the plant even stood still for a while. We managed with one week marginal or so. That was a bit sweaty and we have drawn the conclusion that we need to get one more supplier of veneer" // "We have had them for a very long time and we are very satisfied and they give us a very good price… with the exception of this conflict [sub-supplier strike], there have never been any problems, regardless… we have decided that we must have one more developed supplier that manufactures some of the volume. We will start working with one more supplier. Then you can say that the argument is only risk, because we are very satisfied [with the current supplier]" CEO*

In an outsourcing perspective the conclusion for Kährs is that M/B-component is not a core component to create differentiation on the market and customer value, but are a very strategic component to avoid production interruptions in the manufacturing. The CEO states that the lack of veneer could have knocked out the whole production and at the same time this supplier is the dominating actor in Europe and there are no other suppliers available with enough volume.

> *"This is an extreme example of dependency. We had not earlier thought about the fact that we were so dependent" CEO*

Whether buying raw material or outsourcing components, another problem with a single source, according to the Purchasing Director, is to know how competitive the supplier is in comparison with other suppliers. By this he says that when outsourcing the whole production or just having one supplier of raw material it is difficult to follow the development of the market.

> *"…in a few years you lose a lot of knowledge about the supplier market. It is very dangerous because then you do not know if you buy the service or product to the right value or not" Purchasing Director*

This risk can be handled, according to the Purchasing Director, if there is some kind of cost index to follow and other potential supplier available: "*then there is no problem to outsource 100%*". For Kährs, the Purchasing Director says that one alternative is to outsource 80-90% or 70-80% to one supplier. By such strategy Kährs would still buy components from other suppliers or have some production in-house. This enables also benchmarking the cost efficiency of the supplier. This of course requires existing alternative suppliers, which is not necessarily the case for the considered component manufacturing.

A Time Perspective on the Outsourcing Strategies of M/B-Components

Looking back at the intention to outsource M/B-components from a time perspective and yet still focus on the content of the strategies formulated in the Kährs case, there has been several related projects. The general issue has been to find developed suppliers to handle this type of manufacturing:

2004-2005: Kährs "test outsourced" M/B-component manufacturing to a sawn timber supplier in the North of Sweden. Kährs participated in the development of the supplier, however, this supplier did not manage to become as cost efficient as Kährs' in-house production. The lack of a functioning business model, where the supplier had difficulties maintaining the quality and needed to increase the prices of the products produced resulted in a stop of outsourcing of these components.

> *"There are no large supplier groups developed… "// "It has been difficult to find suppliers and [we] are still looking for suppliers. The thought is that the M/B-component manufacturing in our plants in Ljusdal and Brumunddal is not so rational and should be outsourced" CEO (040526)*

2004-: Kährs closed the contract with a large supplier to rationalise their purchasing of wood for the mid-layer components and moved one step closer towards outsourcing by pushing more responsibility on the supplier. The expectation of this contract was that large cost rationalisations could be made by working closely and by closing a longer contract with the large supplier.

> *"This is a new trend where one company puts their whole need [of wood] into one supplier instead of buying smaller volumes… We can likely thank the modern management of Kährs for such decisions" CEO of the Supplier (press release, 040708)*

> *"…a large supplier can optimise the cooperation and drive development projects, something that is beneficial for both companies… right now we have three extensive ongoing projects to find efficient solutions together for our continued cooperation" CEO of Kährs (press release, 040708)*

However, the expectations of this contract have not been fulfilled and Kährs considers the supplier to be somewhat too expensive and have not been able to push as much responsibility towards the supplier as intended.

> *"They have very pressed profitability, we have not found any price mechanism and the whole time we have felt a bit fooled on the price…" CEO (051007)*

The CEO of Kährs says that there is a need to see how interested the supplier still is for such increased collaboration (e.g. working more with optimising yield of input and output), especially when they from the start showed great interest in such production development.

2005-2006: Kährs negotiated with the large sawn wood supplier Norrskog Wood Products (NWP) about outsourcing approximately 10% of the M/B-component manufacturing. However, Kährs and the supplier did not manage to agree on the cost levels of the contract, and the project is for now put on ice (see also case study of NWP, section 4.7).

> *"We made the conclusion that the north of Sweden is not possible [for outsourcing], because then you have the same labour costs and the transportation costs increase. "CEO (051007)*

At a similar time, Kährs also did a larger investigation on the possibilities of outsourcing the M/B-components. This investigation was initiated to get a better understanding of the cost levels that exist in-house and to compare that with both domestic and off-shore suppliers. The outcome is that the in-house production is very cost efficient.

> *"The suppliers neither have the quality nor the price. We continue instead to make it by ourselves, however, Kährs has done a larger investigation into the M/B-component manufacturing. CEO (051007)*

> *"We have such volumes and when we have the raw material relatively close, it is clear that if anyone were to make [the M/B-component] they would need to have the same prerequisites [i.e. must be at least as cost efficient as Kährs' in-house production], in addition transport costs and similar [e.g. need for new investments] are added [for a potential supplier]" Purchasing Director (051111)*

2005-: As an alternative, when there are no suitable suppliers directly available, Kährs is more and more considering outsourcing volumes of non-standard components from the less efficient production lines, to lower the high utilisation of the production plants.

> *"…the only opening for a Swedish supplier is to do something that is special for us…." CEO (051202)*

It seems more and more, according to the CEO and the Purchasing Director, that this manufacturing cannot be outsourced without Kährs effort and involvement in developing suppliers.

4.2 The Window Manufacturer Elitfönster

INWIDO[25] (formerly the Elitfönster Group) develops, manufactures and sells a full range of windows and doors to the building material market, construction companies and modular house manufacturers. Since 1998 sales have increased by ~19% per year that can partly be explained by acquisitions made (also cf. Dagens Industri's website[26]). The group has operations in all the Nordic countries and also exports to countries outside the Nordic region. In 2006, the main brands were Elitfönster[27] and Allmogefönster in Sweden, Storke in Denmark, Pihla in Finland, and Diplomatdörren in Norway and Sweden. The group is the largest manufacturer of wood based windows in Europe and with a market share of ~44% in Sweden the group has a very strong market position.

In November 2004 the Elitfönster Group was sold from the private equity firm Triton to the private equity firm Ratos, which acquired 95% of the group. Following this ownership change has been a strong acquisition strategy of several window and door manufacturers in the Nordic countries, where the financial support from Ratos has been important. To mention a few examples: in April 2005, the group established itself on the Finnish window market through the acquisition of Pilha. With the acquisition of Diplomat Scandinavia in the summer of 2005, one step further was taken into the Norwegian and Swedish door market. By acquiring Lenhovdafönster during the same time the group could increase its production capacity. An acquisition in Denmark created a strong local production platform for the Danish window market. In addition, some smaller acquisitions have been made (e.g. Hajom, a Swedish door manufacturer, Ostvik, a window manufacturer in the north of Sweden, and Panorama Nordic, a door manufacturer in Latvia). More acquisitions are also on the way. (also cf. press release from Ratos, 2005-2006) The acquisition growth strategy has been done at the same time as the group experiences strong sales and organic growth.

> *"We are impressed by INWIDO'S strong development. It is positive that the company's organic growth – plus 19% in the first six months of this year – has contributed to this favourable development to such a high extent." CEO of Ratos (Press release from Ratos; 2005-07-15)*

The fast growth of the Elitfönster Group has led to changing the company name to INWIDO. The reason for this is that there is a risk for confusion if the group is named Elitfönster when there are several other brand names gathered in the group. The former CEO of Elitfönster (Sven-Gunnar Schough) is now the Group Director for the whole INWIDO Group (will in the case study be referred to as the Group Director)[28]. INWIDO has relocated its headquarter to Malmö and has formed a national subsidiary in each country where INWIDO has its operations. In Sweden the company INWIDO Sverige has been formed and includes several

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[25] Abbreviation for International Windows Doors

[26] http://www.di.se: 2004-11-05

[27] Since the studied started in spring 2004 the main focus has been on Elitfönster, and their outsourcing agreement with Stora Enso will continue to be in focus. The strategies of the entire group include Elitfönster and are also captured in this case description.

[28] The former Plant Manager (Anders Isaksson) is the new CEO for Elistfönster and INWIDO Sverige (will be refereed in the case as the CEO). On an operational level he still has his position as Technical Manager of Elitfönster. The new CEO will share the operational responsibility of Elitfönster with the vice CEO (Börje Bellinger, who also is the Market Director). The Group Director is the Board Director for INWIDO Sverige.

brand names. Elitfönster is the primary brand name but several others are included, see table 4-4.

Table 4-4. Subsidiaries of INWIDO Sverige

Company (subsidiary)	Allmoge-fönster	Norsjö-fönster	Överums-fönster	Fönster-installatören	Elitdörren (Bruksdörren)	Lenhovda-fönster
Location in Sweden	Edsbyn	Norsjö	Överum	Årshammar	Högsby	Lenhovda

The Group Director expects to strengthen the market position by the offering of a wide variety of different brands of both windows and doors, which can be enabled by the different companies within the group.

4.2.1 Market and Customers

The CEO states that the group today is experiencing a good market growth on the Nordic market and an upswing especially on the object market (e.g. new building projects). Builders' merchants, construction companies and modular house manufacturers are the group's main customers and can be divided into three main segments:

- *Consumer market* with focus selling to builders' merchants and Do-It-Yourself-retailers. In recent years the DIY-retailers have contributed to the largest segment growth and these customers are very important.
- *Object market* sales to the construction companies (e.g. Skanska, NCC and PEAB).
- *Modular house manufacturers*

According to the CEO, competitive priorities on the market are quality, brand names and availability. Offering well functioning distribution is also more and more an important priority.

> *"Quality and distribution are the two most important parameters…. What is it that is visible at our customer? Well it is our products and how it gets there. It is critical that we can handle this in a good way, where we then manufacture is another thing" CEO*

For Elitfönster, the major part of sales is on the Swedish market and exports are mainly to Norway, Denmark and Great Britain, where sales companies are also established. The company also sells volumes to Japan. There are plans to further internationalise Elitfönster by expanding to interesting markets by increasing export and making more acquisitions (e.g. interesting in improving position in England, Scotland and Ireland).

Elitfönster experiences increased demands from both larger construction companies and DIY-retailers, but also accompanied business opportunities. Working with these large customers requires a lot of resources. Elitfönster is an exclusive supplier to several new DIY-retailers on the Swedish market, e.g. Hornbach and Bauhaus. However, for these retailers second brand names (e.g. Allmogefönser), private labels or unbranded products are often used. By doing this they avoid exposure of the primary brand name (Elitfönster) and pressing down the price levels on the market. The Group Director emphasises that this strategy enables the selling of large volumes to the DIY-retailers while still remaining a strong primary brand name that can

offer higher margins. The Group Director expects that unbranded labels will increase in the future:

> *"…many of these retailers are low-price-chains and non of them have brand names or wish so to say administrate the brand names we would like to sell to them. Therefore, the offer they will get are having unbranded products" Group Director*

According to the CEO, having a wide variety of different brands but at the same time offering unbranded products and private labels is a major strength. In the future windows will become more and more technically complex, e.g. contents such as security systems and alarms will be integrated with the window construction. This product development is important to further create differentiation of windows on the market. Selling windows more and more also includes services such as the installation of windows to customers. The CEO says that these services could be even more augmented in the future to include services of windows and also cleaning, especially if there, in the future, will be permission for households to make a deduction for these kind of services.

> *"… you must be very flexible… for the person who cleans the windows what does he do more? He can point out that this hinge is not functioning and that the windows soon need to be changed" CEO*

4.2.2 Products and Production Setup

Elitfönster manufactures a wide range of different types of windows (e.g. models and colour). While the design of the window can vary depending on which local company manufactures the window, the basic construction of the window is somewhat the same. More and more the windows are delivered with an aluminium cover (i.e. an aluminium clad), which makes them almost maintenance free. Figure 4-16 gives a simplified view of the construction of a standard window.

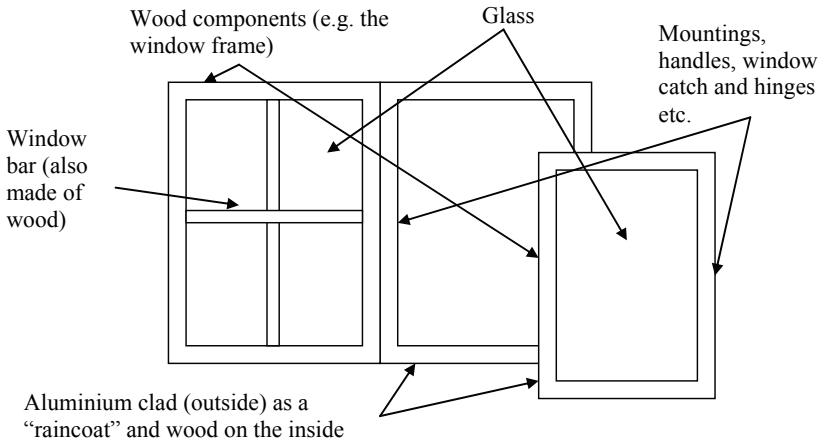

Figure 4-16. A simplified view of the construction of the windows and input of components

The window construction is based on sawn timber. The wood components are today made from blanks consisting of finger jointed glue-laminated wood[29] (e.g. for manufacturing the frame and the case of a window), which partly have been outsourced to the forest product company Stora Enso.

Elitfönster has two main production sites located in Vetlanda and Lenhovda as well as one plant in Poland. The plant in Vetlanda mainly manufactures windows for construction companies. The Lenhovda plant is specialised on manufacturing windows for the consumer segment mostly, which are sold via the builders' merchants. This plant also produces products for the modular house manufacturers. The group does their own manufacturing of glass for the windows. This manufacturing is done by the subsidiary Isolerglas Fabriken (IGF) and is integrated with Elitfönster's production plant in Lenhovda. Offering the right window glass to customers is important and enables differentiation. The Production Manager[30] says that a lot of the offer in the window selling is offering the right glass (e.g. self-cleaning and energy saving). The base of wood suppliers has traditionally been more national, while the purchasing of mountings and some of the glass is made from foreign suppliers.

Assembling is the activity which today is the most labour intensive. However, according to the CEO, this is an expected development, where they have not strived to automate these activities, partly due to the large number of different variants and components that exist when manufacturing windows. Figure 4-17 gives a view of Elitfönster's production setup for manufacturing standard windows in the large scale Vetlanda plant.

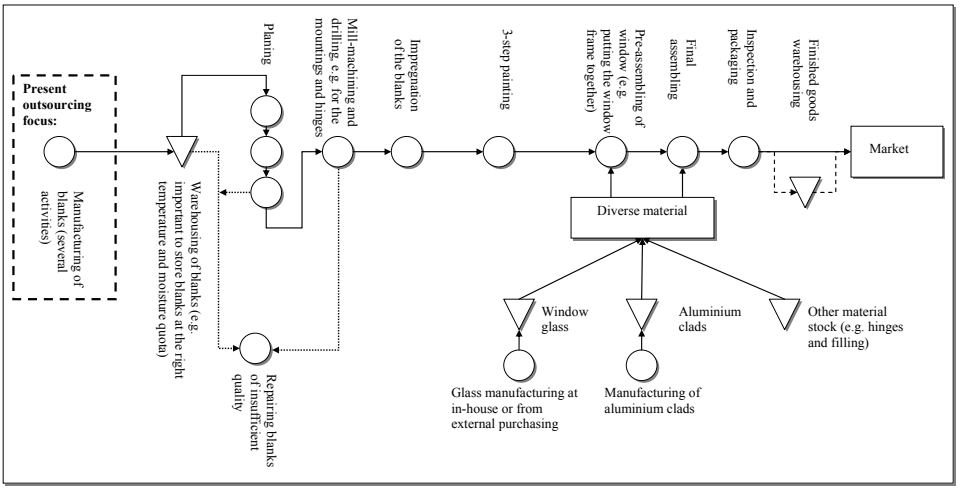

Figure 4-17. Manufacturing process of a standard window[31]

[29] Finger jointed components by glue-laminated wood are joined together to become a component, e.g. a window frame. This method gives several production advantages as a minimisation of wood and little spillage (Stora Enso's website, 2005-11-07).

[30] Production Manager at the glass manufacturing subsidiary IGF

[31] For non-standard, a separate production line exists that is more manual (e.g. round windows).

4.2.3 Driving Forces for Outsourcing

A main component when manufacturing windows are the blanks. For the main production plants in Vetlanda and Lenhovda, Elitfönster used to manufacture blanks of solid wood from sawn timber. The plant in Vetlanda has been producing these components and several investments in this production line were made to make this production efficient. However, the previous machinery at Elitfönster had the shortfall that it could not manufacture finger jointed blanks and it would demand costly investments to upgrade. In addition, the manufacturing of blanks was quite labour intensive and Elitfönster wanted to cut costs and work towards a higher degree of automatisation that was more cost efficient. Here, the management at Elitfönster wanted to take a technological step forward and to start making blanks of finger jointed glue-laminated wood, which also offer minimisation of sawn timber and low spillage.

> *"If you should be up-to-date today you must have finger-jointing" CEO*

This manufacturing could as well have been handled in-house but Elitfönster wanted to find the means to avoid investments.

> *"…if we would have done it [invest to manufacture the blanks in-house] by ourselves we would have invested SEK 40-50 million in a new plant… that was too much money for a relatively simple operation… so we managed to get Stora Enso [a supplier] to do it instead" Group Director*

> *"[A driving force] for outsourcing… is to let somebody else take the investment cost." CEO*

The Group Director argues that cost and financial factors are the driving forces for any outsourcing in the group.

> *"It is only the [total] economy, nothing else" Group Director*

For this blank manufacturing Elitfönster entered an outsourcing agreement with the international forest product company Stora Enso[32]. The CEO states that the available resources instead can be better used on components and operations that create differentiation on the market and create customer value. The financial aspect is closely related to the fact that there is a lack of capacity in Elitfönster's plants and they wanted to stop the tradition of handling everything in-house.

> *"… when you are making everything there are large risks" CEO*

Outsourcing the blanks was also to lower capital tied up in their production facilities, warehouses and in raw material.

The new production technology was expected to result in a better quality and functionality of the blanks, for example, the blanks would be more shape-resistant. Another advantage would be that finger-jointing reduces the need for putty (e.g. covering knot holes or knots). The cost for the puttying in the previous blank manufacturing plant in Vetlanda used to be about SEK 18 million per year and required up to 60 employees for handling this.

Elitfönster previously experienced unnecessary transportation and governance costs due to the fact that all blanks were manufactured in Vetlanda, but 80% were shipped to the production

[32] Stora Enso is an integrated paper, packaging and forest products company producing publications and fine papers, packaging boards and wood products (Stora Enso's website, http://www.storaenso.se/, 2004-12-06).

site in Lenhovda. The outsourcing of blanks was expected to enable lowered transportation costs and improve logistics due to making more of the processing close to the source of the wood raw material and more direct transportation. Linked to this was a simplification of the flows in the production plant that were enabled by the outsourcing of blanks.

Elitfönster had several problems with the earlier supplier base setup, which was also a driving force for outsourcing. Elitfönster had 15 minor contracted sawmills that they needed to coordinate supplies from. An ambition was to lower the number of raw material suppliers, which turned out to be very difficult because the agreed time of deliveries could not be held by a single supplier. At the same time a difficult task was to take the raw material from all these suppliers while not really knowing what they would get in terms of quality. Thus, with the earlier supply solution Elitfönster experienced large problems getting the right quality standards and tolerances in the right time from their suppliers. As a consequence they also had a lot of spilled-timber from their manufacturing of blanks, which caused unnecessary costs. Moreover, the governing of these suppliers was very time consuming.

Looking at the results from the outsourcing several technical and cost efficiency benefits have been realised:

- Avoiding costly investments for upgrading the machinery and lowering tied up capital.
- Lowering total costs: Elitfönster can buy blanks at a somewhat lower price than the costs were when they manufactured the blanks in the Vetlanda plant (e.g. can purchase blanks in L-shape at lower costs).
- The cost for repairing blanks with insufficient quality has been reduced to a 1/3 of the costs. As a consequence of less need for puttying the efficiency of surface treatment line at the plant in Vetlanda could be improved and Elitfönster could create an integrated “putty on-line” (spackling on-line, author’s translation).
- Increased range of available types of blanks but less variants of L-shaped blanks (L-profilvarianter, author’s translation) by more standardisation.
- Improved lead-time between customer orders to complete windows.

4.2.4 Key Factors Addressed when Considering Outsourcing

Two main factors are addressed when Elitfönster considers outsourcing for a component: the costs are weighed and compared with the risks of letting an external supplier handle a component/product manufacturing.

4.2.4.1 Focus Areas for Outsourcing – Component and Product Importance

According to the Group Director, products and components such as blanks that can be measured in metres (i.e. piece goods) are most preferable to outsource. In total, the company outsources ~10% of their total production.

> *"…If we would manufacture all the blanks and all the glass by ourselves, which we now have outsourced, then it would correspond to 100 employees of the 1000 employees we have… in this sense [we outsource] approximately 10%, or in that magnitude measured in number of working hours". Group Director*

The CEO states that Elitfönster produces a lot in-house, perhaps a little too much. According to the Group Director, how difficult it is to outsource a component is depending upon how complex the item is to manufacture. If it is a complex component that Elitfönster is considering outsourcing they will try to keep some kind of "know-how" in-house.

> *"You can say that [the component] can be simple to [outsource] or it can be more difficult. It is depending on its complexity or uniqueness… if it is difficult to [outsource], that is to say it is a complex product… it can also be complicated if you need to move [the manufacturing] to a new supplier if there are problems with the old supplier. If it is that kind of complex product then I use to say that you should keep the know-how at home, you should not be so niggardly that you close everything at home. You need to have a preparedness, which means that you should keep the production tools at home" Group Director*

If it is a complex product or component that requires 6 months start-up time or a need to develop a new supplier, there can be a necessity to keep a parallel production as a start. Figure 4-18 illustrates the Group Director's view of combining outsourcing with parallel production.

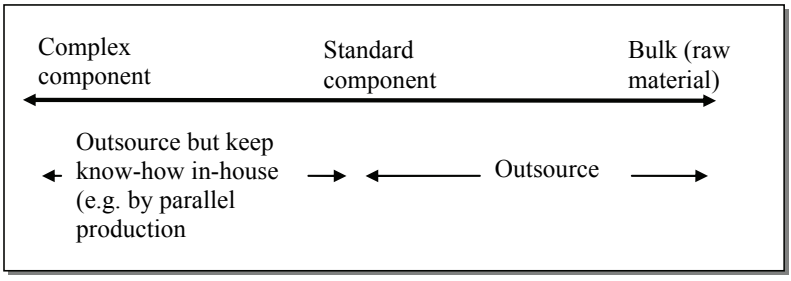

Figure 4-18. Outsourcing strategy depending on the complexity of the product

The reason that the blank outsourcing was not done earlier was because there were not any developed suppliers that directly could handle this kind of outsourcing. At this time the supplier planned one plant in close proximity to one of their present sawmills in the north of Sweden. Elitfönster guaranteed certain volumes to the supplier that built a new production plant at the Ala sawmill[33]. This component mill is directly integrated with the sawmill. To build the component line at the Ala sawmill the management at Vetlanda participated in supporting Stora Enso (e.g. requirements on the production process, the different functions and quality standards). Late in 2003 the component mill started to deliver components to Elitfönster. As a starting phase, Stora Enso delivers up to 80% of Elitfönster's needs of blanks for windows (and door manufacturing). Elitfönster receives the blanks in lengths of 6 metres which initially when received needs to be planed (see also figure 4-18 about the manufacturing process).

Blank Outsourcing and Parallel Production

At the time for outsourcing, Elitfönster had two production plants for the manufacturing of blanks, one in Vetlanda and one in Norsjö (Norsjöfönster, which is a company in the group that manufactures windows under the brand name Norsjöfönster). As a consequence of the outsourcing agreement with Stora Enso, Elitfönster closed the production of blanks in Vetlanda. However, Elitfönster decided to keep the production of blanks in Norsjö. Here, the production plant in Norsjö manufactured the remaining 20-30%.

> *"There [in Norsjö] we the all time had a smaller production unit… then technology moved forward and it turned out that we could with rather small means, about SEK 10 million, rebuild our plant in the north of Sweden [the Norsjö production plant]. In this way we could do the same thing as Stora Enso. So we did it and our contract with Stora Enso does not say that we must buy 100% from them. Instead [the contract says that we must] buy some required quantities that we have agreed, a minimum … The remaining need, in addition [to the quantities] that have been agreed with Stora Enso we manufacture in our own plant in Norsjö" Group Director*

> *"If you take the manufacturing of blanks, what has happened since we closed our manufacturing of blanks in Vetlanda and made a contract with Stora Enso, is that we have also built a finger-jointing manufacturing plant for blanks in Norsjö." CEO*

As a consequence of the many acquisitions the balance has also changed. In the two companies that INWIDO has bought in Denmark and Finland there also are developed production units for manufacturing these finger-jointed blanks. As a result Elitfönster (or INWIDO) once again are quite large on manufacturing blanks, but now instead use a finger-jointed manufacturing technique (also cf. NTT, 2007).

> *"We finger-joint more in our group then what Stora Enso does in their Swedish production unit [the Ala component mill]. We are relatively large on this once again and that is the way it is has turned out" Group Director*

> *"…then the Finnish and the Danish companies also have finger-jointing production plants and suddenly we have become quite large in manufacturing blanks in the group" CEO*

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[33] Ala Sawmill operates in Stora Enso Timber's Nordic Production Group. Ala is located 300 km north of Stockholm. (Stora Enso's website, 2004-12-06). The component mill is integrated with the Ala sawmill and produces customised solid and finger-jointed components. The sawmill has an annual production of 360,000 m3 of sawn timber products. (Stora Ensos Website, 2005-11-01). This sawmill is one of the largest production units in Sweden (Staland et al., 2002).

In a time perspective, the development from in-house manufacturing to a mixed strategy illustrated in figure 4-19.

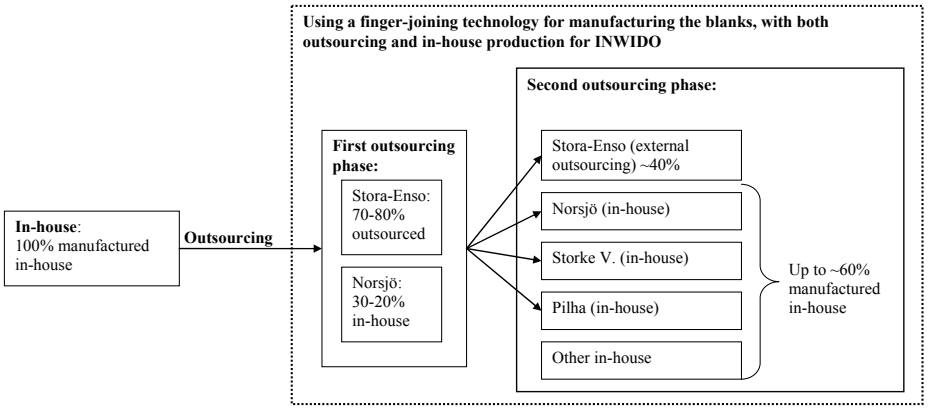

Figure 4-19. From in-house production to outsourcing to outsourcing and in-house parallel production (also cf. NTT, 2007)

INWIDO's many new plants offer a production flexibility for the blanks.

> *"…It is the same for those [the blanks] we [the whole INWIDO group] manufacture more than we buy, and by this we have the knowledge directly in-house. We have almost completely occupied ourselves with the main manufacturing and then we outsource the volume peaks" CEO*

According to the CEO, an advantage of parallel production is that Elitfönster can avoid the risk of having too high fixed costs during market downturns. Here, costly investments to increase capacity can be avoided; thus, finding the right capacity and scale for the production units:

> *"…for both glass and blanks we are today in a situation that we could take a substantial downturn [on the market] without it affecting us" CEO*

In general, Elitfönster will in the future increase their outsourcing to obtain additional capacity in their production plants, and some production will most often be kept also in-house. Having parallel production and only outsourcing a part of the manufacturing capacity of components will enable their production units to at all times have a high rate of utilisation. By doing this Elitfönster can keep overall costs low and plan the size of the staff.

> *"…we can operate our machines optimally and have a steady year-round production volume" CEO*

The outcome is according to the Group Director and CEO, is that they can attain production flexibility and at the same time retain production skills and know-how in the group.

> *"You will buy your demand peaks… we can grow without increasing our investments" CEO*

They both state that this outsourcing strategy enables business cycle flexibility (e.g. avoid investing in capacity expansion that can cause too large fixed costs during market downturns) as well as the possibility to benchmark internal and external processes, see also figure 4-20.

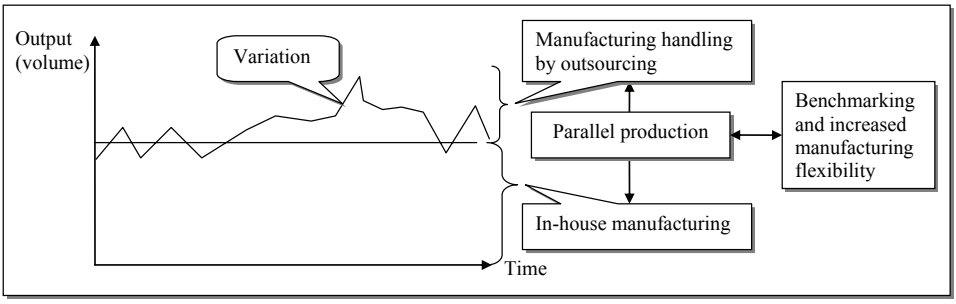

Figure 4-20. Outsourcing the demand peaks to external supplier (Illustrative)

The Group Director and CEO claim that this setup offers better risk-sharing and is not too dependent on their suppliers. The CEO says that keeping know-how is critical when outsourcing.

Product Outsourcing

The present focus is on outsourcing blanks, but the company also outsources the manufacturing of some windows types to a supplier in Estonia.

> *"Somewhere is a limit [how much component outsourcing can be done] and then perhaps it is better to [outsource the] manufacturing of complete windows instead" CEO*

The supplier manufactures ~20,000 windows per year. However, to avoid a dependency situation and the risk that the supplier will increase the prices too much, some of this production is still handled in parallel in the production plant in Vetlanda. Elitfönster negotiates with a Polish supplier which, due to capacity limitations in the present plants, will manufacture some volumes of complete windows.

For product outsourcing, Elitfönster must handle the risk of letting an external supplier manufacture their windows with their own construction, design and technology etc. For this agreement there is a risk that the supplier takes advantage of letting Elitfönster make investments in machinery, getting the competence to manufacture this type of window construction, and then abandon Elitfönster, to deliver windows to competitors or compete by selling windows directly to the same customers.

On Parallel Production for Products: The Manufacturing of Window Glass

The group outsource about 30-40% of their window glass production. The Elitfönster Group, or more lately the INWIDO Group, has grown so much that it would require a lot of investments for the glass manufacturing subsidiary, IGF, to handle all the manufacturing in-house. In addition to that, making a lot of investments and accompanied fixed costs are, according to the Production Manager, less suitable during market downturns.

To handle demand peaks in the production and avoid new investments, the company buys complete window glass (e.g. thermophanes), from two suppliers in Poland. The main advantage with buying window glass from Poland is the low price level (the saving is mainly on labour and material costs). The outsourcing strategy enables Elitfönster to utilise their own manufacturing plant at an optimal rate of utilisation and the number of employees can be kept at a suitable level. Thus, the demand peaks are bought from external suppliers.

By complementing their own in-house production with external suppliers, IGF can also offer a wider assortment to the companies in the group (e.g. for some window manufacturing a certain brand name or glass type is demanded from the different companies). The Production Manager stated that this strategy enables them to offer almost any type of window available on the market.

Keeping an in-house production is important. The Production Manager argues that a critical advantage with in-house production is that they keep a well developed buying competence (e.g. up-to-date knowledge about the production processes, price development of the market as well as knowing about new material). The Production Manager says that parallel production helps to create less dependency on external suppliers. For glass manufacturing the wrong quality or dimension of a window glass could mean a bottleneck for a customer order of many windows. This is because the manufacturing needs await a new window glass to complete the order, which can take some days if it is supplied from an external supplier located in Poland.

> *"I have two suppliers on all input of material… [by this having control] on prices and supply reliability. If you have trouble you always have another to fall back to… I do not want to be in the situation [of only having one supplier]… at least two suppliers" Production Manager*

At the same time, the parallel production enables a continuous possibility for benchmarking. If they did not have parallel production the Production Manager argues that they would lose control over supplier market development: "*You do not have the insight to how the prices of raw material changes… I have full insight in the raw material prices also when we sit and negotiate with these two suppliers*".

Future Supplier Markets for Outsourcing

There can be advantages with outsourcing to a Swedish supplier but then the costs are higher, which can require trade-offs. Here, the CEO states that the risks of outsourcing are somewhat similar whether sourcing to suppliers in Sweden or Eastern Europe. However, if outsourcing to Swedish suppliers the risk may be easier to handle while the Baltic States can offer lower costs. The important thing is to: "…*find the right components to outsource, you can never say yes or no; you need find the right competencies*". Nonetheless, in the future more manufacturing will likely be moved to low-cost-countries but much of this will still be handled in-house:

> *"We will make more then [in low-cost-countries] but will be managed by ourselves, I do not think that we will increase the buying [of complete products]. We perhaps will buy as well, what is important is to be absolutely best at distribution to our customers as the DIY-retailers and the modular house manufacturers" CEO*

> *"It is a natural development towards Eastern Europe; this would not have been the case if we would have manufactured windows of aluminium. This is because we have a material [wood] that exist more in Eastern Europe than anywhere else. We will move towards East [Europe] there is no doubt" Group Director*

Thus, for Elitfönster and the whole group it is more about building up their own production units in low-cost-countries. An advantage with this strategy, according to the CEO, is that the efficiency built up in the Swedish plants can be transferred to a low-cost-country, where both labour and raw material costs are lower. Even though INWIDO today once again manufactures quite large volumes of blanks, the Group Director expects that this manufacturing can eventually be outsourced to suppliers in Eastern-Europe.

"On the other hand I believe that this process will gradually be totally outsourced, but then it will be somewhere else. Probably not in Swedish production units, instead it will be done in Eastern-Europe. It is my belief that it will be done" Group Director

However, for now, the somewhat lack of consistent quality from the main supplier makes it more difficult to decrease the own in-house production (also cf. article in NTT, 2007).

4.2.4.2 Capability Benchmarking

To secure that both cost advantages can be received and that investments can be lowered, total costs must be right when outsourcing.

"The profits in a total economic costing model [to see how much revenues and profits can be attained], there are very few who can do these costing [correctly]". // "The total economic costing model must be correct and there you must put the risk – because outsourcing always contains risks… you must put it [the costing model] against all risk that could arise… then you have to weigh [cost and financial advantages against risks]… however, that is subjective judgement… you can never quantify all the risks" Group Director

However, as the Group Director states, it is difficult to access the whole internal costs to compare it with the external supplier price as well as compromise all emerging risks. The Group Director says that a costing model often only confirms what is wanted to be achieved.

Outsourcing to a Low Cost Supplier

If considering outsourcing to an offshore-low-cost-manufacturer, raw material costs and labour costs will, according to the CEO, be reduced. The Group Director agrees and states that for components the savings are more on raw material costs than on labour costs. In the future, they will consider outsourcing some of their manufacturing of blanks to the Baltic-States.

"We are actually looking into this today, we have started a bidding process with a supplier in Latvia that is large at components and only manufactures components. [The company] sells over all of Europe but primarily in Germany, little in Holland and France." Group Director

When considering this supplier, INWIDO will compare their own costs with the supplier's offered price. In doing so, see where saving can be made:

"There we can see where savings exists. And of course there are some savings on the labour side, but those are not so large because they have relatively automated production units. Instead, the savings are very much on the raw material side. They are in closer proximity to raw material [with high quality]. When I say raw material [costs] I mean raw material and the transportation costs." Group Director

One reason that low-cost-producers have lower raw-material costs are because it is not as expensive for labour compared to Sweden. In Sweden the suppliers have automated operations and focus on having high operational efficiency when sorting and sawing the timber. The Group Director says that as a consequence such sawn timber suppliers consider a lot of pieces as by-products/consequence products. However, this is not the case for a low-cost-producer, as the one in Latvia which may be a future outsourcing partner. After the automated operations have sorted the timber, they will use items that Swedish suppliers consider as spillage sawn timber one more time.

"The low-cost-labour sorts these [items] and gathers them [in piles]. There are several thousands of pieces each day. Then they say that for this industry we can use these [items]

and for this industry we can use these [items]. Then they start laying these [items] on tables and putting them in manual finger-jointing machines and then sell them. This means that they get less spillage of timber on the material side and get a lower raw material cost." Group Director

As a consequence these suppliers have higher labour costs because they use more staff to take care of the spilled timber. However, the labour costs are still lower than Swedish suppliers.

"If we use one employee, they perhaps use 2-3 employees, on the other hand it takes 5 [employees] to cover the labour cost [for 1 employee in Sweden]" CEO

By doing this the main advantage is lower spillage costs, where there are big savings by component outsourcing:

"If we have a spillage of 20% in our plants and they [the supplier in Latvia] have a spillage of 5% we already can save 15% on material. They can afford to utilise it [the spillage of timber from the operation processes]" Group Director

However, he emphasises that indirect labour costs due to large administrative units can often be expensive when outsourcing to low-cost-countries (e.g. CEO has a large staff).

"They are not as efficient in administration, but can be very productive in the manufacturing" Group Director

This often makes overhead more expensive in the Baltic-States and countries as Poland.

Requirements on Cost Reduction

The CEO states that the risk and trouble of outsourcing is very high and therefore outsourcing must offer lower costs and 10% is not enough. In general the Group Director states that these requirements need to be evaluated based on the competitive situation of the company. For Elitfönster it is important to relate the potential savings in relation to the established margins that exist in the industry context.

"It plays a decisive role. If you are in an industry that has very small margins, that is to say that you operate with very small margins, then it can make the difference between life and death by just saving 5%" Group Director

Doing an analysis of the outsourcing decision, according to the CEO, is complex and it is difficult to know if all the parameters have been included in the analysis. Therefore, some kind of margins in terms of cost reduction is needed. The CEO suggests that when they do outsourcing it is for the purpose of lowering the costs, but at the same time the supplier will require some kind of profits:

"You have to remember that when somebody else does it they must also make a profit" CEO

The CEO states that costs need to be lowered at least around 15% if Elitfönster were to consider outsourcing. In reality this means that the supplier's costs must be even lower to have a profit margin. The CEO says that if these margins do not exist the supplier does not have a sustainable business model and there would be no outsourcing to the supplier. This is to make sure that the supplier's offer is reasonable and that the supplier can be profitable in a longer time perspective. Otherwise there is a risk, according to the CEO, that the supplier shortly after the outsourcing agreement will want to increase the price on the manufactured component. One way to handle this is to require to see the suppliers cost estimates and

calculations. By this Elitfönster can see how the supplier is reasoning and evaluate if their price offer is reasonable or too optimistic.

> *"The best thing is if you get to see their cost calculation, then you have tied them down [bundit fast dem ordentligt, author's translation]" CEO*

The CEO says that many companies forget the risks of hidden costs, such as transportation and additional needs for warehousing of components: "*… there are probably many outsourcing decisions that have been done on insufficient cost analysis*".

Making the Cost Analysis

When considering outsourcing, one of the first steps is to find a supplier which Elitfönster thinks can have a reasonable business model to handle the outsourcing, and one that is not just applying a "*loss leader tactic"*. When making the outsourcing analysis Elitfönster starts with comparing internal and external costs.

> *"[We] need to start with a calculation; all volumes must be there, to whom, when and how often" CEO*

Starting with comparing the cost of making a component, Elitfönster compares their internal costs with the suppliers cost estimate (cf. the blank component). This includes raw material costs, labour costs and transportation costs. For Elitfönster when making an outsourcing decision they try to make a thorough cost analysis. After that they try to judge possible risks. The CEO also states that he requires formulation in documents. If Elitfönster were to start buying something from a new supplier, the CEO would expect to get a document that describes how much and what it cost, how the flow is and how much money they make. They do the same thing when considering new investments:

> *"I do not think you should spend millions if you have not formulated this in a document. It is the same for a production technician that wants a new machine. It is not enough to just say that he wants this machine, first he needs to write it down so he starts thinking about it" CEO.*

The analysis also considers need for investments, which was a main driving force when outsourcing the blanks to Stora Enso.

> *"That was the case that time [outsourcing blanks to Stora Enso] when we did not invest SEK 40-50 million in a new component plant in Vetlanda, and instead closed it. The background was that the investment was too big for the value [förädlingsvärde, author's note] it would give. The ROCE-figure would also be reduced" Group Director*

For the supplier that took over the manufacturing of blanks it required several greenfield investments. The fixed costs are, according to the CEO, more difficult to decrease when outsourcing.

> *"When outsourcing you must have an idea what the machines [grejerna, author's interpretation] will be used for. Then you have to remember that if you earlier had one employee that handled the purchasing of raw material, you still now have one that purchases the complete material… Administration still costs as much. If it is on the balance-sheet it is there it will go away; particularly machines if you manage to sell them [or avoiding new investments]" CEO*

The Group Director says that the outsourced blank manufacturing enabled the reduction of fixed costs. However, some remains and he states that how much the fixed costs can be reduced is dependent upon what kind of outsourcing is being done.

> *"When we closed our component manufacturing [the manufacturing of blanks] a large part of the fixed costs were taken away. When you close a whole factory the fixed costs can be taken away, but not all" Group Director*

According to the Group Director, the costs for administration (e.g. the financial and accounting department) do not change and the board of management and the CEO still remains at the company.

> *"[For the outsourcing of blanks] some fixed costs can be reduced but not proportional… fixed costs for machines and buildings can be reduced and one foreman is taken away. The heavy fixed costs remains then you need to outsource considerably more" Group Director*

When Elitfönster made the analysis of the outsourcing decision for the blanks they made it more on a component level. By doing this it was possible to see the component costs and then compare it with the supplier's price. In such calculation raw material and labour costs are included but not so much consideration is given to the fixed costs in terms of overhead (e.g. ongoing administrative expenses of a business). More consideration is given to variable costs but it depends on the level of analysis:

> *"It is often on this level [mainly considering variable costs], but if we were to now close a whole factory, for example the factory in Edsbyn, and buy everything [from external suppliers] it is a completely different calculation. Then it is the whole calculation of the factory [fabrikskalkylen, author's translation]. However, on a component level it is on a variable cost level. That calculation is like any purchasing calculation" Group Director*

This means that Elitfönster compares mainly variable costs with the supplier's price. Here, the supplier must be able to match Elitfönster's variable costs of one special manufacturing and offer lower costs than this level, see figure 4-21.

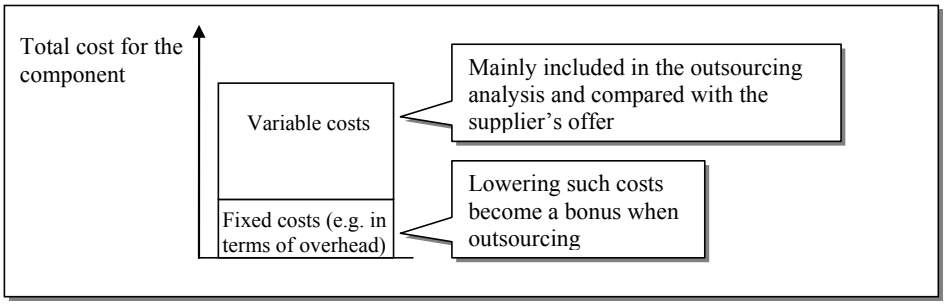

Figure 4-21. Analysis of outsourcing on a component level

If Elitfönster outsource under their variable cost level, then they do not need to consider fixed costs so much and can still be sure that savings can be made.

> *"When it is on a component level and not the whole production plant it is this level you need to calculate" Group Director*

In this sense lowering the fixed costs in terms of overhead can be considered a bonus. However, financial aspects (i.e. avoiding investments) are of course still very important when considering outsourcing strategies.

Capability Analysis for Window Blank Outsourcing

The reason that Stora Enso could make an interesting offer for Elitfönster was:

Firstly, because of the large investment that was needed for upgrading the machinery at Elitfönster. When management made the decision to outsource the manufacturing of blanks they knew that they were too labour intensive and wanted to work towards a higher degree of automatisation and also take a technological step forward. This would demand very costly investments and therefore Elitfönster decided to instead outsource and not upgrading the present machinery.

Secondly, Stora Enso could offer competitive prices by using the finger-jointing technology to make the blanks, which also enabled a larger volume of input to the component mill. The sawn timber used is mainly low quality grades from their own sawmill.

> *"[it] was because they [Stora Enso] use [sawn timber of] very low quality and then they finger-joint these and saw off all knot holes or knots. They found a market for disposing a product from their sawmill that they otherwise got paid little for." CEO*

The CEO states that the possibility for Stora Enso to integrate forward and use the raw material in a new way by finger-jointing was the big advantage for the supplier. Here, it was a combination of avoiding investments for Elitfönster and a possibility for Stora Enso to use their raw material in a new and better way.

> *"[the component mill] was in close proximity to the sawmill, which meant that the transportation costs were zero. They used the [component mill] to balance [the production] in their sawmills and took out a residual product to refine it to a more high value product. That is the whole concept" CEO*

In this sense Stora Enso could offer lower raw material costs. The CEO also says that Stora Enso has made investments to become more productive. By investing for high automatisation they could also offer some lower labour costs: "*but then they get it as a capital cost instead*" CEO. Thus, Elitfönster's view of the business model of Stora Enso is based on trying to offer lower costs and at the same time offer something extra with a new production setup, see also figure 4-22.

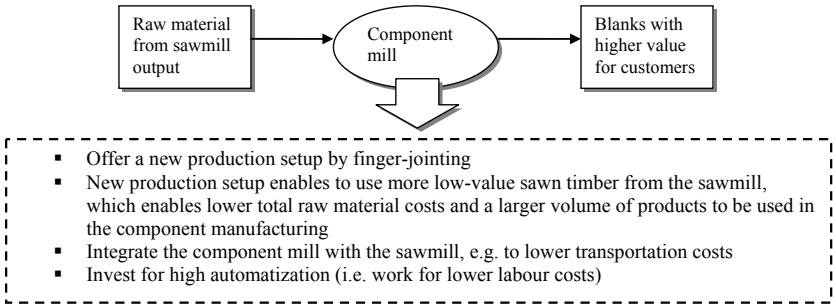

Figure 4-22. Outsourcing of blanks and the business model of Stora Enso

Capability of Sawn Timber Suppliers

The Group Director argues that sawmills should take greater product responsibility and that Swedish suppliers have difficulties forward integrating to handle the raw material supply and component processing in Elitfönster's value chain. Stora Enso was the first in Sweden to build a specialised component mill to manufacture the blanks. However, the outsourcing of the blanks to Stora Enso has not been uncomplicated. While the component outsourcing to Stora Enso has enabled some advantages for Elitfönster, there have been several initial quality problems with Stora Enso's manufacturing of blanks. For example, wrong temperatures in the warehouses caused delamination and general finger-joints of low quality (otäta skarvar, author's translation). This has forced the company to perform costly extra activities such as repairing, filling and puttying the blanks. The CEO emphasises that there is too often a lack of communication from Stora Enso's component plant when they are having production problems. In addition, supply reliability and overall quality levels can still be improved. Here, the supplier needs to create a more constant quality level (i.e. uniform quality of the blanks) (also cf. NTT, 2007). Elitfönster demands that the specification of requirements should be the same regardless of the raw material suppliers Stora Enso chooses to use. A lack of quality results in Elitfönster not being able to close down their own in-house production capacity of blanks (Ibid.). They need to retain some production in-house to guarantee supply reliability and lower the present dependency situation.

The Group Director says that the problem mainly has been that the supplier has not enough competence about this type of component manufacturing.

> *"Their whole organisation is pervaded by focus on cubic metres and volume… they do not consider the quality of the final product as an essential part… for them it is boards and cubic metres… it is volumes they consider… [and] measure… they do not measure how many good or bad products they have made" Group Director*

By this he says that the supplier has difficulties understanding the requirements that it takes to move forward in the supply chain and make components. A company striving for integrating forward, according to both the CEO and Group Director, is normally no problem; only for a raw material supplier that has the ambition to move downstream.

> *"It is like you would go to LKAB [a world-leading producer of upgraded iron ore for steelmaking] and say that now you should make steel products. They only need to make a certain million tonnes of ore per year and it is the same for our Swedish sawmills to" Group Director*

According to The Group Director, the "*cubic metre thinking*" has still pervaded the sawmills as they are now trying to move towards a component strategy from a raw material commodity production. The Group Director states that the sawmills have not been successful when trying to go from supplying raw material to a component strategy.

> *"During the last 30 years there has been a steady discussion in Sweden that the sawmills must go from a bulk to a component strategy and [that they] cannot continue to make sawn timber and then sell the timber to [suppliers in] Denmark which further process them and sell them to the rest of the world…. [then they say that this manufacturing] should be as close to the sawmill as possible and by selecting the right sawn timber for the right industry… get a better quality. This they have been talking about over the last 30 years and the furthest they have come is Stora Enso's component plant and in reality that does not work either" Group Director*

If a sawmill is going to handle the outsourced processes in an efficient way it will require that they can enhance the quality levels offered and focus more on the customer's needs and

requirements. The Group Director says that the contractual agreement with Stora Enso took 1.5 years to negotiate and there are still quality problems with the outsourcing of blanks, which has required Elitfönster to perform costly extra activities (also cf. NTT, 2007). Thus, the problem is that the suppliers from the primary wood industry still keep a volume focus also for a component production.

> *" The quality varies too much. The sawmills have historically not shown capability or understanding to deliver high quality with little variation. If you cannot manage that you should not try to make industrial components" Group Director*

He does not expect that foreign suppliers from the primary wood industry to be better: "*A raw material supplier is a raw material supplier wherever they are in the world*". Instead, the Group Director states that it is better to find and develop suppliers that have a competence for buying sawn timber and transforming them into components with a higher value for their customers. The Group Director says that there is in fact enough margin on these products for an additional intermediary.

4.2.4.3 Supplier Related Risks

The Group Director states that there is always a dependency on the company's suppliers, whether it is a question about outsourcing or simple purchasing decisions. But the risk of dependency is much larger when outsourcing a component manufacturing.

> *"It is just a question of which level [the dependency] should be. If you are dependent on basic raw materials then you have more alternative suppliers. The more specialised products you buy the less alternatives you have" // "It is your component, your design, your construction, your production tools… you take the component and find someone that can manufacture it for you. Then you show him how to manufacture the component, after that there are two who can manufacture this product…. then you must keep competence and capacity and abilities in-house" Group Director*

The main requirement Elitfönster has on their suppliers when outsourcing is that they should be thorough in their handling of the manufacturing. The supplier should continuously provide Elitfönster information on production and deliveries. There is a need for their suppliers to communicate well and have openness about production problems or delays etc. One very important factor becomes the external sources capacity. The supplier must be able to increase its production rate simultaneously with Elitfönster and not create bottlenecks or have a limited sector.

> *"Cost is the major point… but then you have the whole contract of long-term relationship, pricing, supply reliability and so on… they must be able to increase their capacity faster than we…" Group Director*

Important factors that need to be considered when outsourcing for Elitfönster relates to what sacrifices it takes to initialise outsourcing. The Group Director states that if there are established suppliers with the required component manufacturing and expected quality and price, then outsourcing is not more complicated than purchasing.

> *"Then a saving in 1% is good… he has the product and does it exactly after your requirements" Group Director*

The risk is instead outsourcing to a supplier that thinks that he perhaps could manufacture a component.

"…[the other side] is that you need to find somebody that perhaps has the possibility to manufacture the product if you transfer the technology. This means that you have a search process and a development process [of the supplier] and this is rather extensive" Group Director

"…one thing is if you are forced to buy large batches so you need that store and the other thing is if deliveries do not come. [For the blanks]… then you stand still with everything. If you stand still with your business one day then it can eat up the profit for the whole year." CEO

At the same time Elitfönster does not want too large warehouses of components because then the cost advantage of outsourcing is replaced by increased capital cost (i.e. need larger safety stocks to account for unreliability in supplies). This is related to dependency and supplier appropriation, which both the CEO and the Group Director state are two main risks with outsourcing.

"You have to know who you are outsourcing to. It could be so that your main competitor also outsources to the same supplier. Then you can lose the control" CEO

Outsourcing the Blanks: Need for a Constant Quality Level

While the blanks create little differentiation on the market, this component is extremely important in the production. Blanks delivered from Stora Enso lacking quality can result in a stop in the production and very costly extra activities.

"If we receive blanks with low quality it does not mean windows of lower quality. But then we must repair [the blanks], and repair means stop in the factory. We have some staff and some working sites to repair, polish and puttying. Even if we receive top quality there is always something that needs to be done. We then have a staff and capacity for this, which hopefully match the specification of quality we have on our input of material [i.e. the blanks]. We presume that we need to repair x%. We then assume that with certain production volumes this means x-number of repairs." Group Director

The problem is if the quality is changed. Small changes in quality (about 0.5%) are no direct problem. However, if the quality is deteriorated and the volume of blanks that need to be repaired is double or tripled it can become a catastrophe.

"…instead of having 15 employees on repair we need to have 45. Where do we get 30 employees from? If we receive [the blanks] on a Monday morning and we cannot putty [spackla, author's translation] them, then we cannot paint them. The factory stops and it is a catastrophic situation" Group Director

Here, the additional activities with puttying become so costly that it can make the cost reduction of the initial outsourcing very small (also cf. NTT, 2007). Therefore, the Group Director emphasises that the input of blanks must have a constant and steady level of quality. If the quality is low and Elitfönster can buy it for a low price, the CEO says that it is acceptable: "*…then we have [planned the number of] staff to handle it*". The problem is if Elitfönster pays a high price and still receive blanks in low quality; because then they would have reduced the staff for handling these operations and thus expect a certain level of quality (e.g. Elitfönster reduced the staff for puttying when outsourcing the blank manufacturing and expects a certain level of quality of the delivered blanks).

Long-Term Price Development and Supplier Dependency

According to the CEO, a costing model for outsourcing often overlooks elements such as long-term price increases. Here, a plan for outsourcing must also judge how the power balance will be between supplier and Elitfönster in a longer time perspective (e.g. 3 years) and how this will then affect the price development of outsourced components. After deciding to outsource an item Elitfönster would prefer to start buying small volumes from a supplier to see how it works: "*then you let the volumes grow*" CEO.

The Group Director states that they would prefer to have more than one supplier but this is not always possible. The Group Director says that outsourcing can be illustrated as a power battle.

> *"When you purchase you can always choose between a number of available suppliers, you always avoid coming in a situation where you only have one supplier for an important component. When you outsource you often can only find one available supplier. What you make by yourselves and the volume you offer is often not enough large to attract more than one [supplier] to make the necessary investments and commit themselves for you. When you outsource you close your own production which often is not enough large to attract two [suppliers] and thus you attract one partner. This partner is very interesting and takes care of everything… however, during the next price negotiations you soon notice that this was not an easy thing to manage… the price indications [the supplier] given to you in the beginning does not hold… then you come into a situation where you must find an alternative supplier. When outsourcing comes to the purchasing department the first thing they say is that an alternative supplier is needed or we will be in the hands of [the supplier] that we will negotiate with" Group Director*

Therefore, a very important factor for Elitfönster when considering outsourcing is long-term price development of outsourced components. A way to cope with this, according to the CEO, is early in the outsourcing process, try to find alternative suppliers or have parallel production to avoid too much dependence when applying a single sourcing strategy. Otherwise, he says that there is a risk is that the supplier will come back shortly after Elitfönster has closed their own manufacturing capacity and try to increase the prices on the sold goods. He states that this factor needs to be secured before Elitfönster can go further with the outsourcing decision. The Group Director emphasises that the further away you outsource, the larger safety stocks may be needed. However larger stocks demand higher capital tied up in fixed assets.

> *"…one thing you need to consider when outsourcing is that the further away you outsource and the smaller partner you have the larger risk you take... and one element or factor you can use to reduce this risk is stock. But then you have to remember that outsourcing many times demands increased stock [which demands more capital tied up]. Many think the contrary… very often, to remain with the same reliability in supplies to end-customers… outsourcing demands larger safety stocks" Group Director*

The Group Director says that lacking supply reliability could result in a situation where they outsource to set free resources and instead the capital gets tied up in increased safety stocks. This can results in that areas made available by outsourcing for other activities instead needs to be used to store larger safety stocks of components. Today, Elitfönster has a lack of space; therefore, they do not want large safety stocks that require storing in plants that already have lack of space.

Thus, one difficulty for Elitfönster when considering outsourcing is finding suppliers that are capable of handling and coordinating the large volumes offered. At the same time, the supplier must have the competencies to manage the manufacturing. For example, Elitfönster is the major player of planing blanks and even if they wanted to outsource this activity there would not be a supplier in Sweden that could directly handle these large volumes. For these

types of activities and large volumes there are no developed suppliers capable of shouldering such a role. To handle such outsourcing, Elitfönster would instead be needed to have multiple suppliers of this component. However, this could create a similar situation of multiple suppliers as before the manufacturing of blanks in Vetlanda was outsourced.

Managing Supplier related risks by Parallel Production

By utilising a parallel production strategy Elitfönster can avoid becoming too dependent on one supplier.

> *"There is a big advantage [to having parallel production], in my opinion you cannot outsource something if you cannot do it by yourself. If you outsource everything, thus outsourcing 100%, then it only takes a year before you cannot do it [by yourself anymore]. The knowledge is gone" // "If you do not have control of your production then you do not have control of your development…" CEO*

The CEO states that there was a large need to have more than just one supplier for such strategic components as the blanks.

> *"Blanks are a key product for us. It is one of the most critical products [in our production] and we need to secure [the flow of this component] to be able to continue to grow. Then we noticed that we needed to keep the knowledge in-house and that we needed to secure some volumes in order to not end-up too dependent on one source" CEO*

If the blanks are not delivered at the right time or have insufficient quality there is a risk that the whole production in the plant stops, which could be catastrophic. By their own plants and Stora Enso's manufacturing, the different manufacturing processes can also be benchmarked and price increases can be restrained.

> *"We made an assumption that we could restrain a price increase of 2% per year thanks to having our own [in-house] production and knowing what the price should be, and that we do not end up in a dependency relationship" CEO*

If outsourcing the whole production, there is a risk for losing the control of how efficient the supplier in-fact is. By this, the CEO says, that Elitfönster knows if a price increase is motivated and can respond by increasing the volumes manufactured in-house (if the price increase is not motivated). Thus, better steer the supplier. Another example of this is Elitfönster's outsourcing of windows to the manufacturer in Estonia. For this outsourcing Elitfönster kept some of the production in-house and during 2001 the supplier tried to increase the prices:

> *"…when they increased the prices a lot, we decreased our outsourcing with more than 50% [and instead increased our in-house production]. Even if it costs us some money we demonstrated to him that we do not accept this kind of behaviour. The next year he lowered the prices back [to the same level]" Group Director*

If there then is no production in-house and no alternative suppliers, the company comes to a very exposed situation. In such situations the CEO says that there is a risk that the supplier will try to increase the prices short after the outsourcing agreement. Another way to handle such risk is by option agreements (e.g. right of option or warrants). By this Elitfönster can create incentives to avoid supplier risks. When Elitfönster outsource activities to external sources in low-cost-countries, they will try to require the right of options of the suppliers' shares. With this in place they can still have a call-alternative if the outsourcing agreement does not develop as expected.

4.3 The Floor Manufacturer Tarkett Wood

Tarkett is a well established company on the flooring market and sells to over 100 countries and has about 30 global sales subsidiaries. The group sells several different types of floors (e.g. plastic floorings and linoleum), and is one of the leaders in the hardwood flooring segment. Tarkett's products are marketed by a multi-brand strategy: Tarkett (Scandinavia, Eastern Europe), Sommer (Western Europe), Sinteros (Eastern Europe) and Domco, Nafco and Azrock (North America). Eastern Europe, especially Russia and the Ukraine, is becoming an increasingly central market for Tarkett. The business area Tarkett Wood Europe develops and manufactures wood floors and distributes these world-wide (except to the US market).

4.3.1 Market and Customers

Parameters for competitiveness, according to the Product Manger, are high quality and lasting value. Customers of Tarkett Wood are mainly: (1) builders' merchants, (2) DIY-retailers, (3) construction companies and (4) modular house manufacturers. Renovation is an increasing trend and the DIY-segment is becoming a central marketing channel to reach end-consumers. The company's major brand is Tarkett but it also has some products for DIY-retailers. Such products can be either branded/private-label products or unbranded products that are exclusively distributed for DIY-retailers. Although these products for the DIY-retailers have lower margins compared with the ordinary product range, they can often be sold in larger volumes. Tarkett Wood's management says that there will be a need for developing more private labels for the DIY-retailers (partly because they don't want to expose the Tarkett brand too much). The object market (e.g. construction companies and modular house manufacturers) is also an important customer segment for Tarkett Wood. In Europe the object market accounts for about 30% of total sales while in Sweden the segment accounts for close to 55%.

The market for wood flooring is fragmented with several small players. Organic growth in this fragmented market will be difficult and therefore the R&D Manager and Process Manager state that acquisitions will become an important growth strategy. The Process Manager claims that there are too many players on the market, in combination with very strong customers (e.g. the DIY-retailers and construction companies). Tarkett Wood expects that the market in the future will become much more distinct and there will not be room for more than 2-4 larger players with market shares over 20%.

4.3.2 Products and Production Setup

Tarkett Wood has a broad product range of floors with different thickness, wear-layers and joining systems (both traditional that demand gluing and glueless click-solutions). The floors are manufactured in 1-, 2- and 3-strip versions. The 3-strip version represents the largest part of sales (~80%). The company produces about 7 million m^2 wood floors per year. The Process Manager emphasises that these broad range of products require well working flows in the different production centres.

Similarly as Kährs, the majority of the floors have a 3-layer construction including a hardwood wear-layer, a mid-layer and a bottom-layer. Each of the different layer's direction of the grain is directed at a right angel towards each other to assure the stability of the manufactured floor. The mid-layer consists of an "edging-carpet" (ribbmatta, author's translation) of sawn softwood fingers, with plywood end-pieces (i.e. the same construction as

Kährs). The mid-layer and bottom-layer together constitute the M/B-component[34]. Except for exotic wood species, the hardwood raw material is mostly procured from Central- and Eastern Europe as well as the US. Oak and beech floors still account for the largest part of sales in Scandinavia and are very critical wood species for Tarkett Wood. In 2005 Tarkett Wood had four production sites in three countries, see figure 4-23.

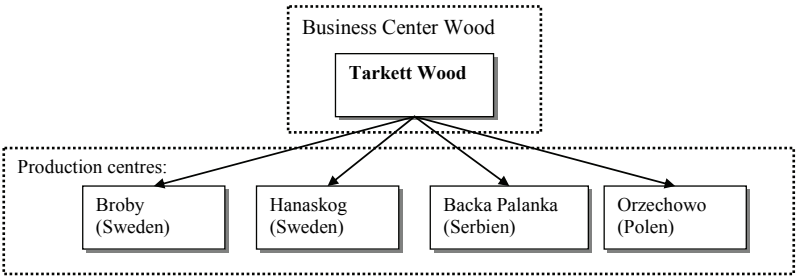

Figure 4-23. Tarkett Wood's production centres in 2005

Handling Limited Raw Material Availability by Supply Centres

The wear-layer has the largest cost share of the Tarkett Wood's total manufacturing costs and up to 60% of the total cost of manufacturing can be traced back to raw material costs. To handle the supply of raw material of this central component, Tarkett Wood will develop supply centres. These centres will purchase wood raw material that are somewhat processed, e.g. hardwood sawlogs sawn to surface strips and dried to required moisture content (i.e. outsourcing of the initial sawmill activities). These centres will also become the coordination point for supplying these components to the company's production centres. Here, the flow of over 200 suppliers will be handled and coordinated for the different production centres. Thus, Tarkett Wood intends to not select any main suppliers for the supply of wood raw material for these central components. Instead they aim to keep control over a broad base of wood raw material suppliers.

The logic for this strategy, according to the Process Manager and R&D Manager, is to avoid the price being driven up by having high dependency on some main suppliers, especially when the wood raw material for the wear-layers is not these suppliers' main output of products. Instead the supply centres enable the company to buy from numerous suppliers to keep both the price down and become not too dependent on a small number of suppliers. By this a central competence for Tarkett Wood becomes to well manage and coordinate flows through these centres.

The production centres will manage the final manufacturing activities and will then supply complete wood floors to the centralised finished goods warehouses, which can distribute the floors to customers or directly to end-customers. Finished goods warehousing and production centres will more and more be placed in close proximity to important markets (e.g. emerging markets). Having production centres locally in emerging markets can facilitate Tarkett Wood in receiving an acceptance as a national manufacturer of floors. In addition, finished goods

[34] The mid-layer and bottom-layer is of the same construction as the component manufactured by Kährs. In line with the Kährs case, this component will be referred to as the M/B-component (Mid-layer/Bottom-layer). See further description of this component in the Kährs case.

warehousing close to the customers will enable high responsiveness and shorter lead times. A simplified view of this supply chain is illustrated in figure 4-24.

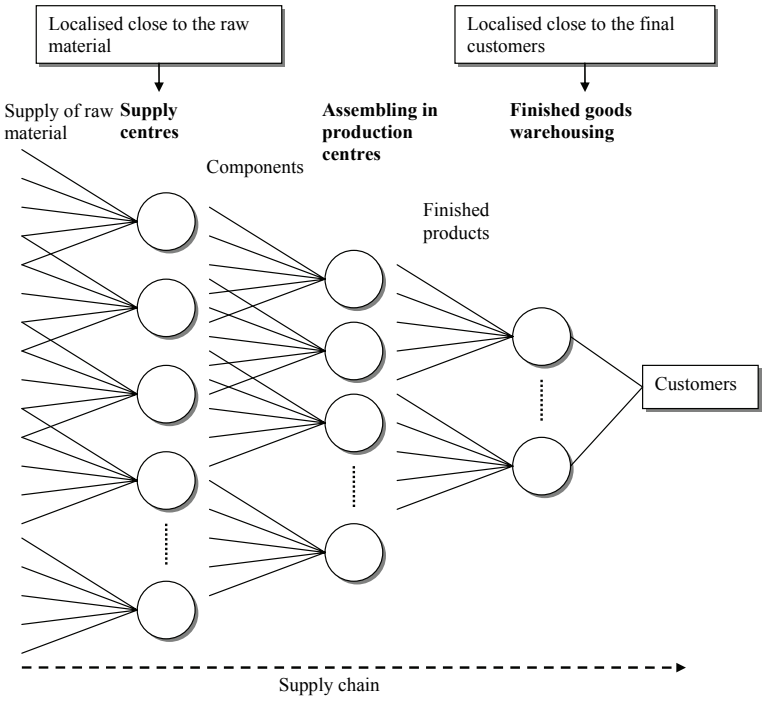

Figure 4-24. Tarkett Wood's supply chain, from raw material to product

Procurement and managing the supply chain thus becomes a central strategy for Tarkett Wood, especially when some raw material can have a lead time of 6 months. The supply centres will be localised where the raw material for central components exists (e.g. oak wood for the wear-layer in Ukraine, Slovakia, Russia or Romania).

By performing the initial sawmill activities in close proximity of the raw material, transport and raw material costs can be lowered. The R&D Manager says that there is no reason to transport "sawdust and not dried timber". Moreover, by only shipping components such as surface strips to the production centres spillage due to low/wrong quality of the logs can be minimised. Here, sawing in close proximity to the location of the raw material and partly manufacturing components at the location make it is easier to evaluate which yield of input and output can be expected. Outsourcing of the manufacturing of the strips that is sawn and dried to local sawmills, also avoids some costly investments. Another reason that Tarkett Wood chooses this outsourcing strategy is based on the difficulty in finding suitable suppliers for this type of component manufacturing.

A reason why they choose to handle the supply centres within the boundary of the company is because Tarkett Wood does not want to outsource the final component manufacturing. The final production of the wear-layer is a central activity that creates differentiation on the market. In line with the strategy to develop supply centres and outsource initial sawmill activities, Tarkett Wood has sold their sawmill in Närrum (Sweden). In the future, according to the Process Manager, there is less interest for the company to possess their own sawmills.

4.3.3 Driving Forces for Outsourcing

Several driving forces for Tarkett Wood's increasing focus on outsourcing of wood components can be seen. Contextual factors that trigger the focus on outsourcing seem to mainly concern a changing competitive environment. Tarkett Wood acts on fragmented markets with tough competition. Simultaneously, the market has become more and more global and is also lately experiencing some stagnation. New competitors from low-cost-countries are emerging which due to low labour costs, the latest technology and new machines are becoming very competitive. At the same time the whole market for wood floors has gained increased competition from substitutes (e.g. laminate floors).

The management states that Tarkett Wood and other main players have not created enough differentiation on the market and have made it too easy for other manufacturers to enter the market and gain market shares. As a consequence they say that the market has been too open for new players. Both the Process Manager and Product Manager emphasise that price nowadays is very important to sustain competitiveness and there is currently a strong price pressure on Tarkett Wood. In line with that, the R&D Manager states that it becomes more and more difficult to earn profits which makes Tarkett Wood continuously need to evaluate and revaluate their production strategy. The management says that the current situation demand high flexibility, strong brand name, lowered total costs as well as avoid investments and freeing capital. Altogether, these factors create a need for Tarkett Wood to rationalise and improve operational effectiveness and make outsourcing strategies a clear focus area for the company to create better long-term competitiveness. With this starting point the management emphasise that a main driving force for outsourcing wood components is a labour and raw material intensive production creating little differentiation, and more resources need to be focused on manufacturing activities that create differentiation.

When it becomes very central for the company to strengthen its brand name, the Process Manager claims that this will decrease the need for handling all manufacturing activities in-house. According to Tarkett Wood, this enables a production strategy where some of the production will be handled in-house and several products and components can be managed by outsourcing agreements with external sources. To state the future direction for Tarkett Wood, the Process Manager and R&D Manager emphasise that the core competencies of the company increasingly become: (1) handling and coordinating flows (e.g. by the supply centres), (2) finalising manufacturing activities in the value chain (e.g. manufacturing of wear-layer - surface treatment and profiling), (3) handling market and customers. When costs are in strong focus and Tarkett Wood only have scarce resources the management says that these drivers also make outsourcing for non-core a very interesting strategy. Here, outsourcing is expected to enables them to focus more resources on core.

Earlier Tarkett Wood had their own sawmills to secure flow and volumes of their own production. Securing flows is still very important, especially for raw material for wear-layer which will be handled by the development of supply centres. However, possessing their own sawmills that tie capital and demands investments become less important and interesting. The opening of Eastern Europe creates new possibilities for potential supplier markets for outsourcing. The management suggests that these supplier markets have lower labour and raw material costs (raw material is also more readily available). The company is interested in both outsourcing of M/B-component manufacturing and for the sawing of surface strips. At the same time it becomes important for Tarkett Wood that their core products have a high competitiveness and that they become leaders in productivity.

4.3.4 Key Factors Addressed when Considering Outsourcing

4.3.4.1 Focus Areas for Outsourcing - Component and Product Importance

The R&D manager states that the company must decide which products and components should be handled in-house (i.e. decide what should be considered as core) and they must also create a high degree of capacity flexibility. The focus area for the outsourcing is on the M/B-component, sawing of strips and for some non-core products.

Tarkett Wood handles the entire whole manufacturing process of the M/B-component in-house. They procure sawn timber in different lengths from suppliers in Sweden, Finland and Russia. However, there is no longer the same need to control all manufacturing activities in-house. The M/B-component does not create differentiation on the market and, according to the R&D Manager, could as well be outsourced as a component to an external source. Tarkett Wood has been discussing this with some potential sawmills for the manufacturing of such component. A supplier would then handle and coordinate the flow from wood raw material to the delivery of the complete component to Tarkett Wood. The challenge has been to find developed suppliers with existing production. The manufacturing of M/B-components is the first activity in the production line and outsourcing of this component therefore implies a need to outsource the initial sawmill manufacturing activities. If partners can be found, it is likely that the manufacturing of the M/B-component will be done by outsourcing to some main suppliers. In line with reducing in-house sawmill activities, the initial activities for wear-layer manufacturing in terms of the sawing and drying of logs is also outsourced (the coordination for this flow will be handled by their supply centres).

The Process Manager emphasises that a main advantage for outsourcing component manufacturing is to focus more resources on the core activities in the value chain, e.g. final manufacturing of wear-layers, profiling and final surface treatment of the floors, but also to reduce costs in production and focus them more resources on the development of the supply chain, distribution and sales channels. By doing this Tarkett Wood management claims that a more apparent market focus can be created.

The R&D Manager emphasises that there is a need to see how the in-house production should be managed, e.g. if one production centre should handle several product-flows or if the centres should be more specialised for production of certain product types. This leads to the other focus area for outsourcing which deals with complete products that do not necessarily need to be handled in-house. The company has outsourced the manufacturing of some products, which is also expected to increase in the future. The main reason for the product outsourcing is to keep a broad range of products for their different customers. These products are important for Tarkett Wood but according to the Process Manager they can just as well be handled by an outsourcing agreement. By strengthening the brand name and at the same time in the future offer more private labels for DIY-retailers, it becomes less important if Tarkett Wood has handled all the manufacturing in-house or somewhere else. By applying an outsourcing strategy the Process Manager and R&D Manager emphasise that a width can be kept in the product range while Tarkett Wood at the same time can focus on their core products. This strategy is linked to the importance of being able to handle large customers and supply them with those products they demand. Thus, where the products have been manufactured will be less important and instead the company's brand name will become more significant. According to the management, the outsourcing of production will in the future increase. However, Tarkett Wood's core products will not be outsourced to an external supplier and the manufacturing activities that create differentiation on the market will be handled in-house (e.g. the final wear-layer manufacturing).

4.3.4.2 Capability Benchmarking

To examine the outsourcing possibilities that exist for Tarkett Wood the Process Manager states that thorough cost analysis is made. This analysis includes mainly the variable production costs to manufacture a component in comparison to the supplier's price bidding. The Process Manager emphasises that when they now consider outsourcing it is very central to establish that such outsourcing would be profitable in both the short and long term perspective. Tarkett Wood must assure that they can lower their own in-house costs and ensure that savings can be made by outsourcing. Here, the Process Manager suggests that an analysis of the outsourcing decision needs to consider how savings will be made, and how Tarkett Wood intends to attain and capture these savings. When the supplier also needs to make a profit, this is especially important because the supplier needs an incentive to manufacture the product and make the necessary investments.

According to the Process Manager, a central factor for Tarkett Wood when considering outsourcing is to comprehend what the total costs really are and to accurately compare it with the suppliers' offer. The company mainly considers production costs but also transportation costs. Other costs that are considered include costs of transferring competence to the external suppliers and estimating possible costs that could emerge in an initial phase or due to communication needs. When considering outsourcing this also includes a dimension of investment needs in the current machinery compared to alternative employment of capital. In addition, the management at Tarkett Wood claims that the outsourcing analysis needs to include where potential suppliers are established (e.g. understand access to raw material). However, a problem for this decision is to find a supplier with developed capabilities and experience that can handle this outsourcing of component manufacturing.

4.3.4.3 Supplier Related Risks

As seen earlier, avoiding high dependency is one main reason for Tarkett Wood to develop their supply centres (e.g. avoiding prices being driven up by suppliers). Other risk factors considered are the suppliers' competence and technology to handle the selected manufacturing of components. The Process Manager says that outsourcing that includes transferring competence always includes risks and therefore it becomes important to weigh cost reduction possibilities and accompanied supply risks. The main issue for the component outsourcing is to find developed suppliers with enough capacity and competence that can directly handle the manufacturing of wood components. If the outsourcing of the manufacturing of the M/B-component were to be done, it would be critical to find some suitable suppliers. The R&D Manager says that Tarkett Wood does not want 10 smaller suppliers; instead it is more beneficial to select some larger suppliers that can handle most of the component manufacturing. Here, he emphasises that an important factor is finding a supplier that can offer the same quality standards as the company's own manufacturing with continued high supply reliability for these components.

4.4 The Door Manufacturer Vest-Wood

Vest-Wood is one of the largest wooden door manufacturers in Europe and the leading supplier of internal and external door solutions in Germany and the Nordic region. However, the company is experiencing a rather tough business climate on often fragmented markets. The competitive situation in the European door market is characterised by a few larger companies and many small national based door companies. In addition, small Eastern European manufacturers as well as larger international manufacturers are expanding into the European markets (see e.g. Company Profile & Annual Report, 2002/03/04)

The overall business strategy for Vest-Wood is to strengthen the company through organic growth and acquisitions and expand in Northern and Central Europe. The high fragmentation of the market has made acquisitions an important strategy to enable growth and increase their market share. Vest-Wood's acquisition of the leading Swedish door manufacturer Swedoor, for example, had the objective to improve the competitive situation in the Nordic market.

4.4.1 Market and Customers

Vest-Wood has three main marketing channels: (1) *DIY-stores* (e.g. Vinduecentre, Centerbyg, Jem & Fix, Bilka, Metro, Bauhaus and Silvan); (2) *builders' merchants* (e.g. Løgstør Tmh, Kibæk Trælast, Johs. Fog, Herning Tmg. Brd. Bentsen, Superbyg and Rindom), and (3) *construction companies* (e.g. Danhaus, Skoubo, Eurodan, Deko, Triplan, NCC och Skanska). (Internal material from Vest-Wood, 2003/2004) Vest-Wood sells to over 20 countries, however, their main markets are still Scandinavia (~45% of total sales) and Germany (~45%). Remaining sales (~10%) go to Central and Eastern Europe, but also to Japan, Russia and the Baltic States. Vest-Wood has two main customer segments: (a) the consumer segment and (b) the project segment. The consumer segment comprises of 65% of the total sales and takes place mainly in Scandinavia (~50%) and Germany (~30%). Sales to the project segment mainly include selling products to the Scandinavian market. The project segment comprises of construction companies, modular house manufacturers and builders' merchants, who acquire both standard and special doors for projects. This segment is given high priority and is considered as key clients. To handle these customers the company has its own sales department to help and meet these customers' needs. The consumer segment consists of DIY-retailers, builders' merchants and wholesalers who procure standard doors for sales to private consumers and professional craftsmen. The Group Director states that the DIY-retailers increasingly become very central customers (e.g. in Germany the DIY-retailers comprise of 45% of total sales).

> *"If you consider the three Scandinavian countries, the DIY share is largest in Denmark, and new DIY-retailers are on the way into Norway… it happens a lot on this side".*

These DIY-retailers demand that their suppliers have a larger international presence and the Group Director says that the retailers are very price focused; "*... price is completely decisive*". Furthermore, they require larger support considering logistics and technical solutions.

The Group Director says that it is becoming more and more important to handle their customers. As a consequence, service and price become two main competitive priorities. This includes requirements from customers in areas such as service development, design and integration of technology in doors (e.g. advanced locks and security alarms that are integrated with the door construction). Vest-Wood intends to be a front runner and has focused resources to well develop these areas. Another factor is that Vest-Wood needs to have a high responsiveness. Here, they try to position plants close to the aimed customer markets to enable shorter delivery time to customers. This also put pressure on Vest-Wood's suppliers

and the Group Director says that more responsibility is pushed over to their suppliers, which sometimes require Vest-Wood to help these suppliers in their development.

4.4.2 Products and Production Setup

Vest-Wood manufactures internal panel doors (e.g. solid pine doors and moulded doors), internal flush doors (e.g. fire and safety doors, hollow core doors) and external doors (e.g. painted doors, solid pine doors). These doors are based on wood components: e.g. door cases, door frames and door leafs. The company works with a multi-channel branding strategy, which means that one product can be marketed under different brand names in different markets, e.g. Moralt, Wirus, AMEX, Swedoor, Kilsgaard, Jite, Swedoor-Jutlandia and Swedoor-Kilsgaard (Internal material from Vest-Wood, 2003).

An objective is to standardise the production and base the manufacturing of doors on modules. However, because of increasing demands of customised products, Vest-Wood's Group Director says that they are required to create high flexibility in their production sites. In 2005, the group had 13 manufacturing sites, which together produce 360,000 m^2 doors per year (Vest-Wood presentation; Internal material). Production centres are either mainly focusing on the customer segment or the project segment, see table 4-5.

Table 4-5. Vest-Wood's production sites have specialisation based on the two main customer segments (Vest-Wood presentation)

	Denmark			**Sweden**		**Finland**				**Eastern Europe**		**Germany**	
Site	D1	D2	D3	S1	S2	F1	F2	F3	F4	E1	E2	G1	G2
Consumer	X	X	X	X		X		X	X	X	X	X	X
Project		X	X		X		X					X	

In addition, the production sites are either focusing on standard products or specialised products. The plants handling standard products are focusing on efficiently handling large batches with few products types. Plants handling special products, characterised by small batches, focus on efficiently handling the many switchovers in the production and the different types of products (Company Profile & Annual Report, 2002/03; Internal material). This gives Vest-Wood the advantage of specialising their plants depending upon which products will be manufactured and to which customer the goods will be delivered. The underlying logic for this strategy is that most of the above plants were earlier niche competitors that Vest-Wood has acquired. Thus, these producers were, from the beginning, specialised for certain production. The specialisation of door manufacturing plants has also resulted in closing some plants and moving the production to the major plants. This has helped to lower the complexity of the production structure and create better synergy among the different production centres within the group. The specialisation of plants is advantageous because, according to the Group Director, there are differences depending on which door type is produced, e.g. an external door compared to an internal panel door or a safety door.

Supply Chain and Distribution

Vest-Wood tries to coordinate the manufacturing of special doors and standard doors. The Group Director explains that the flow to the customers is handled by distribution terminals, which also has been developed to manage the internal distribution."…*it is internal-logistic from our production sites to our sales side*". In fact, a general focus area for Vest-Wood is distribution and development of their supply chain, which can enable higher reliability and responsiveness to strengthen the company's competitiveness. A simplified view of Vest-Wood's supply chain is illustrated in figure 4-25.

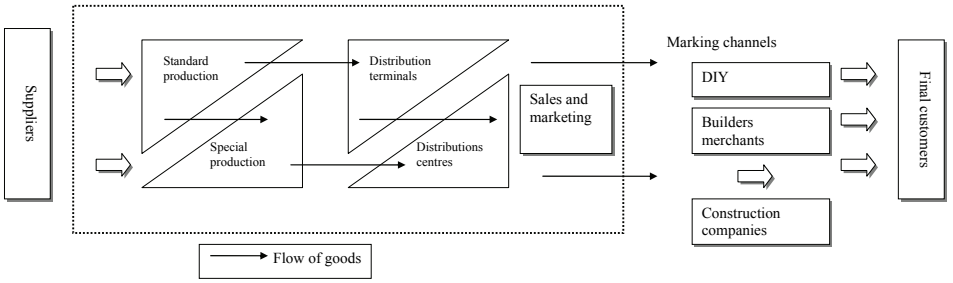

Figure 4-25. Vest-Wood's supply chain (Adaptation from Internal material from Vest-Wood, 2003)

The distribution solutions differ between the consumer and the project segment. This is linked to the fact that the logistical needs of the customers differ (e.g. some have high demands of Just-In-Time delivery while others have demands of special packaging and labelling). The distribution for the project segment goes directly from plant to building site. Here, one plant is responsible for the total order, but the different products can be manufactured at several other of Vest-Wood's production sites. All the products are bundled and gathered at the responsible plant and then sent to the respective building site. This internal logistic is coordinated by distribution centrals. These products are also delivered, bundled and labelled, indicating where the door should be installed.

Distribution terminal have been established to support deliveries to the consumer market. Today the distribution to the consumer market is handled through five terminals, and a sixth terminal is planned for the Baltic States. The distribution terminals are located in Herning (Denmark), Løgstør (Denmark), Åstorp (Sweden), Vääksy (Finland) and Mittweida (Germany). These distribution terminals have a wide range of standard products that enables short lead time and high responsiveness to the builders' merchants' and DIY-retailers' orders. The terminals also have responsibility for some of the final warehousing of doors. The final distribution to the end-consumers is handled via the builders' merchants and DIY-retailers.

In this sense, the distribution centrals are working as coordination platforms while the distribution terminals function more as a finished goods warehouse. Vest-Wood also uses coordination points for the flows from suppliers to the different production centres. The objective with this development of distribution solutions, according to the Group Director, is also to offer a broad range of products and enable service to both small local customers in national markets and large international accounts.

Low-Cost-Country Manufacturing

Central and Eastern Europe (e.g. Russia, Hungary, Poland, Ukraine and Turkey) are important growing market for Vests-Wood and by increasing their manufacturing in these emerging markets, the Group Director states that this creates a strong platform to develop and expand sales: "*It is in these markets where the growth will be*". For these markets Vest-Wood is also considering to grow by increasing the acquisition of manufacturers. By creating a platform for producing products, Vest-Wood can sell directly to the local market. This can enable a status as a local manufacturer, which can legitimise the company as a domestic supplier of doors.

In order to be a cost leader in the future the company continuously tries to reduce their costs and improve their cost structure. This will be done by increasing cost efficiency and flexibility in the present plants. The group also intends to increase the production of the standard products and components in the production sites in Estonia and Hungary, to further lower high labour costs. This production strategy includes both outsourcing and their own in-house manufacturing.

For example, one production centre in Estonia is associated since Vest-Wood was a supplier to IKEA, and when the company divested their furniture manufacturing they kept the plant that also has sawmill activities. This plant is now a central unit for manufacturing door frames and panel doors (around 80% of the door frames are manufactured in the production centre in Estonia). The remaining manufacturing of frames in other production plants are more and more being moved to this production centre. By manufacturing in Estonia the Group Director says that the cost can be substantially lowered, for example, when making door frames in Estonia the direct labour cost is only ~10-15% and for panel doors ~20-25%. By making door frames in Estonia, Vest-Wood has become more price competitive. Earlier they only sold 0.7 door frames per door they sold, but this manufacturing has enabled Vest-Wood to sell 0.8 frames per sold door.

High costs have also made Vest-Wood evaluate alternatives in the Scandinavian plants such as automating the production for lower labour intensity, which has been done by creating very large production lines with a small work force. The Group Director states that such efficient production lines would be difficult to move to the Baltic States (it takes to long run-in time). The things that are manufactured in Estonia are relatively non-complex and it is these types of products and components that Vest-Wood intends to move more and more. It is also the more non-complex products that are under tough competitive pressure, which push the total price levels down. To handle this type of manufacturing setup a focal point for Vest-Wood is to develop their logistical competence to handle the flow of products and components from production centres to customers. To get the production fast running and decrease the start up time the company has special task forces. To avoid high transportation costs, the Baltic States are somewhat the furthest distance for the production.

Most of the wood is purchased from both smaller and larger sawmills in Estonia and other Eastern European countries such as Russia. The Danish and Swedish production centres also procure wood from Sweden and Finland. Vest-Wood prefers to buy sawn timber in lengths of 2-2.10 instead of lengths in stock (fallande längder, author's translation). The objective is to use a smaller base of suppliers of raw material that can supply several production centres, and by this create good synergies and enable purchasing power.

4.4.3 Driving Forces for Outsourcing

Vest-Wood's driving forces for outsourcing are mainly related to cost efficiency. Control over process costs is central for Vest-Wood and since being an IKEA supplier they have kept thorough focus on costs. There is tough price competition on the market and contribution margins are small, the Group Director emphasises that it is difficult to make profits. Therefore, the company is very focused on their expenses and if the production is profitable or not.

> *"Then the discussion about outsourcing or in-sourcing comes up, we are extremely focused on cost efficiency in our own plants… we must, all the time, be able to see how much this component costs in-house and what it costs externally" Group Director*

Vest-Wood only considers outsourcing if they can be sure that it will be profitable from a cost perspective. On this basis Vest-Wood can have clear measurements of when they choose to initialise outsourcing and when in-sourcing is more favourable. Here, the Group Director states that outsourcing enables good possibilities to benchmark their internal processes with external suppliers' efficiency. Often by outsourcing only a part of their production Vest-Wood can improve their in-house efficiency and cost structure, and by this become more cost efficient. For Vest-Wood, outsourcing and having parallel production is an effective way to control their in-house production; this is done by continuously benchmarking against the external production sources.

Vest-Wood priorities own internal process development instead of just outsourcing to external suppliers. However, sometimes very costly investments are needed to make such process development, which can make outsourcing more favourable.

> *"It can demand too much capital investments to go in and therefore we choose to outsource" Group Director*

A driving force is to avoid too large labour costs: "*It is the primary reason for this outsourcing*" Group Director. In addition, outsourcing wood components to Eastern Europe offers lower raw material costs compared with procuring sawn timber in Scandinavia.

> *"It is important with labour costs but the wood raw material can also be purchased for completely different prices than we are discussing here in Scandinavia" Group Director*

Vest-Wood's Group Director emphasises that outsourcing component manufacturing also lowers the spillage and improves the yield between the input of wood and output of components. One disadvantage of buying and processing the wood by themselves close to the different production plants is the amount of spillage. Earlier Vest-Wood could sometimes experience a spillage of up to 50%. Additionally the transportation costs were high due to transporting wood that had not been processed, thus, transported a lot of unnecessary sawdust (unprocessed wood also requires a lot of unnecessary warehousing that causes unnecessary tied up capital). Today, Vest-Wood's Group Director says that the suppliers of wood have improved on this point. The spillage has also been reduced by buying pre-processed sawn timber and by trying to do more component manufacturing close to the raw material. This is handled both within the group and by outsourcing agreements. The Group Director emphasises that a component manufacturing strategy enables almost 100% of the raw material to be utilised, which minimises the costs for spillage and transportation.

The door industry experiences a lot of season fluctuations (up to 40% fluctuations) which demands high flexibility to follow the market during high and low season. Vest-Wood's

Group Director emphasises that the company cannot handle all activities in-house and high flexibility in the production is critical.

> *"We are trying to move our business from being a building branch product [byggbranschprodukt, author's translation] to a lifestyle product, it costs a lot of investments, [therefore] we work with reducing our tied up capital and cost prices…There are relatively large season changes in door production, there can be up to 40% variation from high to low season… the better we are at forecasting this development the more we can steer our own capacity and take this function further out to our suppliers" // "Flexibility is extremely central and outsourcing is important… we cannot be best at everything" Group Director*

Outsourcing helps to balance in-house production. Such strategy will facilitate a clearer market focus but requires availability of resources to focus on what creates differentiation. For Vest-Wood this can be done by increasing outsourcing and avoiding too much investment and tied up capital in non-complex component manufacturing.

Development of Supply Chain and Product Augmentation

Among Vest-Wood's future objectives is to create an organisation with focus on local customers but with both wide local and central competence (i.e. think global act local). Vest-Wood will place more focus on activities at the end of the value chain to meet the demands from their customers. In line with this, Vest-Wood intends to further develop their supply chain and improve the distribution and coordination of product flows. For Vest-Wood a well developed supply chain and being able to coordinate flows are competitive priorities.

> *"Logistics and the whole supply chain thought is today a considerably more important core competence to me than production… it is definitely strategically important to get more control [over flows] to not lose contact with our end-customers" Group Director*

Short lead times are central for Vest-Wood and the objective is to avoid too much inventory of raw material and components. The Group Director emphasises that it is critical to utilise the economies of scale that can be created in the supply chain. The main issue is cost efficiency and therefore it becomes central for Vest-Wood to have resources and financial possibilities.

> *"It is incredibly important to become more lean" Group Director*

Activities in the beginning of the value chain are the most preferable to outsource and the Group Director emphasises that more resources will be focused on activities close to the customer. An objective is to go from product orientation, where customers buy what the group has produced, to market orientation where customers' real needs can be realised and fulfilled (Internal material Vest-Wood, 2003). The future challenge for Vest-Wood is to meet their customer needs and balance these needs with production and logistical requirements, without losing the benefits of scale in the manufacturing, thus better match of the capacity and market requirements. (also cf. Company Profile & Annual Report, 2002/03)

Vest-Wood intends to vertically integrate downstream towards DIY shops, builders' merchants, construction companies and wholesalers. In line with this they will develop specific solutions for their customers that are based on product and logistic services.

> *"We are trying to move our business from being a building branch product to a lifestyle product…" Group Director*

In line with the increased outsourcing and increased focus on the core, the supplier base will be reduced and a closer relationship with these suppliers will be built to further reduce costs and improve the flows in the supply chain. Vest-Wood's doors are becoming more of design products and at the same time there is a development for integrating more technology in the doors and offering more services. Today the group develops packaging and labelling to meet increasing demands from their customers. In the future the group will increasingly deliver complete solutions to the construction companies and builders' merchant. For example the Group Director expects that Vest-Wood will handle logistical issues, installation as well as the after-sale service of doors.

The demand from the project segment to handle the installation and services of doors started in England where Vest-Wood has delivered prison doors. An operator for prisons in England has requested to have a door supplier which could handle the development, manufacturing, installation and services of doors. The operator would likely to have a long-term contract, where Vest-Wood has full responsibility for the functionality of the doors. This business development is totally new for Vest-Wood, but the Group Director expects this area to become very important. In this sense the company expands its business to also become a service company. To handle this augmented selling, Vest-Wood will cooperate with a partner who has the technology and lock systems for these types of doors. The Group Director emphasises that outsourcing facilitates the development in new business areas. Here, component outsourcing enables Vest-Wood to focus more resources on activities associated with product augmentation while at the same time lets suppliers take more responsibility for the wood component manufacturing.

4.4.4 Key Factors Addressed when Considering Outsourcing

When considering outsourcing, the Group Director says that they concentrate on three main factors: (1) cost comparison, (2) tied up capital and (3) reliability in the supplies from the outsourcing partner. All these parameters must be considered.

4.4.4.1 Focus Areas for Outsourcing - Component and Product Importance

Even though Vest-Wood has the objective to further develop their own production centres in Eastern Europe, there are several focus areas for outsourcing. For the company it is central to have a clear market focus, meanwhile it is preferable to let go of some initial component manufacturing. The manufacturing of door case components is partly outsourced to external suppliers. Another area where Vest-Wood has outsourced is the manufacturing of some components of hardwood, which they now buy in different degrees of completeness. Other areas for outsourcing include the manufacturing of wood components such as the veneering of particleboards. The activities that Vest-Wood considers to be the most simple to outsource are the initial activities in the value chain. Here, outsourcing strategies for components comprise of quite simple products with little complexity and high labour costs, e.g. door frames, door cases and profiles.

> *"It is easier to do it [outsource] in the beginning [of the value chain], the other alternative is that you buy complete products from sub-suppliers... Outsourcing surface treatment would be very difficult, it is mostly in the beginning [outsourcing is done]...". // "The earlier the easier it is to outsource" // "What we generally do is that we outsource components with a low degree of complexity and relatively high labour costs". // "Complexity in the product cannot be too high". "... then we put the more complex parts in the [in-house] production" Group Director*

Mostly initial sawing activities are outsourced nowadays to improve yield and lower spillage. Here, the outsourcing strategy of components imply that downstream manufacturing activities

will be done in the own production plants and upstream activities will more and more be outsourced. The company outsources about 10-15% of their total production.

> *"We started with outsourcing components and today they are equivalent to approx. 80 % of what we outsource, 20 % are complete products" Group Director.*

Interestingly, supplier markets for outsourcing are the same as for in-house component manufacturing: Eastern Europe. The company intends to gradually outsource more components and some complete products.

A factor which facilitates outsourcing is that Vest-Wood tries to build all their doors based on modules. By this, it is easier to outsource component manufacturing to external suppliers. Here, the supplier can deliver components that can go directly into the manufacturing of doors. Vest-Wood also works with the standardisation of their product range, e.g. in Sweden and Denmark about 90% of the product range are of similar products. Vest-Wood has a lot of different door types which are manufactured at many different production centres, however, the Group Director emphasises that thanks to modular thinking many components are similar for the different door types.

> *"We try to reduce the number of raw materials [number of components] and the number of suppliers and it is totally strategic" Group Director*

According to the Group Director, the activities that Vest-Wood chooses to handle in-house are where much of the production and technology competencies are found. Vest-Wood intends to focus on those activities that can create differentiation for the customer. Here, design, technology contents and other related product attributes becomes central aspects. It is here the company will focus more resources in the future. The Group Director says that it is these areas that generate differentiation and enables the creation of a competitive customer offer. In line with the outsourcing strategy of components, the Group Director says that the sawmill activities becomes less obvious in the company's production centres and at the same time these centres become more and more specialised in their production processes.

4.4.4.2 Capability Benchmarking

The main deciding factor when considering outsourcing is cost. The Group Director says that there is tough price competition on the market and contribution margins are small. Therefore the company is extremely focused on their expenses and if their own production units are profitable or not. This leads to the discussion about outsourcing or keeping in-house production. The analysis of outsourcing is continuously done to ensure that high cost efficiency can be reached. Vest-Wood must at all times be able to see how much a component costs in-house and what it costs externally. The Group Director states that the only way to create a basis for an outsourcing decision is to have their own control of internal process costs. The company works on a very detailed level to keep track of every single cost.

> *"We have had a business that has been extremely production oriented, and controlled by its cost price" Group Director*

This goes back to the time when the company was a supplier to IKEA. Being a supplier to such company, the Group Director emphasises that it was Vest-Woods highest priority to keep track of the costs for IKEA had very high requirements on this issue. Since then the company has kept its thorough notion of cost focus. The outcome of this is that Vest-Wood only considers outsourcing if they can absolutely be sure that it will be profitable from a cost view-point.

Broadly looking at Vest-Wood's outsourcing analysis, they measure the total internal costs (including production costs, transportation costs and warehousing cost etc.) with supplier's price. Vest-Wood has clear measurements of when they choose to initialise outsourcing and when in-house manufacturing is more favourable.

> *" ...so we outsource in several different areas, a rule of thumb is that we consider outsourcing when the price of a supplier is lower than the internal cost price plus 25 % [price from supplier +25% < internal cost price], then we are interested in considering outsourcing... but it is not the same thing as to say that we will go in and outsource [just because they have a lower price]" Group Director*

Thus, a supplier must at least offer a price that is 20% lower than the Vest-Wood's internal costs. However, as noted it is not certain that outsourcing will be done just because there is a temporary lower price offered from a supplier. The first alternative for Vest-Wood is to analyse the underlying reason for the lower price and see how their own processes can be improved to match the cost of the supplier. If they find that an external supplier can handle an internal activity at a lower cost and process development seems difficult or demands very large investments, they will consider outsourcing rather than making products/components. In this sense, control over processes' costs is very central and this is one main reason why Vest-Wood has decided to handle some component manufacturing and sawmill activities within the borders of the company (e.g. in Estonia). Here, the applied strategy is parallel production. In this sense, Vest-Wood can benchmark their internal processes with their external suppliers to develop their processes and keep track of their suppliers' efficiency.

> *"If we go in and consider the sawmill in Estonia it of course has extra expenses but it is strategically important for us to keep track of our larger suppliers" Group Director*

If Vest-Wood outsource to a supplier that later on cannot offer competitive prices, they start thinking of in-sourcing the activity instead. This implies that requirements on efficiency and productivity development are increasingly pushed towards these suppliers.

The Group Director says that the outsourcing partners must have similar focus on cost efficiency and productivity development as Vest-Wood has on its own business, however, the quality standard cannot be lowered. The Group Director states that the customer prefers to pay SEK 100 less for a door but they will not accept any lower quality. The company needs outsourcing partners that are innovative and that can set the standard on the development that takes place. Thereby, when considering outsourcing the supplier's overall competence also need to be analysed. Vest-Wood experiences season fluctuations that require having a supplier that can follow Vest-Wood during both high and low season. For the outsourcing of components Vest-Wood would like suppliers with a developed scale capability.

> *"A typical demand we have is that they [suppliers] must have the scale to deliver to several plants, we try to reduce the number of raw material [number of components] and the number of suppliers and it is totally strategic, in many areas we only have two suppliers, [why not one?] two suppliers because of supply reliability reasons .... typically such supplier should deliver to all our factories". // Instead of handling your assignments [problemställning, author's interpretation] to 10 suppliers it is better to work with one or two suppliers to secure well working relationships" Group Director*

Their supplier base is much less fragmented than it used to be and will be further reduced. To guarantee reliability in supplies and quality, the Group Director emphasises that Vest-Wood prefers to pay a little higher price when outsourcing. Thus, the cheapest supplier is not always selected even though cost efficiency is in central focus. Instead, overall capability is important

when searching for suppliers. Group Director suggests that Scandinavian wood suppliers have increased difficultly keeping up and need to develop: "*a major challenge for [these] sawmills is to become more developed and flexible*".

Vest-Wood considers buying rather than making if they find that an external supplier can handle an internal activity at a lower cost and process development seems difficult. However, the company can as well consider in-sourcing activities that are not cost efficient enough or change to another supplier. To handle this, Vest-Wood works closely with their suppliers to continuously evaluate costs and to see where process improvements can be made. Outsourcing agreements have not always implied lower costs for Vest-Wood. The Group Director says that there have been several examples of suppliers from Eastern Europe that have not been able to offer the same cost efficiency and process development as Vest-Wood: "*After we have looked into our own processes in our organisation we have managed to come below their price level*". However, a consideration is that purchasing too many components can press the whole industry's price levels, thus risk creating too much competition for the lowest prices for both products and components.

4.4.4.3 Supplier Related Risks

According to the Group Director one problem when discussing outsourcing of wood components with potential suppliers can be communication problems, where wood components sometimes are defined very differently by the supplier and Vest-Wood. Some other risks that are addressed when Vest-Wood's management considers outsourcing are quality and not having reliability in supplies. This is especially important if they are dependent on a few suppliers and components are critical to production. When considering outsourcing to a potential supplier, Vest-Wood tests the supplier by letting it handle the most difficult activity. The Group Director emphasises that if the supplier can handle such activities they can probably handle all the other required activities in an outsourcing agreement. By this the risk of supply unreliability and low quality of components delivered can be lowered.

Vest-Wood often keeps some of their manufacturing of an item when outsourcing. The Group Director emphasises that there is a balance between focusing on outsourcing manufacturing activities and considering in-sourcing an already outsourced activity. By this they can avoid the risk of unmotivated price increases due to high supplier dependency.

> *"It is a balance all the time, we try to follow all the time and everything is not outsourced… and if a supplier that we work with tries to raise the prices we can start thinking of in-sourcing the activity instead, it hovers towards and backwards" Group Director*

As mentioned earlier, Vest-Wood mainly focuses on outsourcing non-complex and quite simple components. The Group Director says that there are potential suppliers that can manufacture wood components in Eastern Europe, although in most cases Vest-Wood needs to help develop their outsourcing partners. An example of Vest-Wood's first outsourcing of wood components was the glue-laminated wood to an external supplier in Latvia, which became a very profitable outsourcing programme. Here, Vest-Wood needed to start with developing and helping a suitable supplier handle this type of component manufacturing. For the supplier development, the company has special developed teams which can help suppliers with several of the operational related problems. This often includes helping suppliers with quality problems, building manufacturing experience, production problems or lack of reliability in their supplies. In addition the team can help with starting up new technology and logistical issues, which the Group Director states is the most difficult part of developing their suppliers. The teams shorten the start-up time when outsourcing has been done and help to

coordinate the flow between the supplier and Vest-Wood. Most importantly, these teams enables Vest-Wood to keep the competencies of wood component manufacturing within the firm.

> *"We have no intention of our wood related areas to outsource our core competencies"*
> *Group Director*

By this he states that Vest-Wood has deliberately invested in competencies and some of the component manufacturing is partly kept in-house to enable continuous benchmarking of internal and external processes.

4.5 The Door Manufacturer Dooria Kungsäter

Dooria Kungsäter is a part of the Dooria Group, which is a result of a merger of the door manufacturers: (1) Fjordtre Produkter in Norway, (2) Kungsäter Dörr, (3) Nordbo Dörr and (4) Ekodoor in Sweden and Ekodoor in Scotland.

4.5.1 Market and Customers

The group is the second largest door manufacturer in Scandinavia. Sweden and Norway are Dooria's main markets. Scotland is a growing market where the group has also established a sales company (Dooria UK Ltd). Some volumes are also sold to Japan where Dooria has attained a significant market share in its specific segment. Swedoor (which is a part of the Vest-Wood group) is the firm's main competitor. Dooria Sverige (DS) is the sales company of Dooria Kungsäter (DK) and is located next to the production centre in Kungsäter. Sales can be divided into three customer segments:

- Consumer market: builders' merchants (e.g. Beijer Byggmaterial, Interpares och Byggtrygg) and specialised door retailers. Builders' merchants cover the largest part of sales and are dominating the sales in both Sweden and Norway.
- Project market: building entrepreneurs and construction companies.
- Modular house manufacturers: on the Swedish market modular house manufacturers comprise of 1/3 of total sales and are an important group on the national market. In total modular house manufacturers comprise of less than 1/6.

Sweden, Norway, Denmark and Great Britain are the main markets for Dooria Kungsäter, where the latter is becoming increasingly important. The door market in Scandinavia seems, according to the Managing Director of DS[35], to be developing towards both a high- and low-price segment. Today, Dooria Kungsäter experiences strong price pressure on the market. The Managing Director of DS emphasises that there will always be competitors that can manufacture products at lower costs.

"For the low-cost-products other players will come in" Managing Director of DS

But an important factor is to not let that gap get too large and at the same time focus on developing competencies in areas such as product development. A two brand strategy is used, where the main range of doors bear the Dooria brand name. The Kungsäter brand name is used for more exclusive doors, thus utilises this well known brand name[36]. From an end-customer perspective, the overall branding strategy is to make a relatively low-price-product that bears the Kungsäter's brand still valued as superior products compared with other competitors in similar segments. The low-price-products can also function as "attraction goods" to sell more expensive doors. This strategy, according to DK[37]'s Managing Director, will enable that the company efficiently reach end-customers and have well developed marketing channels.

A possible development for the Scandinavian market is the development of door-studios (i.e. specialised door retailers). This type of sales channel is common in Germany. These

[35] Dooria Sverige

[36] Kungsäter dörr has continuous produced doors for more than 90 years (Dooria's website, 2004-12-07).

[37] Dooria Kungsäter

specialised retailers can become very important channels for reaching the end-customer who is willing to buy the more expensive products and services that Dooria Kungsäter offers. The strategy is to have a wide variety in the production offer and by doing this be able to sell to several segments.

"We must find the right product for the right customer" Managing Director of DS

Competitive priorities are high quality, design and short delivery times. High accessibility as well as flexibility is also critical. Price can be a very important competitive factor for doors that are manufactured to certain customer segments (e.g. sales to builders' merchants or DIY-retailers). DK's Managing Director says that the company needs to be one step ahead of their competitors, where the customer's experienced value of the offer must be higher compared with competitors. Therefore, customer driven product development becomes an important competence. An important strategy is to have products and added services that customers are willing to pay for. As a result the company will focus on product development and find appropriate marketing channels for their products. This has demanded a larger customer focus but has at the same time increased Dooria Kungsäter's focus on outsourcing. Today, Dooria works for putting more responsibility for the initial wood processing activities on their suppliers.

4.5.2 Products and Production Setup

The group has four production centres: (1) Dooria Kungsäter, (2) Dooria Utvik AS (Norge), (3) Dooria Gagnef and (4) Dooria Osby. A wide range of different external and internal doors are manufactured. Dooria Kungsäter is measured as a profit centre and focuses on development and production of internal and external door solutions. The door material costs are the largest part of the selling price, followed by the labour costs (however, this varies depending on which type of door being manufactured). The manufacturing process of Dooria Kungsäter can be divided into four phases: (1) component manufacturing, (2) assembling; (3) surface treatment and (4) final assembling (see also figure 4-26).

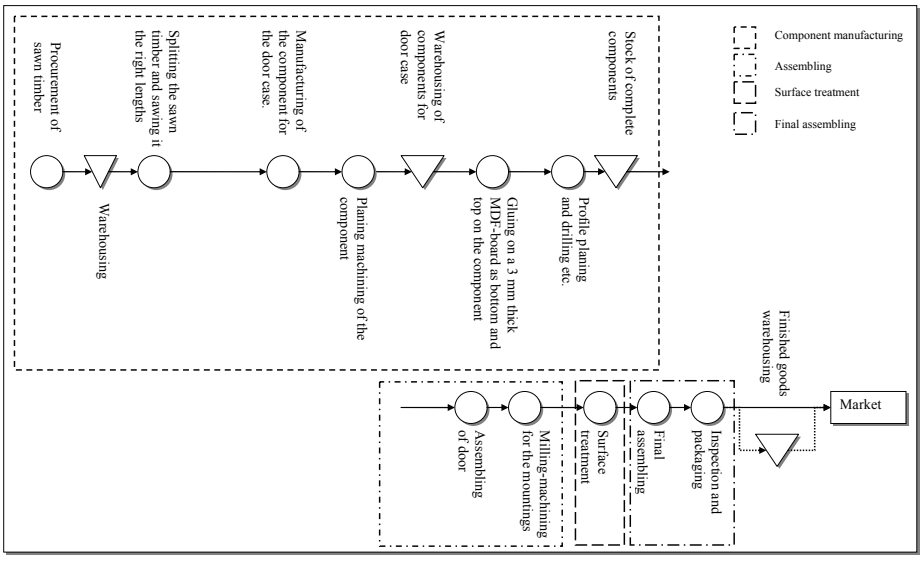

Figure 4-26. Dooria Kungsäter's production setup

The firm recently initialised an outsourcing programme for the manufacturing of wood components for the door case. An outcome of this outsourcing was that a planing machine for manufacturing of the door case component could be sold. The wood components for the door case consists of joint-glued-lamella-wood with a knotless wood furthest out.

4.5.3 Driving Forces for Outsourcing

Two main driving forces for Dooria Kungsäter's outsourcing are cost and financial aspects. Outsourcing must generate substantially lower costs compared with performing the activities in-house (there is today a tough competitive situation on the market), and enable the mobilisation of capital or help the company avoid costly investments.

> *"We are in a situation where costs are in strong focus, where the strategy for Kungsäter is to continue to work with a component [outsourcing] strategy…" Managing Director of DK*

The advantage of outsourcing components is that large investments can be avoided and more focus can be put on core activities at the end of the value chain.

> *"Capital is a scarce factor; where should you use this capital? Well, as close to the customer as possible and why should we then drive and build up plants that will handle raw material when we can utilise our money much better towards our customers". // "The reason that we do not [outsource] faster is that we have relatively good efficient machinery that are already in place, however when considering new investments we rather put the money on the customer" R&D Manager (Dooria AS)*

The Managing Director of DK says that cost and financial considerations are very important. But here the most important driving force for outsourcing, linked to the financial factor, is to focus more resources on their core competencies.

> *"The day only has 24 hours that you can put on our business, but if you have to put 30% of that time to improving the sawing of wood, which does not create any differentiation,… that time could be focused on improving logistics at the end of the production". // "[We must] focus the organisation on what is in the end important: customisation and customer focus" Managing Director of DK*

The outsourcing of door components has enabled Dooria to mobilise capital as well as improve the present flow in production and set free occupied space in the plant. The outsourcing of the planing activities created a possibility for a new production layout which is more concentrated on simplifying the flow. DK's Managing Director says that this shows that outsourcing offers several possibilities for the production and enables the possibility to make rationalisations.

The demands from construction companies and DIY's have increased and in the future it will become very important for the company to augment product offers to include added services. There are also increased demands from customers that Dooria needs to participate and support in marketing activities.

> *"They have a lot higher demands today… partly on competitiveness and help with marketing… and also demands on environment and quality policies". // "We will get increased demands on supplementary elements of value-adding services [kringtjänster, author's note] Managing Director of DS*

> *"In the same way as we outsource, construction companies are thinking of sourcing installation and joinery and then they might demand on installation of inner doors at a specific time and place" Managing Director of DK*

Some of these supplementary elements of value-adding services are present today (e.g. the packaging of doors for the construction companies is done with barcodes indicating where the doors should be installed at the building site after the customers' specifications). Another example of Dooria Kungsäter's downstream focus is their augmentation of the product offer for modular house manufacturers. Here, they offer a complete package of doors with door frames that are delivered directly to the house building site. This integration is strategically important for the firm and they expect to in the future gradually offer more installations of doors at the building site and develop specific packaging for house manufacturers and builders' merchants. This system thinking of product bundling could also be applied for the consumer market where the Managing Director of DS says that Dooria Kungsäter could offer complete installation service. This requires relocation of resources from sawmill related activities to more customer close.

4.5.4 Key Factors Addressed when Considering Outsourcing

Important aspects in general for Dooria Kungsäter are to decide which suitable outsourcing partners the company should cooperate with and what the firms focus area should be. Supplier offered price and the capital tied up in fixed assets are two main factors that Dooria Kungsäter address when considering outsourcing. However, quality aspects, reliability in supplies and supplier attributes are also very important factors to consider.

> *"This work [considering outsourcing] is about considering which outsourcing possibilities exist in our own manufacturing, it is a time-consuming process". // "The more we outsource the more we change our competence profile of our employees…, we go more from being a good joiner to becoming a good negotiator [förhandlare och en duktig kravställare, author's translation] with our suppliers, and [handling] questions such as logistical solutions and capital tied up". // "Outsourcing drives the question about competence development" Managing Director of DK*

4.5.4.1 Focus Areas for Outsourcing – Component and Product Importance

The company is in a position where financial performance and capital investment possibilities are vital to long-term success and sustainability. Outsourcing becomes an important strategy for the company to handle this development. Dooria Kungsäter needs to focus more of their resources on activities that create differentiation on the market and lasting value for customers.

> *"…the strategy for Kungsäter is to continue to work with a component strategy… where one part becomes outsourcing of present production". // "The closer you come to the customer the closer you come to the core competence… considering the production our core competencies are assembling and then surface treatment [final activities in the production process], there you have the core competence for the production company… then comes customer contact" Managing Director of DK*

Dooria Kungsäter estimates that the current outsourcing of wood components for the door cases generate up to 20% in cost savings compared with making them in-house. Even though the focus area today is on outsourcing these components, it would be possible to further outsource certain activities for this initial component manufacturing, especially the gluing of the 3mm thick MDF-board as the bottom and top of the component would be preferable to outsource. In addition, the profile planing machining and, if possible, the drilling would be preferable to outsource. Hence, this would imply that Dooria Kungsäter could buy complete components to be used directly to put in the manufacturing and assembling of doors, see figure 4-27.

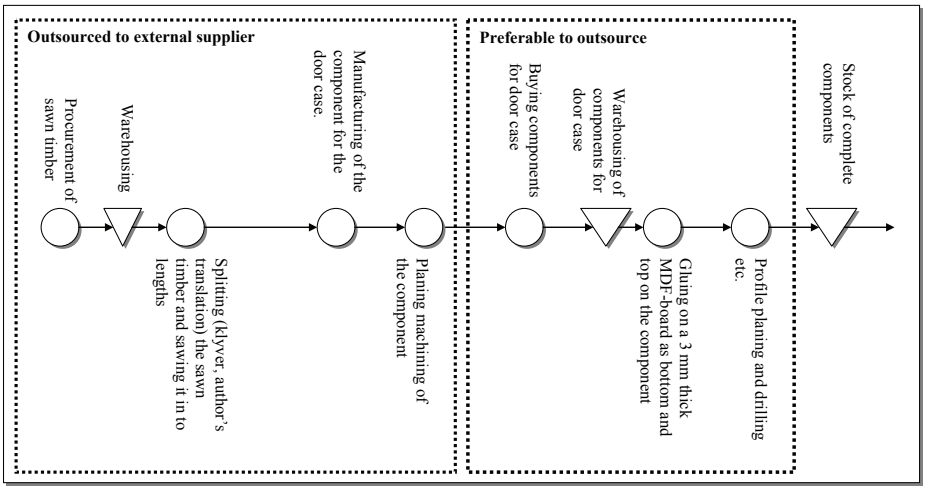

Figure 4-27. Possible future outsourcing strategy for Dooria Kungsäter

It is these components that can easily go directly into the manufacturing of doors that are most suitable for Dooria to outsource. A goal is to also push more of the responsibility for handling inventory towards their suppliers. The issue here is to find suppliers that can handle this type of manufacturing. The advantage with more outsourcing would be, according to Dooria Kungsäter, that costly investments in new machinery could be avoided and instead more resources could be focused on core activities at the end of the value chain and those close to the market. Another reason for outsourcing these components, according to DS's Managing Director, is that it would lower internal lead times from order to delivery. This is because an outsourcing strategy for components facilitates the flows in the production plant. After these activities the customisation begins and further component outsourcing would be more difficult.

Although focus today is on component outsourcing, outsourcing could in the future also include more products. DK's Managing Director says that a future scenario for the company could be to focus on certain products and outsource others to external suppliers, and develop a high competence to coordinate these flows. Once again, the Managing Director of DS notes that, it becomes central for the company to find the right product for their customers. By this outsourcing strategy, the company will manufacture the core products by themselves and focus more resources on marketing and selling activities. Other products can be outsourced to an external supplier. By focusing more on adding value for the customer it also becomes less important if all of the manufacturing activities have been handled in-house and where the products have been manufactured.

4.5.4.2 Capability Benchmarking

Costs are in focus for Dooria Kungsäter and by outsourcing the company can focus more resources on activities that create differentiation. DK's Managing Director says that cost becomes the initial factor to compare when considering outsourcing. Here, the supplier product cost estimate becomes the first thing to consider. Another factor that is considered is the possibility to set free resources for other purposes. The problem emphasised by the Managing Director of DK is that today there is difficult to estimate the possibility to make time- and cost/financial savings because of the difficulty to quantify these factors, particularly activities at the end of the value chain. Therefore the question for Dooria Kungsäter is how much time and resources should they put on these activities, and how should they follow up and measure this? The present costing models have difficulties quantifying these factors says the Managing Director of DK.

Another factor that becomes central for Dooria Kungsäter is if outsourcing should first be considered when the company comes to a point where new investments need to be made or if outsourcing can be considered for existing machines. For new investment, DK's Managing Director says that it becomes much easier to address the outsourcing decision. For machines that are functioning but have been fully depreciated, this decision becomes more difficult and requires a more thorough analysis with connection to how long these machines can offer competitiveness on the market.

If Dooria Kungsäter would outsource the whole manufacturing of components for door case and allow the suppliers to vertically integrate downstream to manage these activities it would require very high demands on these suppliers (e.g. high output capacity, short lead time, minimum delivery delays, high competence in manufacturing). This is linked to the risks of production interruptions if they don't get the components in the right time or receive low quality items. The external source must have superior distribution and logistic competencies and high flexibility. Outsourcing requires high demands on their own organisation and Dooria Kungsäter expects that an outsourcing agreement needs to generate high quality products, long-term relationships and well working communication. However, the R&D Manager says that it can be difficult to find such developed suppliers when it comes to wood components and notices that the outsourcing of wood related components and products often requires helping the suppliers build a high capability. By this suppliers cannot just be random selected, and then expect high quality; it requires participation.

4.5.4.3 Supplier Related Risks

The risks that the Managing Director of DK sees are having an unreliable supplier, low reliability in supplies or losing control over their suppliers. Here, supply reliability is critical when these components are the first input to the plant. DK's Managing Director claims that there is a need to maintain high competence in their production to be able to outsource components to their supplier and at the same time be able to effectively match the flows to fit the outsourcing of components. Otherwise, there is a risk of becoming too dependent on their suppliers' competencies. This makes the outsourcing analysis for Dooria Kungsäter to a levelling between cost/financial factors and the supply risk of outsourcing components.

According to the Managing Director of DK it is easier to consider outsourcing when there is a possibility to quantify the requirements on the outsourced component. The R&D Manager has experience from former outsourcings of wood related products and emphasises that the outsourcing of wood products can often require helping the suppliers build a high competence and experience.

"Another thing is to build competence at your suppliers; this has been very time and cost consuming [arbetsbetskrävande, author's translation]". // "For some goods and especially wood goods you cannot buy [outsource complete products] wood goods… it is not steel, you must almost live in the factory [supplier's factory] to get the quality you require" R&D Manager

By this he says that it cannot be assumed that external wood suppliers directly have high capability. According to the Managing Director of DK, problems of that degree have not so noticeable for the present outsourcing. Instead, for the outsourcing of the door cases main aspects are assuring high quality and supply reliability.

"…here it is more about making requirements on tolerances" Managing Director of DK

Here it has been challenging to get components with high quality and reliability. Today, Dooria Kungsäter considers outsourcing both to suppliers located in Sweden, Poland and the Baltic States. However, a likely development in the future is to focus more on outsourcing wood components to suppliers in the Baltic Sea region, thus, the need for finding suitable suppliers becomes a central question for the company.

"Finding new suppliers is not the easiest thing, it is a process finding reliable suppliers... it takes a longer time to find suitable suppliers and logistical solutions which will work, the further away you come the more capital tied up you get and the larger batches… it is important to find a balance between price and distance to outsourced partners, the Baltic States are right now the furthest limit [for outsourcing wood components] we see right now" Managing Director of DK

Hence, finding suppliers with developed manufacturing of more processed products is not easy for Dooria Kungsäter. To handle this, DK's Managing Director and the R&D Manager state that a possible development could be to use an intermediary. This is today used when buying wood panels (e.g. MDF-panels). The intermediary can function as a buffer and by this, according to the Managing Director; the company can buy the right volumes and avoid unnecessary tied up capital.

"You go a step further in the chain and avoid buying a ship [large volumes that demands unnecessary tied up capital]" R&D Manager

Dooria will try to lower the supplier related risks by having two or more suppliers and not solely rely on a single sourcing strategy. For Dooria Kungsäter better prices are expected to be created by having several outsourcing partners. By having two suppliers of components they can reduce the dependency of components that would arise if they only had a single sourcing strategy. Another advantage is that these two suppliers' processes can be benchmarked.

4.6 The Window Manufacturer Svenska Fönster

Svenska Fönster is the second largest wood window manufacturer in Sweden and is owned by the Danish window group VKR (Villum Kann Rasmussen) Holding[38]. Svenska Fönster is the main owner and the parent company for the subsidiaries: Svenska Fönster Produktion, Traryd Fönster, Mockfjärds Fönster and SP Fönster. Svenska Fönster is governed as an own company, but there is some collaboration with the whole VKR-Group (e.g. in areas such as purchasing, IT-questions and product development). Market and sales and similar activities are more locally handled by each company. Svenska Fönster Produktion is the production subsidiary and is one of Sweden's largest wood window and French door manufacturers.

4.6.1 Market and Customers

Approximately 95% of Svenska Fönster's total sales are national and the remaining sales are mainly to Japan and Great Britain. The three sales companies have different market channels and customer segments. Mockfjärds Fönster sells directly to end-customers and offer window-solutions by adding supplementary services to their products (e.g. visiting customers to take measurements, delivery of new windows, removing the old windows as well as installation of the new windows). SP-Fönster's and Traryds Fönster's most important customer is the traditional builders' merchants, which represent around 60-70% of SP-Fönster's and approx. 75% of Traryds Fönster's total revenues. The two sales companies attempt to work closely with their customers to create a long-term well working relationship. According to the Managing Director Svenska Fönster's brands can help retailers to strengthen their own position on the market.

> *"…private labels are seen very little for windows" Managing Director.*

About 30-40% of SP-Fönster's sales are to construction companies and around 25% of Traryds Fönster's sales are to modular house-manufacturers. Elitfönster is the main competitor.

There has been extensive discussion in the industry about the threat from emerging competitors (e.g. from China or other low-cost-countries). However, such players have not yet, to any large degree, been visible on the national market according to the management of Svenska Fönster. The management at Svenska Fönster says that an underlying rationale for this can be that wood windows are dominating the total sales in Sweden and the market for wood window is a very national product. Here, only a small part of wood windows are actually exported or imported (~92-93% of the total domestic sales of wood windows are estimated by Svenska Fönster to have been manufactured in Sweden).

[38] The group is a part of the business consortium FVS, which has revenues of SEK 15 billion and is also the owner of the Danish window manufacturer Velux.

4.6.2 Products and Production Setup

Svenska Fönster has traditionally governed the whole production in-house, from sawn timber to complete wood windows (see figure 4-28).

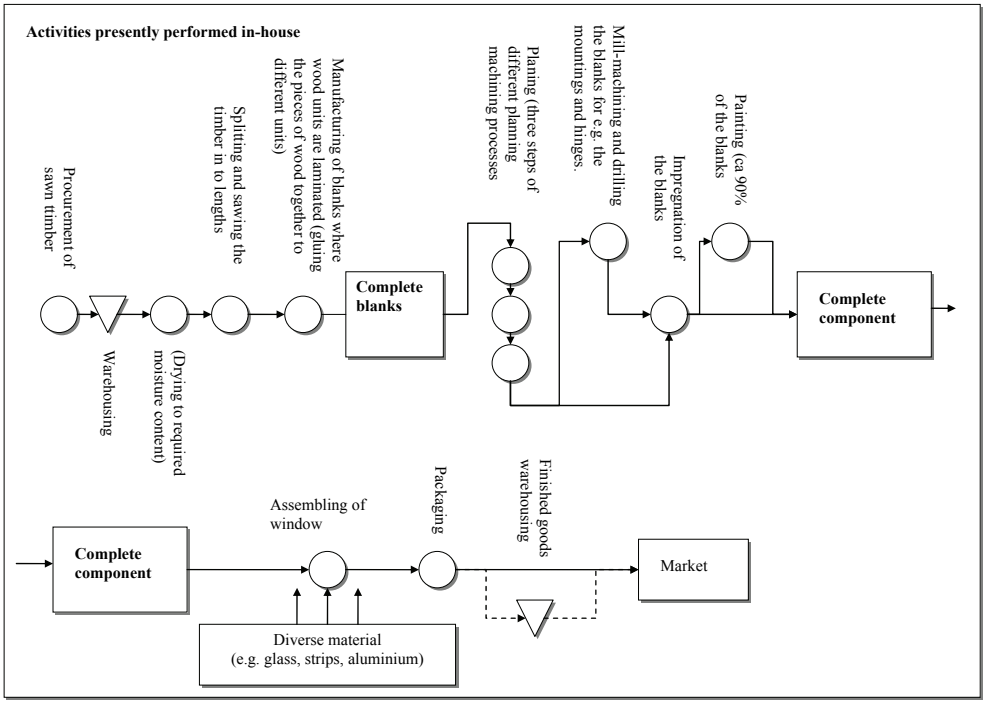

Figure 4-28. Svenska Fönster's manufacturing of windows

The company produces around 250,000 wood windows per year and manufactures about 60,000 different types of windows. The outcome is a very short production series: during the final assembling the average series-length is below two. The vast variety of different types of wood windows is thus a major challenge to handle efficiently.

> *"Before we can initialise outsourcing in any larger scale we need to simplify [e.g. number of ingoing components, production flow]… we can also see that the production plant has increased its volume with almost 100 % in 4 years, we have had a enormous volume growth at the same time as we have increased the complexity by taking in new brands… the variety of different types [windows] have exploded" Managing Director*

For example, the type of window that will be manufactured is decided already during the first sawing of the timber. At present, there are over 150 components before the planing-machining, after mill-machining there may be over 1,000 components and after painting, the number of components has again been doubled several times. The volume of manufactured windows has doubled in four years, which has also increased the complexity of the material flow. By product development Svenska Fönster will try to lower their wide variety of components, but retain the same wide variety of different types of windows available (i.e. by product development, maintaining the vast number of window-types but substantially reduce the number of ingoing components). By this Svenska Fönster hopes to proceed more flexibly

and be able to decide as late as possible what specific type of window will be manufactured. Decreasing the large number of variants of ingoing components will also reduce costly non-value creating activities (e.g. adjustments of machines) and create a less complex flow of material and components.

Svenska Fönster is one of the largest buyers of high quality sawn timber of pine butt logs[39] (Only procures: "*stamvara/block (rotstock från furu)"* as explained by the Managing Director). This type of wood is a high quality pine wood with a high degree share heartwood and few knots. When manufacturing blanks, unique windows components can be produced with a knot-free wood furthest out. The raw material needed for this production of window blanks has at least 50-60% higher price in comparison with other parts of the sawlog. Svenska Fönster procures 15,000-17,000 m^2 per year which is the equivalent of 40% of the total regional availability of this type of wood raw material. By only using this quality of sawn timber the Managing Director emphasises that they can achieve process advantages and increased competitiveness on the market. Purchasing is done from three main national suppliers: (1) Skästra sawmill (part of the Setra Group[40]), (2) Horndahl[41] sawmill (part of the Setra Group) and (3) Rundvirke sawmill. By having national local suppliers the Managing Director says that they can achieve good communication with their suppliers and create a long, well working relationship. These three suppliers deliver about 90% of procured timber, the remaining 10% consists of bulk bought from a supplier (Hedlunds) located in Furudal.

4.6.3 Driving Forces for Outsourcing

There are clear driving forces for Svenska Fönster to initialise outsourcing for the manufacturing of the window blank manufacturing. The company's objective is to buy complete blanks (e.g. as specified modules with pre-described measurements) from selected external suppliers.

> *There are strong driving forces [for outsourcing] especially when we are working with sourcing together with our Danish colleges" Managing Director*

According to the Managing Director, the major driving forces can be summarised as follows:

1. Capacity: increase production capacity without needing to make costly investments.
2. Costs: realise production cost reductions by outsourcing certain activities.

Here, capacity becomes the most important driving force and is also closely related to the possibility to reduce costs and investments need.

> *"Today when considering [outsourcing] blanks perhaps the thing that is most in focus is capacity, we are growing at a rapid speed and the capacity limit will be reached next year and we must find suppliers… but certainly the cost factor is also very interesting" Managing Director.*

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[39] cf. rootstocks

[40] The Setra Group is Sweden's largest and Europe's fourth largest manufacturer of, sawn timber, wood components and products (Setra's website, http://www.setragroup.se/, 2004-12-06)

[41] The production sites Horndal och, Skästra are especially concentrated on processing pine- and spruce rootstocks (furu och granrotsstockar). Deliveries are mainly to customers who utilise the sawn timber for window manufacturing and cabinet making (Setra's website, 2004-12-06).

"The main overall driving force is the need for capacity" Member of Management (Sales)

By outsourcing Svenska Fönster can expand but avoid growing more in the production-lines located in Edsbyn. Also on a group level the capacity needs is a clear driving force to initialise outsourcing. When outsourcing the manufacturing of blanks another influencing aspect is the space that is made available to be better utilised for other activities. Interrelated with the investment aspect, Svenska Fönster intends to focus more resources on core activities at the end of the value chain. The Managing Director emphasises that every activity in Svenska Fönster's manufacturing can be done in-house but they prefer to focus more resources on activities that can generate more differentiation on the market. Thus, Svenska Fönster's competencies are changing and the customers and market knowledge becomes increasingly more important. Focus has moved from the optimisation of raw material utilisation and on high yields to becoming more market oriented.

> *"Today focus out here has moved very much from wood working activities [träbearbetning] to market focus … but we are still too production orientated" Managing Director*

Market focus will facilitate growth and sustainability but must be backed up by a well developed production unit with volume, quality and with the products demanded on the market.

Even though new European DIY-retailers want the company to become more industrialised, and make some troublesome demands (e.g. on logistical requirements), these demands have marginal effect on Svenska Fönster. The Managing Director emphasises that the increased focus on outsourcing is not driven by these customers' demands. Instead "*the clear driving forces are more to expand capacity and cost advantages*" (Member of Management, Purchasing). Other driving forces for outsourcing the manufacturing of blanks are to ensure a continuous supply of wood with the specified properties from their suppliers.

4.6.4 Key Factors Addressed when Considering Outsourcing

4.6.4.1 Focus Areas for Outsourcing – Component and Product Importance

Managing all manufacturing activities in-house is not an optimal production setup for Svenska Fönster.

> *"…it is difficult to be good and best at everything in the whole value chain, today we are focusing on activities that are at the end of the value chain, marketing, selling and assembling, while we are questioning more what we should do with e.g. the manufacturing of components [blanks]" Managing Director*

In the future the company will not handle all activities of the value chain in-house, instead they will focus their resources on their core activities at the end of the value chain and likely outsource other non-core activities. As a start, Svenska Fönster intends to outsource the manufacturing of window blanks. The manufacturing of blanks is the initial activities in Svenska Fönster's value chain and outsourcing of these include (see also figure 4-29):

- Procurement of wood material (after Svenska Fönster's specified quality requirements of type of wood quality)
- Warehousing of the wood raw material
- When needed, drying the sawn timber to required moisture content (to about 12-13%)
- Splitting the sawn timber and sawing the timber into specified lengths
- Manufacturing of the blanks where the wood units is laminated (gluing the pieces of wood together to different units, e.g. in a L-shape)

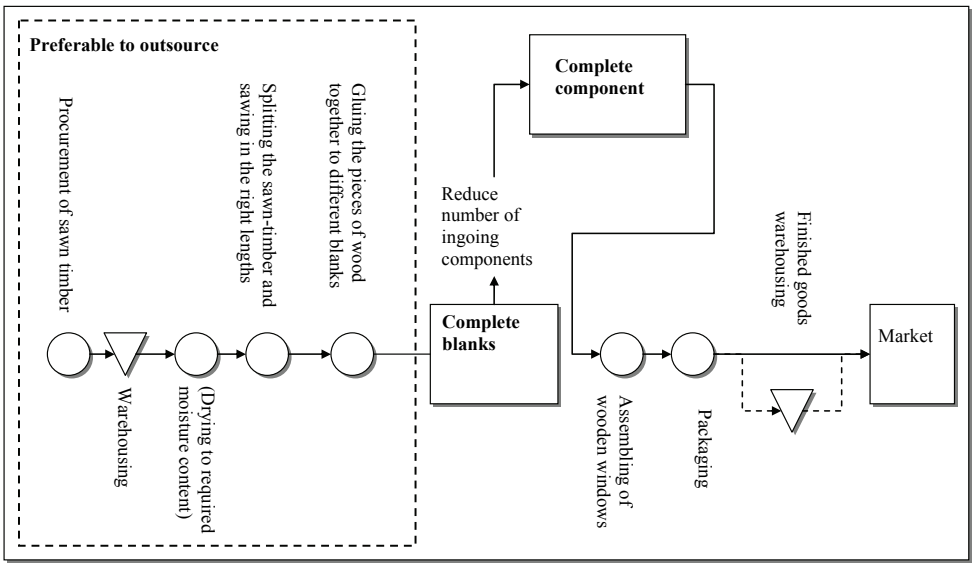


Figure 4-29. Svenska Fönster's preferable change of the value chain when considering outsourcing strategies

In an outsourcing agreement, Svenska Fönster would like to get the blanks in modular dimensions. The company is "test-outsourcing" only a minor part of their manufacturing of blanks to two external suppliers. They will start with small volumes to see what obstacles they

come across, and by this incremental logic Svenska Fönster can "…*gradually learn during the course of the journey*" (Member of Management, Purchasing). However, to make outsourcing profitable it needs to comprise certain levels of volume, "*otherwise these kinds of flows are less interesting*" (Managing Director).

Future focus areas for outsourcing will be to outsource parts of their manufacturing of windows, which will be produced after Svenska Fönster's specifications and with their brand. The driving forces for this are to increase capacity and simplify the flow in the manufacturing plant without decreasing the present product range. The Managing Director says that avoiding investment needs are of course important and that the company's manufacturing does not necessarily need to be expanded more locally.

From a market perspective, another driving force is being able to offer a wider range of different products, which could concentrate specifically on certain customers (e.g. DIY-retailers). These products already exist today, however, due to the capacity limitations and the complex production flow, these products would be complicated to produce in the present plant. Thus, the production of these new windows awaits an outsourcing strategy. Because wood windows are a very national product it would therefore be preferable to outsource to a domestic supplier. However, the possibility exists to outsource together with the whole group to a foreign supplier, e.g. in Eastern Europe.

> *"…once again, as with the component production [blank outsourcing], a possibility exists within the group to build up joint resources in a plant somewhere outside Sweden's borders to produce products where we can have an efficient production, without disturbing the flows in the businesses that exist today" Managing Director*

The decision of where to outsource will be depending on if outsourcing is done locally or on a group level. Svenska Fönster's Managing Director states that the more they do it together on a group level the further away the outsourcing can end up. This can also include the outsourcing of blanks. Today, the group has a close collaboration for purchasing other components (e.g. mountings and aluminium) with China and other low-cost-countries.

4.6.4.2 Capability Benchmarking

When Svenska Fönster considers outsourcing blanks to a supplier they compare the cost of production with the supplier's price. They compare their estimation of their total cost for manufacturing a product.

> *"…there is no exactness, but broadly speaking it [estimation of internal costs for blanks] should be in the right category, raw material is a very large part [of the total costs] when it comes to blanks and there we have full control… which makes maximum and minimum much smaller when material is the larger part" Member of Management (Sales).*

It is easier to consider outsourcing for a new product that has not previously been handled in-house. This is because the new product can often be given a market price with respect to a profit margin that can be captured. However, this is not as easy to handle when considering outsourcing in-house activities.

> *"…when we are moving something from our own production and we assess what contribution ratio is needed it becomes considerably more difficult" Managing Director*

Price is not the only parameter addressed when considering outsourcing. Quality, competence, technology as well as volumes are equally important for Svenska Fönster. A reason for not outsourcing is that the competence of manufacturing blanks can be kept in-house. The

Managing Director says that this can be compensated for if they find a specialised supplier that has comparative technical, cost and competence advantages in their manufacturing. By this maintain a high quality or even improve product quality (e.g. it is theoretically possible to get blanks that do not need impregnation) and at the same time avoid costly in-house investments.

According to Svenska Fönster's management, sawmills become increasingly more interested in taking over additional activities. However, the suppliers that are considered today are not as well developed as their own in-house manufacturing of blanks or windows.

> *"…there are not many [suppliers] that can do blanks in comparable quality as we do" // "…at the moment it is not easy to find these suppliers [suitable for outsourcing blanks to]… some can be found but the volumes [capability to handle large volumes] do not exist there today" Member of Management (Purchasing)*

> *"…it is not easy to find a supplier that has the knowledge and competence to manufacture windows according to Swedish's traditions and standards" Managing Director*

An important factor when considering outsourcing is how well the supplier can handle large volumes.

> *"…they [suppliers considered for outsourcing] must have the capacity, we do not want to have 10-20 small suppliers that we need to steer… but a limited number of quite large suppliers" Managing Director*

An important factor that Svenska Fönster considers is that suppliers will demand a profit margin and at the same time they would like to lower their costs by outsourcing. As a result Eastern Europe might become an important supplier market. However, other factors such as simplifying Svenska Fönster's raw material flow and other intangible factors other than just cost comparison need to be considered. A Swedish supplier would in-fact be preferable but they need to offer the same competitive prices as their counterparts in the Baltic States and other countries in Eastern Europe. The comparative production cost advantages between domestic and abroad (e.g. the Baltic States or Eastern Europe) external suppliers and the ability to maintain the same high quality will decide where the outsourced activities will be located. If these activities are outsourced to a country in the Baltic States it would require that these suppliers can efficiently procure raw material (from e.g. Russia), and require a guarantee of reliability in supplies. Therefore it is no disadvantage to choose a Swedish supplier.

4.6.4.3 Supplier Related Risks

An external source must be able to offer high quality and not measure everything in volume output to justify large investments. This can be difficult for a sawmill company.

> *"…sawmills do not see the connection between price and quality… they see the connection between volume and investments" Managing Director*

High reliability in suppliers' delivery is absolutely critical because the manufacturing of blanks is the initial activity in the value chain and necessary in the manufacturing to avoid production interruptions.

> *"…supplier reliability in these kinds of products [manufacturing of blanks] is of course totally critical" Member of Management (Purchasing)*

> *"We cannot manage without this; it is first into the plant" Member of Management (Sales)*

The manufacturing does not stop if the delivery from the two "test outsourcing partners" gets delayed. However, in the future, outsourcing of blanks will gradually be done in a greater scale and Svenska Fönster might only buy blanks. Here, lacking supply reliability could result in production stops. Therefore, there is a need to find a high degree of reliability in the supplies from external suppliers. The option to lower the risks of supplier failure to deliver blanks within time-limits, and reduce the uncertainty in supplies, would be to have a larger warehouse. However, already now, there is a scarcity of space in the manufacturing plant. Supply interruptions of other components (e.g. aluminium) later in the value chain are less critical and cause less economical damage. This is because others activities can be performed while waiting for the supply of the missing components. This can be compared with the supply of blanks which are critical to avoid any production interruption.

As seen earlier, suppliers do not necessary have the expertise and experience to handle this type of raw material and this type of manufacturing. In this sense the company would likely need to participate in developing a suitable supplier-base that could handle required volumes and that fulfil their high demands of quality and supply reliability. Therefore, it is necessary for Svenska Fönster to transfer their competencies to their outsourcing partner. Even though the transfer of competencies is needed, this is where most of the risks with outsourcing comes from, because Svenska Fönster gradually loses competence while the supplier increasingly builds competence.

> *"…suppliers gradually build up more and more competence than we gradually lose… in the end we can end up in a relationship where we do not decide how much we want to buy but where the supplier decides how much he want to sell" Managing Director*

In the long-run if a supplier relationship fails it can be difficult for Svenska Fönster to switch supplier, in addition the process is difficult to reverse because the competence to manufacture the certain product or component might no longer be available in-house.

> *"…transfer of competencies and building up a network of suppliers is good but it also means a risk for exposure and new risks" Managing Director*

This will increase Svenska Fönster's dependency on their suppliers and when the transfer process starts it will be more difficult for them to steer. Therefore, it is necessary to find an economical incentive to avoid the supplier building a competence that can be used against Svenska Fönster, by this minimising the risk that a supplier would bypass them. One theoretical way of outsourcing to manage supplier related risks would be within the group. By doing this competencies can be kept in-house and risks can be kept at a minimum level.

> *"One way to outsource could actually be to build joint plants somewhere… then we would outsource activities from this production plant but we would keep it within the group… theoretically it would be possible to work with a local partner in Russia or in the Baltic States and perhaps have a 60-40, 70-30 or 80-20 ownership-relationship with the supplier" Managing Director*

In doing so, the size of the group can be utilised and at the same time the supplier related risk can be reduced.

4.7 Outsourcing from a Supplier Side: Norrskog Wood Products

Norrskog Wood Products (NWP) is a sawmill company with 250 employees and about SEK 900 million in sales (2005). The company develops, manufacture and sells sawn and planed timber but also building components in terms of engineered wood. The two main customer segments are industrial end-users (e.g. WPM firms and house manufacturers) and builders' merchants. The business idea is to develop and process forest raw material from middle Norrland (i.e. middle/north of Sweden), and by supplying customised value-added products and services meet and exceed the expectations of customers. The vision is to be the leading actor of processed forest raw material of Norrland by production, development and marketing of wood based products and systems. NWP is owned by the forest owner association Skogsägarna Norrskog (a private forest owner association), which supplies their main need of raw material.

4.7.1 Market and Customers

Historically, selling sawn and planed timber has been under strong competitive pressure.

> *"If a customer buys planed timber from us, they do not buy sawn timber because it is convenient. It is then because we are very competitive on sawn timber as well." Mill Manager (Östavall)*

NWP has geographical advantages by supplying sawn and planed wood to the middle and north of Norway and Sweden (two base markets). Here, in comparison with companies located in the south of Sweden, transports can be handled faster. However, both Norway and Sweden are experiencing seasonal variations (e.g. the building frequency is lower in the winter), which means that it is good to complement the regional sales with exports. On the export side NWP is established on all markets in Europe and also sells to North Africa and Asia (mainly Japan and China).

Customers Buying Sawn Timber Products

The sawn timber supplied has different properties and quality classes. Large volumes of sawn timber are sold to industrial end-users (e.g. for component manufacturing, gluelam production and to building system manufacturing). Sales to regional and national industrial end-users are increasing in volume. For small customers, the sawmills sometimes use intermediaries (e.g. importer and wholesalers) to reach customers. For larger customers NWP sells their products directly (e.g. to the large door manufacturer Jeld-Wen). The classic marketing channel through importers and wholesalers is a declining trend. The CEO says that the more the market is developed the importers will lose their foothold. Here, the industrial end-customers see that there is a margin that can be captured by not using the importers. The Technical Manager states that by avoiding intermediaries, NWP and customers can directly communicate to investigate how improvements can be made in the raw material flow. By this he says that NWP can actually see what needs the customer has: "…*wholesalers and agents were a filter, but by taking away these filters you can make adjustments that are beneficial for both* [customers and NWP]".

To improve differentiation on some markets, the sawn timber is sometimes marketed under different brand names that signify the quality class of the wood (e.g. in Spain and countries in Africa such as Egypt, Morocco and Algeria). The Sales Manager says that these brands are only important for some export markets and have less importance when selling to larger industrial customers. Important differentiating factors and competitive priorities are to have a broad range of sawn timber that is well sorted and delivered in time. Offering wood of high

quality can create some differentiation. The price is of course very important and there is tough price competition on sawn timber.

> *"The price on sawn timber is completely based on the prerequisites of the market and has no linkage to the raw material price [of sawlogs] or the price of manufacturing or anything else… it is the market that sets [the price]. The price [of sawn timber] is much more global than on planed products. Different countries affect the price. If there are low [total] stocks [in the world] the price is high and if the stocks are large it is a lower price. These curves follow each other but in an opposite way. What you can say is that it is difficult to see that we will get a demand that is larger than the supply [of available sawn timber], what we have seen over many decades is that the supply has been larger than the demand. What has saved the situation is that new markets have emerged, e.g. Japan that consume about 4 million m^3 per year and China and USA…" CEO*

> *"Sawn timber is extremely substitutable… it makes it tough for us" Mill Manager (Östavall)*

Customer Buying Planed Products

About 25% of the output from NWP's sawmills are further processed in the planing mills (or at the glue-laminate plant). The sawn timber that is planed is often of lower quality classes and by planing the value of the timber can be improved. Some volumes of the timber that is planed is further processed, e.g. by impregnation and painting.

The three planing mills are producing products for builders' merchants (e.g. Beijer Byggmaterial and Alljärn), Do-It-Yourself (DIY) retailers (e.g. Byggmax) and other players on the building material market. Products are also sold to modular house manufacturers. For the products that are supplied to the building material market, the planing, bundling, labelling and packaging of products for builders' merchants and DIY-retailers can be seen as a simple way of value-adding wood to products with higher value. Lately NWP has experienced tougher price pressure form DIY retailers and more demands on having a broad palette of different products. These customers are also starting to request additional services such as having larger stocks as well as fast availability and delivery. Here, the latest acquisition, NWP Forsa, is intended to help to broaden the product pallet for the building material market. As an indirect consequence of new DIY-retailers entering the market that put pressure on overall prices, price pressure has also increased from more traditional builders' merchants.

4.7.2 Products and Production Setup

The group consists of 4 sawmills (Hissmofors, Ocke, Sikås and Östavall) and 3 planing mills (Hammerdal, Hissmofors and Forsa). NWP Gluelam produces engineered wood in terms of gluelam beams and Ocke Emballage is a joint owned company that produces pallets. Figure 4-30 gives an overview of the organisational structure.

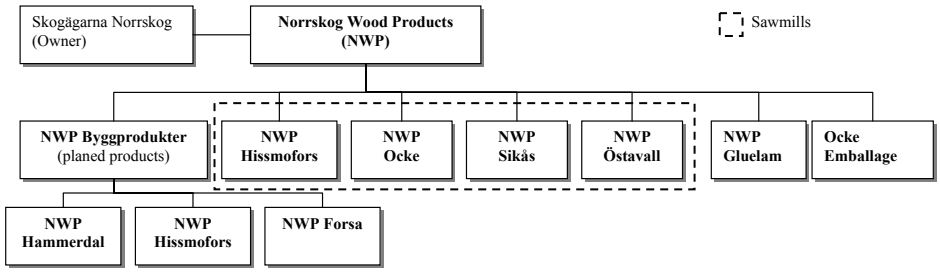


Figure 4-30. Organisational structure of NWP (Source: company website, 2006-03-03)[42]

The sawmills produce about 420,000-450,000 m^3 sawn and planed products per year where about 70% is spruce and 30% is pine wood. The sawn timber is the major part of the total sales. The CEO says that the sawmills are in focus, but the availability of raw material will decide how much NWP will be able to expand by organic growth. The owner of NWP offers good financial support and supply reliability of raw material (i.e. volumes of raw material for the sawmills can be secured by the supplier-owner situation). By having two niche sawmills, two larger sawmills and three planing mills, NWP can coordinate and bundle a larger package of wood products than a single sawmill cannot offer.

The Sawmill Manufacturing Setup

Östavall sawmill is the largest sawmill production unit in the group and saws almost half of the total production (in terms of production volume the sawmill is almost five times larger than the smallest sawmill in the group). Östavall sawmill saws both spruce and pine (in similar large volumes, i.e. about 100,000 m^3 spruce and 100,000 m^3 pine). Sikås sawmill only saws spruce. Ocke is a niche sawmill and has a special assortment of sawn timber that are 3m in length. The CEO says that there are only 5-6 such specialised sawmills in Sweden. Hissmofors sawmill saws timber for both industrial customers and for the building material market and has a similar structure to Östavall sawmill, but is smaller. In a simplified way, the production process of sawn timber is described below (see also figure 4-31):

[42] www.norrskogwoodproducts.se

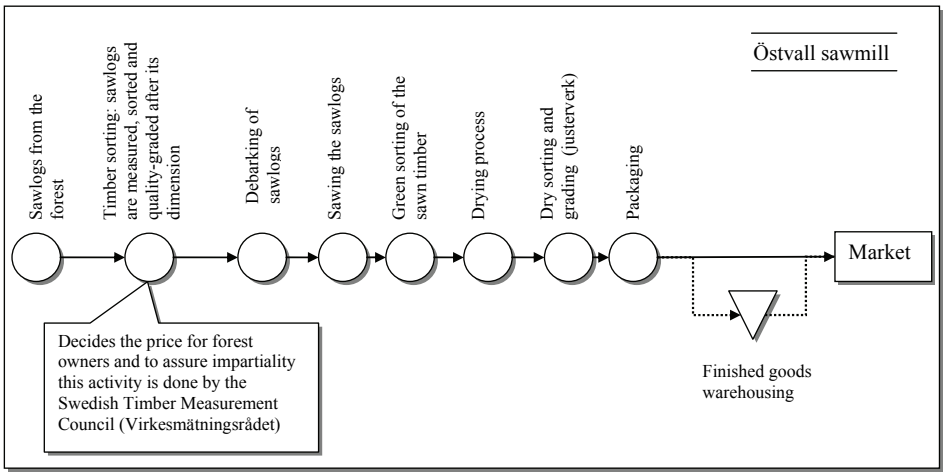


Figure 4-31. Simplified view of the production layout at a sawmill

A. Initially, the sawlogs are transported from the forest to the sawmill. The logs are supplied, mostly from the forest owners in the Norrskog forest owner association. Timber can also be supplied from external forest owners but the supply is coordinated and managed by the purchasing group at the owner association.

B. At the mill site, the first activity is sorting the timber by its dimension (but also looking at the quality, for example, to see if the log is crooked).

C. The next activity is the debarking and sawing of sawlogs. Östavall has two input lines for this activity: one for logs of smaller dimensions (klenstock) and one for larger (grovstock).

D. After the debarking, the logs are more precisely measured by their dimensions and quality is graded by using laser scanning technique. These measurements will help NWP to optimise the yield when sawing the timber and also to optimally rotate the log for the input to the sawing activities. At the sawing station, the sawn timber is separated in terms of outer sides (which become boards) and the core of the log (which become deals).

E. During/after the sawing, comes the first real sorting activity of specific sawn items. This is called the green sorting of the timber (råsortering). The sorting is based on the dimension of the sawn timber but here products with insufficient quality can also be sorted out. Some adjustments are made to the length of the timber (toppkapar virket). After the sorting activity each item is measured and then placed in compartments where each batch has the same dimension but the quality grade can differ. After the green sorting the timber is now ready to be stacked and dried to required moisture quota.

F. The timber is then stacked and dried to required moisture quota (Östavall sawmill has about 20 compartments to dry the timber).

G. The next step is processing the timber in the dry sorting and grading station (justerverket). Here, a batch from the drying activity is first unstacked and then each piece of the sawn timber is sorted and graded after quality class and length. Some adjustments are done, e.g. cutting the timber to the right lengths. Finally, each package is inspected and often packed in plastic to protect the sawn timber during transportation (e.g. from rain). The packages are now

transported to the finished goods warehouse or directly to the customer. The Sales Manager states that the dry sorting and grading is a key activity to check (e.g. moisture quota, knottiness and straightness) the sawn timber before deliveries to customers. But this is of course also a time-consuming and costly step with many different activities.

4.7.3 Drivers for Focusing on Taking over Outsourcing

According to the CEO, the business goal for NWP is to further increase businesses with industrial end-users. The CEO says that a value-adding strategy can improve the possibility to make money. He thinks an important key is finding a niche and having it closely integrated with the available raw material from the sawmill. What NWP sees as a special market potential for, is value-adding manufacturing of components.

> *"Qualified input of raw material where you do the next step in the value-adding chain, gives good prerequisites and less spillage. It is this, with spillage, that has changed radically, the competition forces [customers] to buy smaller dimensions [to avoid sawing and getting spillage and consequence products] and by this save some money. Then the sawmills need to saw some millimetres thinner and this is something that is developing more and more." // "When working with industrial customers that make complete products, they have very precise requirements on the lengths [of the sawn timber]… but then they might not get [the required lengths], and then they [still] buy it and get spillage. Then they can either lower the spillage by steering the purchasing towards more precise [lengths]… or find other options like moving the problem to somebody else. This is what outsourcing can be about: Stora Enso can make it better than Elitfönster and then you can earn [a profit] and create a win-win situation" CEO*

By a value-adding strategy CEO says that spillage can be lowered and consequence products perhaps can be converted to be used in other types of components.

> *"We must be able to have a higher value on the spillage and must be at least as skilled at converting off-grade [products] to a value that is larger than what [customers] are doing today. It can exist prerequisites if you integrate the value-adding [i.e. integrating the component mill with the sawmill]" CEO*

Lowering spillage is an important issue for the industrial customers, e.g. window, floor, door or furniture manufacturer.

> *"…before they bought more standard products and then they planed [the sawn timber] to complete products; if they had little or a lot of spillage [in the manufacturing process] had rather small importance because all [other manufacturers] applied the same processes. Now the competition is tougher and there are manufacturers in all different parts of the world, they start to look for possibilities. They might not be able to press the price of m^3 [on sawn timber] but they can buy so they get more complete goods. CEO*

Looking at sawn timber, the spillage from sawing can vary both on the width and length. The CEO says that if a WPM firm constantly has a couple of percent length spillages by buying sawn timber, the production manager at that company would probably like to avoid such spillage and instead buy the right lengths and more complete components.

> *"This is when the component [thinking] comes in focus and you move this problem to somebody that can adjust the length better" // "[Improving the use of the raw material] is the next big step. The large profit is probably to lower the spillage that we can do in a way that is superior. Avoiding spillage cannot be done, but it can be so that we can convert the spillage we get to a product of certain value or a higher value than it has for secondary processed wood product industries [i.e. WPM firms]. CEO*

The Sales Manager expresses a similar view and says that using the raw material in better ways in combination with eliminating process steps are critical factors for succeeding with a value-adding strategy. Here, he states that customers get many consequence products and spillage that they cannot use for other products. For the customer it is much more beneficial to get a complete component. In line with this, the CEO states that industrial end-users cannot use the spillage as efficiently as NWP can do. While these companies often even see spillage as fuel wood, NWP could use such material to manufacture pallets/packing or even some types of wood components. By this NWP could take advantage of the manufacturing of one component by using consequence products and spillage for other types of components. Such components do not need to have any linkage to the first component manufacturing.

> *"We take care of the spillage that they [i.e. customers] might not do" CEO*

The CEO says that cost advantages are also linked to lowering transportation costs and developing geographical and logistical advantages. By handling component manufacturing in close proximity to the production of sawn timber sawdust, spillage and water do not need to be transported (i.e. not needing to transport unprocessed timber longer distances). According to the CEO, this is one of the incentives when producing gluelam beams for customers in Japan: "*We process the raw material and take away spillage and does not need to transport everything, it is the classic incentive"*.

4.7.4 Key Factors Addressed When Considering Taking Over Outsourcing

NWP's analysis of the possibility of taking over outsourced component manufacturing, with focus on the project with Kährs, is discussed below:

4.7.4.1 Focus Areas for Value-Adding

An overall strategic goal expressed is increasing the volume of value-adding products.

> *"It has been the strategy since day one. It does not need to be planing mills, instead it could be something different, as an example taking over outsourcing" CEO*

> *"[The reason that WPM firms move towards buying components] I think is because they have too much spillage and costs in production as well as investments. Then the question is how can we become better? We must find a niche for our raw material and overcome the state of the market [e.g. downturns on the market of sawn timber]. [For components] it is a much more stable price situation" Sales Manager*

For NWP the future strategy will be even more focused on value-added products.

> *"Our business area is value-adding of wood; we are in wood mechanics… When we talk about wood it should be in combination [with something], it can be with glue or other material… but wood should be the basic material for the value-adding. It does not need to be that you own it 100%, it can be a joint venture or as a qualified supplier… it is the business opportunity that will decide."// "We have as a goal and market plan that our sawmills should increase the share of sawn timber that is value-added within the company and develop more customised products. Today, we perhaps have an internal value-adding of less then 20% [mainly planed products], this is something we would like to significantly increase in the future" CEO*

Value-adding strategies for NWP include to further process the sawn timber and extend their competence base in certain areas.

"In general we have a positive interest to look into [the possibilities] of becoming a qualified supplier. We have our knowledge and competence in certain areas and are not ready to go the whole way to complete end-products. We have no interest in making a complete floor or furniture or a complete window. Instead, we would like to see that we have customers that are willing to pay a long-term high price, and that are quality demanding and would like to establish production over a longer time period. That could include a project where we take over their processing of the sawn timber… It could include that we go further than we are used to. We often need to plan and cut a little, but this could be as the floor components where you plan, cut, saw and glue. Then it is almost a complete component [that can go directly in to the customers] assembling. That we are still positive to" CEO

The management argues that it is this kind of value-adding that is very interesting and the Kährs project would enable such development.

The Kährs Project

NWP made an analysis of the possibilities of starting to make components in the Östavall sawmill for the large floor manufacturer Kährs. The component that the floor project included was the M/B-component[43]. Today, Kährs buys sawn timber of a low quality class with very precise measurements (e.g. 25mm thickness), widths and certain lengths. If they were to take over outsourcing, NWP would deliver complete M/B-components to Kährs that would then directly put the component in the final production of the floors.

"The remaining process is that the floor manufacturer would glue on the wear-layer and the final design [as profiling and surface treatment]" Mill Manager (Östavall)

"Kährs and Tarkett have a lot of production but their strength is their brand name and their market organisation and to some extent [certain production steps such as] surface treatment… [for] the rest it is of little importance as to who makes it…" CEO

The reason that NWP investigated this kind of project is that they have had a purchasing agreement with Kährs for many years. Here, NWP has delivered some of the raw material used for manufacturing the mid-layers for the floor manufacturing plant in Ljusdal (i.e. raw material for the manufacturing of quarter sawn pine fingers).

"It is easy to see when you look at the flow that there must be a lot of money to save. It is a process that implies that we saw [the logs to] timber and dry them to normal moisture quotas and then sort them in our dry sorting and grading station… then the fraction of lower quality becomes commodities for floor manufacturers. [Kährs] buys them and takes them for an extra ride. The final activity is that [the sawn timber] come to [the floor manufacturing factory in] Ljudal and become flooring. [Before that] they first send them to [a plant in] Matfors to stack and further dry the sawn timber and then transport them to Ljusdal for the final manufacturing." Mill Manager (Östavall)

The Mill Manager states that this is a good example of too much handling of wood, double processes and unnecessary transportation. By doing more processing in one place, the Mill Manager expects that, work for transporting the items will be lowered. In addition, he states that there are, today, unnecessary transportation costs due to the geographical location of Östavall, Matfors and Ljusdal: especially when transporting unprocessed sawn timber (i.e. not dried to the required moisture quota and not sawed to lamellas).

[43] See further the case description of Kährs for a detailed description of the M/B-component

4.7.4.2 Capability Benchmarking

There are several things that must be considered to enable a value-adding strategy. Becoming a component supplier, the CEO argues that the production must be at least as efficient as the customers' present production. However, to enable this he says that it almost requires that the customer has older equipment and does not want to make new investments.

> *"If they have a tiptop plant and have recently invested in scanning [equipment] and everything, it is easy to guess that it will not be easier for us to make it more efficient. Then you begin to question why a customer would like to get rid of that [i.e. outsource that production]. CEO*

The CEO states that it is likely that NWP will be able to create a more cost efficient plant and manufacture components at a lower cost than the customer, when a customer is in an investment need and has old production equipment that is not cost efficient enough.

> *"…if you outsource you do not want it to cost more. But it does not necessarily have to be a much lower cost. Just this, and not needing to make the necessary investments [can be enough]. Needing to make investments [it is necessary to consider] what a reasonable return is. It is company specific. Generally for many companies, they are trying to ease their balance sheet as much as possible and cannot tie so much capital in stocks and machines... if you have your own machines and need to give employees notice it is even bigger issues, then it is better to let somebody else do it for you" CEO*

One main issue is if enough cost advantages can be achieved so that there is not just a transfer of costs upstream.

> *"…if we would enter such outsourcing projects [e.g. manufacturing M/B-components]… it must be an economical cost advantage, it must be there and it can only be there if we make it better then they do, otherwise somebody has to take that loss" CEO*

One basic thought when considering taking over outsourcing is that NWP is expecting to use the raw material in a better way than a customer can. An important issue is that NWP must be sure that any consequence product as a result of a value-adding strategy can be off-set to other customers. Otherwise, there is a risk that the total business will be unprofitable. To offer lower costs for the M/B-components, NWP had several key arguments mainly related to: eliminating production steps, rationalising the production, being able to use the raw material in a better way and keeping investments at a low level. These will be discussed below.

Improving the Production Process and Eliminating Double Processes

One basic idea with the Kährs project was about integrating the Östavall sawmill with a component mill. Today, Kährs buys sawn timber of low quality with quite a lot of knottiness with standard moisture content. As a consequence, the first thing Kährs needs to do is stack and dry the timber and one of the last things a supplier like NWP does is stacking, drying and unstacking the timber. This means unnecessary double processes. Here, a main synergy effect, according to the Mill Manager and Technical Manager, was the possibility to reduce the number of operations and double processes that exist today. The same view is expressed by the CEO:

> *"You could eliminate production steps by having this value-adding at the sawmill. It is a very specific moisture quota they demand, very precise but unusual. If you talk about [moisture quota on] glue-laminated wood you do not have the same requirements. As they, and [as] every floor manufacturer does, they buy and dry the [sawn timber] by themselves. It means that [we first] must stack [and dry] the timber… and then [Kährs] must [also] stack [and dry] it [once again to reach the required moisture quota]. We could eliminate*

this whole process because we could dry [the sawn timber at the right moisture quota] directly. Then you had an incentive that would make it [possible] for us to manufacture it to lower costs then what they do. We probably did that; our cost estimate could show that. But then it is a question of who should have part of that business profit and saving?" CEO

If NWP made M/B-components, they could integrate a component production line directly after the drying procedure. In addition, NWP could change their production setup to enable the sorting of timber already after the first sawing (i.e. already at the dry sorting), which becomes critical for enabling the reduction of production steps. Today the green sorting mainly includes sorting the timber by dimension, not the quality class grading, which would be necessary if wanting to enable these production process improvements. This means that the sawn timber intended for component manufacturing does not need to go through the dry sorting and grading station and be stacked and dried twice. Instead the sawn timber can go directly to the production line for the M/B-component manufacturing. This would be enabled by having an integrated component line. The Mill Manager and the Technical Manager state that an integrated production line is critical to avoid double processes and enable the elimination of production steps. Otherwise, it may be need to take the timber through the dry sorting and grading activities or be prepared to pay a lot higher price for transporting the stacked timber[44]. By having an integrated component production line this could be avoided.

On top of these advantages, NWP would be able to rationalise and improve the production process of the mid-layer in component. Instead of sawing the sawn timber directly to lamellas and then gluing these to mid-layers like Kährs does today, the new production setup was instead based on manufacturing a glued wood beam that could be directly sawed to the mid-layer carpet.

"By this we could lower the number of units, otherwise we would have sawed lamellas first and then, as they do in [the main plant in] Nybro, putted the lamellas to form a layer [and then glue them together]. But we came with glued carpets [of the sawn lamellas] to be putted on [the bottom-layer]. It was a different [production] process and we could reduce the handling of units [of lamellas]. We glued [the sawn timber] to beams that we by a bandsaw saw to lamellas…, [and] then we did not need to handle the [many] small small lamellas; it was more a carpet that could be placed. We had made a rationalisation of the process" Technical Manager

Thus, in comparison with Kährs' own production of mid-layers, NWP changed the production setup and made improvements which were expected to enable a rationalised production. The characteristics and quality of the M/B-components would remain the same (would neither be improved nor get worse by this production setup). One main reason that NWP wanted to change the production setup by making glued wood beams was to enable the use of sawn timber with more different dimensions. The Mill Manager states that Kährs certainly has a larger scale production than NWP, but the advantage for a sawmill company like NWP was having the possibility to cut production steps and create more rationalised production in the sawmill production and partly in the component line.

"They have one type of raw material with the same measurements and quality. If you look at the whole flow from the sawlog to complete M/B-component I claim that we can become more efficient on the sawing" Mill Manager (Östavall)

[44] Transporting dried wood that is still stacked is almost twice as expensive due to larger volumes transported

By this he says that NWP would have good possibilities to make the whole process more efficient. However, he also states that Kährs has an overall more efficient M/B-component production, which they have had many years to fine-tune and develop. Nevertheless, an advantage with having onsite component manufacturing, according to the CEO, is the possibility of fine-tuning the sawing of timber to fit the production of the components, by this somewhat maximise the yield of lamella output. However, this can only be done to a certain degree because otherwise there is a large risk of getting consequence products and sawn timber with non-standard dimensions that could be difficult and less profitable to off-set to the market. Together with eliminating production activities and avoiding double processes, the CEO says that this should be a very interesting incentive for starting with this kind of production: "*Then you have the demand to make a cost estimate that should be interesting for both parts*". Linked to this he says that the sawmill industry today has greater possibilities to initiate these kind of value-adding strategies, than just ten years ago.

> *"We can pre-sort [the sawn timber], thus, sort the sawn timber after quality classes directly after the sawing and before the drying process." CEO*

This has been enabled by the development of new technology, e.g. scanning equipment. By this NWP can take out suitable sawn timber for component manufacturing such as the M/B-components from the running production. The timber can be selected to be dried to a special moisture quota and sawn to lamellas. The drying is very challenging but one positive aspect is that the drying equipment has improved.

> *"Then you have the whole drying process, you must be able to sort before drying, this is an important issue… you need to have drying capacity and you need to be able to dry it well. " Sales Manager*

> *"Also the drying technique has developed… the dryers are controlled in a better way and have programs that can guarantee less variety [in all of the pieces dried] and fewer defects" CEO*

The Sales Manager argues that the drying process is an important activity that must be well handled to avoid too much spillage in this process.

Using Both Spruce and Pine Wood and More Dimensions

One main issue to begin the manufacture of M/B-components was to find enough raw material of the right quality and dimension to fulfil Kährs' requirements to manufacture 1 million m^2 per year. Otherwise, according to the Mill Manager, Kährs said that they could as well keep the production in-house. Here, the Technical Manager argues that Kährs required a partner that could handle such large volumes. If NWP could only manage to handle 300,000 m^2 he states that Kährs would not be interested: "*…then there would be other that were more interesting to work with*". To handle this demand and at the same time find cost advantages NWP has to look for way of using the raw material better.

> *"We had the technological concept that we thought gave some better utilisation of the raw material than today" Mill Manager (Östavall)*

> *"…Our way of manufacturing made it possible for us to use a lower quality [of sawn timber], Kährs buys a higher quality" Technical Manager*

This was done by being able to use both spruce and pine wood of more different dimensions, which was enabled by the production setup and changing the production process at Östavall sawmill (e.g. making the glued wood beam).

"The fundamental concept was that we in Östavall have the possibility to sort before drying, we judged to have enough drying capacity to dry requisite volumes. We had a production concept that differed from today's standard procedure, which showed that we could use considerably more dimensions for the input of raw material and we could use both [wood of] spruce and pine. Thereby, we could get a local base of raw material on the sawmill to be able to produce 1 million m^2 M/B-components [per year]. Mill Manager (Östavall)

"We do not have insight into their own cost estimates but if comparing their own in-house manufacturing [and a need for Kährs to make new investments] we believe that we had a quite competitive price," // "We could use more [sawn timber] with different thicknesses because we could do this process where we glued [the sawn timber] to a beam. There we could glue boards to each other, but if you would saw to lamellas first you would get an unmanageable number of units [if using thinner dimensions]… our way of doing it enabled us to use thinner types of boards" Technical Manager

By this NWP could somewhat steer their production towards using the raw material in a better way and at the same time take sawn timber of higher quality for other purposes. By doing this there are more opportunities to use more types of raw material than Kährs. However, there are limitations for NWP to just saw timber to maximise the yield of lamellas for the M/B-components: "…*We were of course required to adhere to standard measurements*" Technical Manager.

Working with Partners to Keep Investments Needed at Low Levels

The glued wood beams were intended to be transported from Östavall sawmill to a production plant in close proximity of the customer's production plant in Ljusdal. This supplier (Ljusdals X-trä) had the necessary equipment to do the final manufacturing activities (e.g. sawing the beam and machine for pressing the bottom-layer with the middle-layer). This was related to keeping investments at a low level and avoiding building up too many new production facilities.

"They had scanning equipment and would invest in a type of gang-saw to saw out these layers, and together we could then reduce the investment costs. Then we decided to transport [the glued wood beams] between Östavall and Ljusdal" Technical Manager

Thus, this would mean avoiding too costly investments and as consequence taking marginally higher transportation costs. In addition this plant is located only about 0.5km from Kährs' plant, which meant that final transportation costs could be kept at a low level.

Capability Challenges: Handling a New Type of Production Setup

The Mill Manager and the CEO say that becoming a component supplier is a great challenge. Just taking over such manufacturing puts high demands on a sawmill.

"It has been like this because it requires rather special conditions for a sawmill to be able to meet the demands a floor manufacturer has, being able to dry [the sawn timber] with very high precision at very low moisture quotas is the first thing. This requires that you both are skilled and that you have good technical equipment… and that you have a lot of drying equipment, because you triple the drying time for this sawn timber." // "We have tested some [drying of sawn timber to the required moisture quota] for Kährs and notice that it is rather difficult, they have completely other demands on tolerances of moisture quota then what is normally the case for sawn timber." Mill Manager (Östavall)

According to the Technical Manager the difficult thing is avoiding too much variation when drying the wood. The Mill Manager also emphasises that it is important to actually reach the

exact moisture quota, which is not easy. He says that such floor manufacturers as Kährs have a little bit different equipment and have many years experience of handling this production.

> *"They have a technical specification of this product that is not easy to meet. It is the capability to dry that is central, [and] the capability to keep the quality on the input of sawn timber in terms of knots, checks and edges… [and] the capability to put this together as a product that keeps to the required dimensions with quite small tolerances, and then you cannot have a lack of glue [limsläpp, author's translation] or other [defects]. I have the deepest respect for the difficulties it takes to manufacture these M/B-components." Mill Manager (Östavall)*

A competence that needs to be developed, according to the Technical Manager, is managing the new type of production when manufacturing M/B-components: "*It is a new competence that needs to be developed*". This includes the gluing of the sawn timber. When drying the timber to such a low moisture quota Östavall must also protect the timber from rain and moisture, which could result in a need for larger warehouses (higher moisture quotas also makes it more difficult to transport it).

Summarising the Potential of Taking over M/B-Component Manufacturing

What can be seen is that the main capability advantages are found more in the sawmill production by manufacturing improvements and integrating the component mill on site (see figure 4-32).

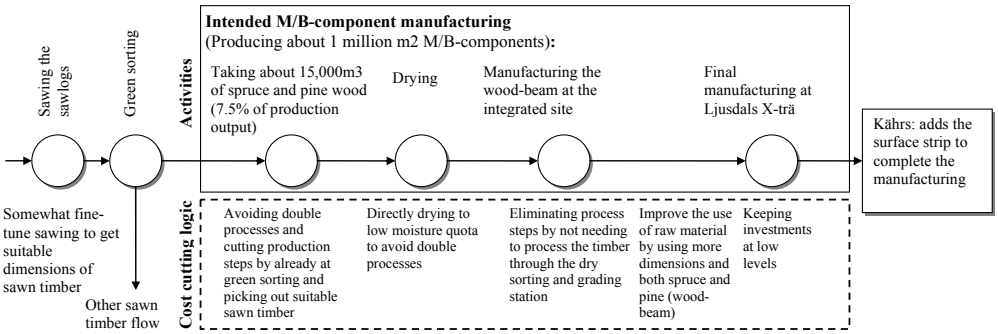


Figure 4-32. Production setup for an intended M/B-component manufacturing

However, in the project, NWP and Kährs had difficulties reaching an agreement on the cost levels. Kährs required NWP to produce M/B-components at a cost lower than the present in-house variable cost level. The CEO of NWP says that when starting a new production line there is always a capital cost due to investments made and a need for some kind of profit margin on the business performed. Similarly, the Mill Manager says that it is very difficult to produce below the customer's variable cost and not include the investment cost that is necessary to start making M/B-components. This has for now put the project on ice. Assuming that Kährs, in a longer time perspective, would need to invest in upgrading their plant and are considering such accompanied investments costs, the Mill Manager and Technical Manger state that their offered price by NWP should be competitive in comparison to the in-house production at Kährs.

4.7.4.3 Business Related Risks

To avoid the risk of ending up in a non profitable situation, a critical challenge is to be able to offer lower costs. The CEO argues that a main consideration must be that the value-adding strategy is profitable of itself and not dependent on the other selling of sawn timber.

> *What you can deliver to [customers like] Tarkett, Kährs or some other [floor manufacturer] is the middle-layer, they will never buy any pine for the wear-layer… if we cannot make money on the middle-layer then we cannot make money at all [in that business]". CEO*

Therefore, before taking over any outsourcing from customers, NWP's view is to ensure that profitability can be reached based on the outsourcing of the specific customer (e.g. assuring that the manufacturing volume offered from Kährs is enough to make the development of such manufacturing profitable). However, the problem the CEO states is the difficulties reaching profitability if considering the required investments and accompanied costs.

> *"It is a catch 22 in this discussion, because you must be extremely efficient – Kährs more or less put demands that you should beat their variable production costs at the same time you are investing 20 million. That put requirements on a technology leap and large scale thinking. Then you must have all [equipment and a well working production] when you push the [start] button, [but you also] need delivery contracts otherwise there will be no board in the world that will finance [such project]… You must have the price and you must have the volume secured for [at least] five years, this [altogether] makes it difficult" Mill Manager (Östavall)*

By this he states that a company outsourcing components like M/B-components with efficient production must have an investment need to consider an external supplier costs competitive.

> *"If there is going be to an outsourcing [agreement], it must be a volume increase or a time when you should invest. Otherwise it is very difficult. Or else they must be extremely inefficient or have lack of space in their business" Mill Manager (Östavall)*

The question the Mill Manager asks himself is if sawmills should even try to move towards value-adding strategies in terms of making components such as M/B-components.

> *"Sawmills and value-adding is tricky" Mill Manager (Östavall)*

The difficulties of taking over outsourcing is linked to a divergent production flow which creates many different products per year at Östavall sawmill.

Managing the Sawn Timber Flow with an Integrated Component Mill

Increased value-adding, such as M/B-components, requires very precise drying. A difficult thing is that a sawmill like Östavall cannot just dry their whole production at the low moisture quota. Instead the sawn timber must be sorted before the drying.

> *"All value-adding has more specific moisture requirements then what we are normally used to on our standard products. Then you can ask why we do not dry all [sawn timber] to 6.5%? That lessens the quality, you get more splits and the timber can become a skew. The more you dry [the sawn timber] the more [quality problems] arise, you would likely to stop around 16-18% because then it is dry, keeps its shape and it never gets blue stains. If you dry it more than that it becomes dry enough to glue and to put it in a floor. But then it is also reduced in size. If you dry [sawn timber] from 18% to 14% it will shrink 1%. This means that the measurements get 1% smaller… If it is not required by the customer, we do not want to dry anything more than necessary." CEO*

"That is not the normal procedure, instead you usually sort [the timber] after [the drying process]. Then it requires that you have a sawmill that can sort the goods before you dry them and not all sawmills can do that. Therefore it is not so strange that is looks like it does. It is in this way that it has worked where the floor manufacturers have made the final drying by themselves." Mill Manager (Östavall)

In addition, drying the timber to such low moisture quotas can become a bottleneck for the whole production. The time to dry timber is quite linear, which means that this drying can take several extra days (about 3 more days). This can delay other flows of timber that needs to be dried.

Large Investments for a Small Volume of the Production

The project with Kährs was relatively large and would require investments of about SEK 20-25 million in a new production line. However, even though the project would require quite large investments there would still be rather small volumes that would need to be further processed to M/B-components. Taking over a part of M/B-component manufacturing would consume only about 15,000 m^3 of raw material output. This means that such investments would still only consume ~7.5% of the total output of sawn timber from Östavall or if considering the whole group:

"The M/B-component manufacturing would consume 3% and then we would have invested SEK 20 million. If it would be the same amount for the rest it would be a gigantic amount" Technical Manager

In relative numbers it can seem that a component consuming only 15,000 m^3 is a very small volume for a sawmill producing around 200,000 m^3 per year (i.e. such sawmill should have no problem to deliver). However, the volume that this component is consuming is almost the upper limit if they want to have a cost advantage by not needing to buy sawn timber externally.

The Technical Manager says that a production setup advantage if NWP were to start manufacturing the M/B-components, is that the sawn timber could be sorted already after the first sawing of the log (vid råsorteringen, author's translation). Today, selling sawn timber to Kährs implies that the timber is first sorted at the final production stage (the dry sorting and grading station). However, a challenge has been to produce enough raw material with the right quality to be able to manufacture the floor component. The Mill Manager says that the problem for a single sawmill is that it would not have enough input volume to generate the necessary volume of sawn timber of suitable quality to manufacture the mid-layer component.

"Traditionally you have used a specific dimension; you have perhaps used 25mm [thickness] pine with widths of 100-125-150mm. It will not be enough [volume] on one saw, not even the [sawn volume on] Östavall sawmill, which is rather large, would be enough. There will not be enough square metres to make it meaningful to have a floor M/B-component manufacturing. So another detail is that you might need to work with purchasing [sawn timber with the right dimensions and quality] from other sawmills, but then you lose synergy effect benefits [that you would get] by having [the sawing and M/B-component manufacture integrated] at the sawmill location. The key in our concept was that we have a production setup that allows us to use many more dimensions as raw material input [for the manufacturing of M/B-component and by this the Östavall sawmill would not be required to buy sawn timber from other sawmills]." Mill Manager (Östavall)

Increasing the volumes of wood produced is also problematic. The dilemma is that taking higher quality classes or buying externally will mean losing some of the expected cost advantages.

"[Looking at the] total [volumes produced] there may be small volumes, but there can be large volumes because it is only these products [i.e. sawn timber of a certain quality] that can be used. In the Kährs case with the M/B-components it can be said that we could setup manufacturing that [could produce] 1 million m^2, but we could not produce more. Because then we would have to put in goods that were not suitable, simply just too expensive. They wanted a certain quality that they could pay a certain price for, this means that they then will only get that quality." CEO

The consequence is that even partial outsourcing volumes from a customer such as Kährs is almost the upper limit as to what a large sawmill like Östavall could manage. This causes a high dependency risk and limits the possibilities for NWP to create scale advantages.

"It gets difficult to manufacture enough volume, [but] it is always a risk to have only one customer. It puts demands on the formulation of the contract [det kräver ju att man har extremt om sig när man formulerar avtalet, author's translation]. The contract must be long-term and should relate to volumes and hopefully also the price; so you dare to invest around SEK 20-25 million." Mill Manager (Östavall)

"If you consider Kährs' decision and also ours, you can see that there are large risks. When you come to the contract formulation you want to guard against all possible risks" Technical Manager

If NWP would deliver components to Kährs they could then not just double the capacity to deliver also to other floor manufacturers. Taking sawn timber of higher quality would mean loss of cost advantages and would not be an option.

"You do not want to put in sawn timber of higher quality, as soon as you start buying externally the synergy effect disappears. Then you are in the same situation as they are [i.e. Kährs]. Then you probably have offered a price level that takes its starting point from these synergies, which means that you cannot afford to buy [wood raw material] in any large scale" Mill Manager (Östavall)

"The good thing with the floor project was that it took all available material [sopade rent, author's translation] of one type of homogeneous quality" Technical Manager

If a sawmill does not want to buy sawn timber externally, the consequence is that there are only very large types of sawmills that could start manufacturing such components.

"There are not so many companies that can take on these large jobs because you need to have rather large volumes. Stora Enso do it in Ala and of course that sawmill is relativly large and only produces one type of wood and has quite a good capacity to handle such value-adding. If it would have been a smaller sawmill it would [need to] base it on the purchasing [of sawn timber] and then [in addition] would have transportation and the handling of the sawn timber" CEO

Because it is costly to transport sawn timber that has not been unstacked, taking timber from external sawmill or from other sawmills within the group is not an option for M/B-components. Here, large volumes would be needed to be transported and due to the large size and bulky goods transportation by train might even be necessary. In addition to that, transporting timber that has been dried to such low moisture content is difficult and costly (e.g. the timber must be protected from rain that requires costly measures). The option is to take such timber into the dry sorting and grading station before delivering it. However, in addition, this causes unnecessary processing steps in the manufacturing.

Because of the limited availability of sawlogs and divergent production flow, just sawing more timber is not a practical strategy. The Mill Manger says that today they saw as much as

they can get hold of and are reaching their capacity limits. At the same time, sawing more logs in the sawmill puts requirements on finding off-sets for all other product outputs of sawn timber. Here, the divergent production flow will create many other products than just sawn timber suitable for M/B-component manufacturing. The Mill Manager and Technical Manager emphasise that all output must be off-set to assure profitability.

To handle the limited availability of raw material input NWP changed the production setup to be able to use more dimensions and also intended to use both spruce and pine.

> *"To use both wood species was a way for us to increase this share - to get a local base of raw material for this type of manufacturing. If we would apply Kährs present concept on a sawmill you would get a very small part of your own sawmill production [i.e. would consume very little of the raw material output]. They only buy pine boards with 25mm thickness and [width of] 100mm and above. It does not get as many thousand m3 [of this sawn timber with these measurements] per year on the Östavall sawmill. This means that you [risk] building a value-adding [production] that requires a purchasing organisation to supply [the component manufacturing]. " Mill Manager (Östavall)*

If you take all boards of both wood species with suitable quality and combine it with using more dimensions, the Mill Manager emphasises that Östavall sawmill would be able to scrape together enough raw material to produce the required volumes to Kährs (around 10-13% of Kährs' total production).

> *"If we locally on the sawmill would manage to get enough raw material, we would need to use 16, 22 and 25 mm. But it is a little bit troublesome to create a production line where you in an early stage put these together…" Mill Manager (Östavall)*

A WPM firm like Kährs is thus the upper limit of what NWP would manage to deliver. Being restricted to one customer, the unit output can not be increased to spread the costs.

> *"Östavall were expected to manage 1 million m^2, but then we principally would not have the capacity to deliver to somebody else. Then you cannot spread the cost for the factory on a larger [scale] production" Technical Manager*

Therefore, the internal capacity limits create a large dependency. Initiating a value-adding strategy can thus consume all available sawn timber of a quality. However, a risk is that it can negatively affect other customers.

> *"That is why some of the products that you get the chance to analyse and take over the manufacturing of [are not suitable]…it can be so that [they] will consume too much of the available production you have, then you become vulnerable: you only have one customer and one type of value-adding, you might lose other customers" CEO*

Difficult to Steer Production Based on Customer or Component Mill Requirements

Assuring that all parts of the sawlog can be sold is a critical issue to becoming profitable.

> *"…you need to sell every least gram" Mill Manager (Östavall)*

> *"We can get offers on products that look very good on paper, but it is only one part [of the sawlog] and the other parts become impossible to sell, it is special measurements and so on. We can thus not do it even though the price looks good." Technical Manager*

> *…"every output of products from the sawmill must find off-set to assure good profitability" Sales Manager*

Even though one offer from a customer to saw a certain product may yield good margins the total deal can be unprofitable due to the rise of consequence products. As a consequence, both the Technical Manager and the Mill Manager argue that the production cannot be completely steered on the basis of customer requirements. If NWP would do that they would get too many consequence products that are difficult to off-set for and the result would be low profitability.

> *"Consequence products is a term used in the sawmill industry, it is those you not would like to have. [You get them] as soon as you saw a log" Mill Manager (Östavall)*

One problem here is the divergent production flow. The Mill Manager emphasises that NWP, before sawing the logs, does not know the product output. Here, every log will result in a number of various outputs to different possible customers.

> *"Is not so that the sawmill industry is least suitable for forward integration, due to the divergent production flow? We have one sawlog as input and get 8 different products as output, which can be further processed to over 20 end-products, and large investments are needed to invest in a rather small part of the total production" Mill Manager (Östavall)*

> *"The length of the log can be right but then it turns out when you saw the log that the timber quality was not right: it was not good enough or it was to good" CEO*

Discussing this in more specific terms of the M/B-component manufacturing, NWP will only want to use the lower quality fraction for this type of manufacturing. At the first sawing and at the green sorting of the timber, NWP cannot just adjust to maximise the yield of lamella output for the M/B-component manufacturing. Such strategy would result in consequence products with non-standard dimensions, which would be difficult to off-set on the market. According to the Mill Manager, a main risk here is that NWP will be forced to sell such sawn timber to the closest lower standard dimension. This would result in a profit and volume loss. This is something that both the Technical Manager and the Mill Manager emphasise as an issue that needs consideration. The Mill Manager says that special care is needed when sawing something where the other product output results in non-standard dimensions: "*…these are not easy to sell*". NWP has some room for steering their production to get the right dimensions to fit the manufacturing of M/B-components, but will still be tied to the standard qualities and dimensions that exist on the market for sawn timber. What is clear is that it is not easy to steer the sawmill production based on requirements from integrated component mills or external customer requirements.

Investments Risks when Considering Value-Adding Strategies

The Technical Manager says that it, from a production perspective, would have been beneficial to integrate the whole production at Östavall sawmill (i.e. not needing to manufacture glued wood beams and transport them to the other location for the final manufacturing). However, this would have resulted in increased investment costs. He states that there was an uncertainty about how long they could expect to manufacture the M/B-component for Kährs. Investment risks would then especially become an issue when such production lines are designed for one type of production and are not so easy to convert to other types of production: "… *an investment in a plant has a depreciation time of 25 years and then of course you need an alternative usage if the agreement is only for 5 years*"

The Mill Manager says that in line with fast technological development, the threshold for taking over production such as M/B-component manufacturing has increased. Today's manufacturing plants require a high rate of utilisation: "*…now you need to buy a turn-key plant for 20 million…this makes the threshold much higher*". The CEO says that large investments in very specific production equipment means much higher risks, which means that more profits must be made. According to the CEO, finding other products that could be produced in the same production line could be important to lower vulnerability. However, for the M/B-components this would be more difficult.

> *"Regarding M/B-components it would not be easy to use [the production line] for something else, it is for more specific floors and then you have Tarkett, Kährs and Forbo..." CEO*

The CEO says that investing SEK 20-25 million for handling component manufacturing is quite a large amount, especially when it still consumes rather small volumes of the total production output.

> *"Then you start thinking if it wise. It is different if you start with [investing] a couple of millions, then it is okay and you can convert [the plant] to something else if it does not work" // "Often it is a specific [production] line, it is another situation if you take over something that is standard and [the production line] can be used for other products." CEO*

In general, the Mill Manger says that a main risk with this kind of forward integration is dependency as a consequence of only having one main customer. One investment risk, according to the Technical Manager, is alternative material arisen for making M/B-components (i.e. substitute materials).

> *"You must at all times be sure that you can get back investments made, you must have contracts for about 5-7 years for these kinds of large investments" Technical Manager*

There could thus be a risk that a customer, after outsourcing the component, changes to another type of material or stops using this type of component.

> *"It can be that the [customer] is in a phase where a product is on the way out. So [the customer] says that we should outsource this so we can get rid of it and let somebody else take it over." CEO*

The CEO says that this can be a risk if floor manufactures change the construction of the floor or find alternative materials.

Tough Requirements on Quality and Supply Reliability

The CEO exemplifies the risk of interruptions in the production flow in terms of dependency of the supply of raw material (i.e. sawlogs). Here, he says that even though today NWP has a good and stable supply of raw material, issues can still arise. At the same time he states that a component strategy implies much higher producer responsibility in terms of quality and supply reliability with large risks for claims of damages.

> *"Have control and assure that prices are reasonable and safe [are important aspects]. If something happens, it could probably feel very uncomfortable if you outsource it to a sub-supplier and dispose yourself of all possibilities to make it. If you talk with industrial customers the claim for damages or similar when there are delays in deliveries or quality problems is something completely different than in the [traditional] selling of sawn timber. There you could replace such with substitutes. A package of sawn timber you could get from somebody else, but if you make components for floors there is no [supplier] market and you cannot [just] buy it. CEO*

The CEO states that industrial customers want guaranteed quality and reliability if buying components and will not accept any shortcomings that perhaps are acceptable when selling ordinary sawn timber. Similarly, the Technical Manager says that the main service requirements for this type of manufacturing are fast and reliable supplies, especially when storing can be a difficulty when there are such large volumes which lead to increased capital being tied up.

The CEO says that the competence base at a sawmill company might be a limitation when discussing value-adding projects. Here, he emphasises that industries such as bed, furniture, window or floor manufacturers have for a very long time built up a knowledge base about how their component manufacturing should be handled. Therefore, according to the CEO, there is a need to evaluate needed competencies and to be careful to not just jump on projects that seem interesting. The Sales Manager says that when dealing with these projects some time must be given to develop the necessary competencies.

Alternative Strategies to Lower Risks

When a project with Kährs is not materialised some alternative strategies are considered. For NWP taking over outsourced activities and working with a value-adding strategy towards large customers is not necessarily an advantage. The CEO states that a preferable development would be to sell volumes of M/B-components to several smaller customers, which can be a way of spreading risks. In addition the CEO says that larger companies tend to change the overall strategy fast, which will affect their suppliers. When discussing the project with Kährs, NWP felt that the floor manufacturer experienced a turbulent period.

> *"It is not better that they are large, more the opposite [because] you have no idea who will own them and how they will move production from Sweden to China or what they will do. It does not feel comfortable at all. We have seen examples in the furniture industry where we have had good customers in Denmark and have tried to develop similar corporations. Then they suddenly decide to move their production to the Baltic States. Then we are not a supplier anymore because they will take sawn timber from Russia. It is also a question of trust, there must be a long-term interest in making money so that the plant can be written-off. The term of contract must be of reasonable [time]; it is seldom that you can write-off a project in three years. Instead, if you are taking on larger investments, you perhaps need to work on a five-year basis before you have the possibility to leave a project" CEO*

For a company like NWP it can thus be more suitable to take over outsourcing from some smaller customers and by doing this spreading some of the risks. NWP has contacted several floor manufacturers to see their interest in buying complete M/B-components. According to

the Mill Manager, these manufacturers showed a large interest in "test buying" some volumes of M/B-components: "*…they said if you have something to sell then we can buy, and they were interested to test*" As of today, the Mill Manager and Technical Manager argue that there are no such component suppliers developed enough to handle the production of these M/B-components. Thus, delivering similar components to several customers would be possible but the problem is the availability of the raw material with the right quality and dimensions (i.e. enough of their own in-house raw material base to avoid buying from other sawmills or taking more expensive sawn timber). Another issue if delivering such components to several customers is that each customer might have some variants of the components. This will, according to the Mill Manager, increase the complexity.

If comparing to other possible components that NWP could manufacture (e.g. window blanks), the M/B-component had several more advantages. Therefore, it is preferable to focus on this type of component manufacturing.

> *"M/B-components were worthwhile because you put in the lower [quality] fraction of sawn timber, and the [sawn timber] that could not be used for M/B-components became firewood. You had one product. It is difficult enough to learn how to run one production line with the right tolerances and qualities, if you in addition [need to] build up a marketing know-how and [handle] the planning problem that you get by doing several different product it becomes difficult." Mill Manager (Östavall)*

An alternative could be to become a qualified sub-supplier of sawn timber. The Sales Manager states that a good start to getting the necessary competencies is by delivering sawn timber to a component manufacturer or directly to customers. By having a dialog with their customers and seeing how, for example, spillage can be lowered, NWP can develop good knowledge about how to handle such component manufacturing. For example, some customers are also component manufacturers where NWP delivers specific sawn timber of a certain quality. This could be one way toward becoming a fully component manufacturer.

> *"[if a company such as] Elitfönster outsource [a component] to somebody that needs to cut and glue it [to make a component], we perhaps can not make it but we can be there to control it…" CEO*

Compared with becoming a component supplier, it is not necessary to make such large investments if becoming a qualified sub-supplier of sawn timber. In addition, the limited availability of sawn timber of the right quality class and dimension for that type of manufacturing can be better handled. The CEO states that this is a good way of learning how to manufacture a component and extend their competence base about this type of manufacturing. For these components, he states that NWP would become a partner that can develop further on. Similarly, the Sales Manager argues that being a qualified sub-supplier can be an interesting strategy, where NWP will not be required to make such large investments and could deliver sawn timber to different types of customers: "*you can do something with the spillage you get*.

5 Analysis and Discussion

The analysis is divided based on the analysis model (see section 2.5). Firstly, the driving forces for outsourcing will be addressed.

5.1 Driving Forces for Outsourcing

In literature, cost reduction is often identified as the main driving force for firms' initialisation of outsourcing programmes (see e.g. Bettis et al., 1992; Welch and Nayak, 1992; Brandes et al., 1997; Jennings, 1997; Lonsdale and Cox, 1997; McIvor et al., 1997; Cánez et al., 2000; Fill and Visser, 2000; McIvor, 2005; Bengtsson, 2005). By mapping out the case companies' driving forces for outsourcing with the major driving forces that were aggregated on the basis of the theoretical framework chapter, cost reduction also seems to be a main driving force when the WPM firms consider outsourcing (see table 5-1). But financial motives, operation/capacity constraints and focus on core competences are also indicating to be rather strong driving forces (see table 5-1). One observation is that outsourcing to access external competencies and technology advantages does not seem to be a main driving force.

Table 5-1. Summary of the case companies' driving forces for outsourcing [45]

Case Company	Cost Reduction	Financial Motives	Operation/Capacity Constraints	Utilisation of External Capabilities	Focus on Core Competence
Kährs	High	Medium	Medium	Not present to any great extent for the companies studied	Medium
Tarkett W.	High	Medium	Low		Medium
Vest-Wood	High	Low	Medium		High
Dooria K.	High	Medium	Medium		Medium
Svenska F.	High	Medium	High		Low
Elitfönster	High	Medium	High		Medium

Based on the five analysis areas (see table 5-1), the driving forces of outsourcing for the cases studied will now be further analysed. I will start by looking at cost reduction and financial motives.

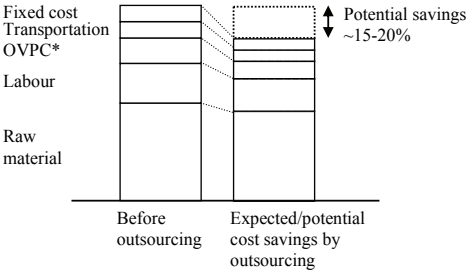
[45] The starting point for the mapping of the driving forces in table 5-1 can be seen in appendix 4.

5.1.1 Cost Reduction and Financial Motives

The floor manufacturers studied experience strong competition on a rather fragmented market and need to cope with the competitive environment (e.g. managing tough competition from small off-shore niche companies and substitute manufacturers). At the same time, they have had a tradition of handling most manufacturing activities in-house, which has caused costs to become too high during market downturns. In addition, they have not managed to take advantage of the benefits of an integrated production when the market is exhibiting high peaks. This, together with a need for overall cost rationalisation, puts outsourcing in focus. Both companies studied have initialised restructuring programmes for improved profitability and started to divest sawmill related areas.

The door manufacturers studied meet tough requirements from large customers, such as DIY-retailers and construction companies. This has led to increased spending on product and service development, as well as enhanced marketing and sales activities to become key suppliers and get large contracts. The outcome is a need for cost rationalisation and improving focus of resources on differentiating and customer value adding activities. There is an improved focus on spending for the window manufacturers studied but this seems to be more in terms of avoiding increased costs that could arise due to expansion of capacity and avoiding costly investments in non-core areas (e.g. managing capacity constraints). Thanks to the technical complexity of windows these manufacturers seem to have better differentiation possibilities on the market (e.g. offering value added by energy efficient windows and glass coating).

To continue the above discussion, figure 5-1 gives an illustrative view of what costs the WPM firms consider to have the potential to be lowered when considering outsourcing component manufacturing.



What costs have the potential to be lowered for case companies studied?

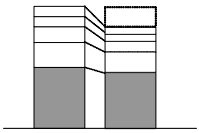
Kährs	T-W	V-W	D-K	S-F	E	
Yes	Yes	Yes	Yes	Yes	Yes	Fixed cost
Yes	Yes	Yes	—	—	Yes	Transportation
Yes	—	—	—	—	—	OVPC
Yes	Yes	Yes	Yes	—	Yes	Labour
Yes	Yes	Yes	Yes	Yes	Yes	Raw material

* Other variable production costs

Figure 5-1. Illustrating potential cost savings by outsourcing components to an external supplier (cf. Case studies)

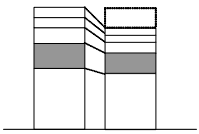
Looking at figure 5-1, reducing raw material, labour and fixed costs are brought up by most of the case companies studied to have the potential to be lowered. Focus on reducing labour costs are in line with literature (cf. Brück, 1995). The focus on raw material costs can likely be an outcome of the wood intensive components where a large part of the total component cost is the raw material (also cf. Brege et al., 2006d). Reducing fixed costs seems linked to avoiding costly investments in non-core areas, coping with capacity constraints and reallocating resources from non-core production to a better focus on creating differentiation

on the market (cf. Bragg, 1998; Greaver, 1999). The different cost elements will now be discussed further, starting with raw material costs.



*Raw material costs***.** Applying a component outsourcing strategy is expected to result in lower total raw material costs (cf. Vest-Wood, Elitfönster, Tarkett Wood and Kährs). For example, when Elitfönster outsourced the window blank manufacturing, the anticipation was that the supplier could reduce the total raw material costs and enable a larger span of sawn timber to be used for the outsourcing agreement by applying a finger jointing technology and use more low-value commodities. Another example is Kährs, who expresses the potential for lower raw material costs in terms of having a supplier that is good at improving the yield between input and output for M/B-components and in terms of not getting too high a quality for the wear-layer manufacturing. Of Kährs' wear-layer manufacturing, about 50-60% of the sawlog becomes spillage. By sawing and drying the strips at the raw material location both transportation and the raw material spillage cost can be reduced. Similarly, Vest-Wood has experienced rather large spillage due to earlier buying more unprocessed wood. These examples relate to the heterogeneity of the raw material, which also creates quality uncertainty from not knowing exactly what kind of raw material will be received from the suppliers (i.e. the WPM firms often have difficulties acquiring the right raw material for their manufacturing) (cf. Nord, 2005). Buying whole logs, where all the material cannot be utilised for the in-house production or sawn timber with inferior properties and qualities, cause spillage and unnecessary costs (cf. Kährs, Tarkett Wood, Vest-Wood and Elitfönster). An outsourcing strategy is expected to better cope with this by letting a supplier take care of component manufacturing with the assumption that such an outsourcing partner will be more skilled at using the sawn timber and converting eventual spillage for other purposes. Thus, component outsourcing should have the potential to result in economies of scope at the supplier end by producing different types of components from the same raw material (cf. e.g. Andersson et al., 2007).

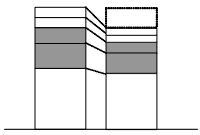
In the future, many of the case companies aim to outsource more component manufacturing to low-cost-countries, and the opening of Eastern Europe seems to offer several possibilities to lower costs, where the wood raw material costs are expected to be lower (cf. Vest-Wood, Elitfönster and Kährs for the wear-layer manufacturing). Low cost suppliers can also spend more time and labour resources to increase the wood yield that provides somewhat lower raw material costs. We can thus see that raw material costs are expected to be lowered when outsourcing by: 1) low-cost-country-manufacturing, 2) lower overall spillage costs in the supply chain (the supplier is expected to be more efficient with the raw material), and/or 3) process improvements at the supplier.



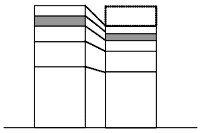
Reducing labour costs is expected to be done by internal cost rationalisation (e.g. decreasing labour force in a production site) and outsourcing to companies with lower cost structures (cf. Kährs, Tarkett Wood, Vest-Wood and Elitfönster). An example of internal rationalisation is Elitfönster's outsourcing of blanks, where the in-house needs of labour force for puttying window blanks were aimed to be reduced, hence the need for reallocation of labour force from the component manufacturing. Labour costs can also be lowered by changing the production setup. For Elitfönster, cost reduction when outsourcing the blanks was partly based on the fact that the supplier would change the manufacturing process by installing a somewhat higher degree of automatisation. Another example is the Kährs case, which illustrates that one critical issue for realising M/B-component outsourcing is that the production of the component must be done at a very low

cost either by low-cost labour or high automatisation. Both examples are in line with Abrahamsson et al. (2003) and Greaver (1999), who claim that the supplier that takes over the manufacturing of the outsourced item must perform the activities in a somewhat different way to enable cost reductions. Otherwise there is a risk of just transferring costs upstream (cf. McIvor, 2005).

Outsourcing of components and products to low-cost-countries is also expected to offer lower labour costs. This is in line with Brück (1995), who claims that such factor costs when outsourcing to offshore suppliers can be so large, that it makes other advantages of in-house production small in comparison. Another aspect of reducing labour costs is to lower the handling and supplier coordination costs. The case companies would like to eventually reduce their first tier supply base from multiple sources to a few main sources. Here, many of the case companies have traditionally had several multiple upstream suppliers where the flow from these suppliers needed to be coordinated. The need for coordinating the raw material flow can be linked to a transaction cost theory perspective where multiple smaller suppliers cause transaction costs that are too high if using a market situation (cf. Williamson, 1985; Rindfleisch and Heide, 1997). Ellram and Maltz (1995) state in their article that reducing the supplier base was a critical moment to enable cost reductions.



Other variable production costs (OVPC). Using the in-house production at too high a utilisation, production lines of varying efficiency and too many shifts as well as little time for maintenance will result in higher manufacturing costs (cf. Kährs). If outsourcing non-standard components that do not fit the large scale production in-house, Kährs states that a supplier could take over such manufacturing and with the possibility to make internal rationalisation the outsourcing partner must not necessarily be as efficient as the most efficient in-house production line. Here, the outsourcing company can have a more normal rate of utilisation of the machinery at a better cost-level. By doing so, outsourcing can also lead to production flexibility, which by using the in-house production at an optimum rate, offers in-house cost reduction possibilities (cf. Kährs, Elitfönster and Vest-Wood).



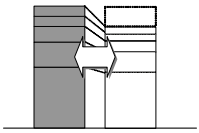
Transportation costs. Handling more activities closer to the wood raw material production, having more direct transportation and transporting goods that have been processed at lower costs make outsourcing an interesting strategy for the cases studied (cf. Kährs, Tarkett, Elitfönster and Vest-Wood). This is also linked to an expectation to lower raw material costs by buying complete components and not unprocessed raw material (not needing to transport sawdust and water).

Financial Motives. Financial motives for outsourcing seems linked to both improving the balance sheet and also reallocating of costs, i.e. transferring resources from non-core areas to instead focus them more on customer close areas such as certain downstream production activities as well as marketing and sales (cf. Andersson et al., 2007):

- The cases consider outsourcing as a tool to avoid fixed costs that are too high. The cases studied are particularly interesting when it comes to avoiding costly investments in non-core activities and avoiding making these investments by outsourcing permanently (cf. Bragg, 1998; Greaver, 1999; Carlsson and Lind, 2005), thus, utilising outsourcing to convert fixed costs into variable costs and achieve a higher financial flexibility (cf. Hendry, 1995; Greaver, 1999; Wasner, 1999). An example of this is Elitfönster, who did not want to invest in a simple operation as the blank manufacturing (it would cause very costly investments and still create little market differentiation). Similarly, the Svenska Fönster case indicates an unwillingness to grow more in the present plants. Furthermore, Vest-Wood considers outsourcing, when in-house development requires rather high investments.

- For the case companies, outsourcing also becomes central in order to cope with scarce availability of resources (cf. Bragg, 1998; Cánez et al., 2000). By doing this, they intend to focus and relocate financial resources on more differentiating activities. An example of this is Elitfönster's outsourcing of blanks, which would free up capital tied up in production facilities, warehouses and in wood raw material. Another example of this is the Dooria Kungsäter case that indicates that capital is a scarce factor that leads to reallocation of resources to more customer close areas (e.g. marketing and sales). Further, Kährs points out the movement of financial resources from non-core to downstream activities. Vest-Wood's moving towards new business areas is clearly indicating the need for focusing resources on downstream activities. This driving force is in line with the findings reported from the Outsourcing Institute, where improving focus and freeing resources for other purposes were identified as two of the five top reasons why companies initialise outsourcing (Deavers, 1997). Handling scarce availability of resources is closely related to managing operation constraints and is addressed in the coming section (see section 5.1.2).

Benchmarking to improve cost competitiveness (e.g. establish possible performance gaps and either enhance internal performance or increase the outsourcing). Another driving force for outsourcing is cost benchmarking by getting access to their partners and comparing their internal processes' effectiveness with external suppliers' (cf. Vest-Wood and Kährs). Vest-Wood is the clearest example of this, and seems to consider the in-house production as a supply base that should be compared continuously with external suppliers to ensure process excellence. For both Kährs and Vest-Wood, by only intending to outsource a part of their production, they aim to improve the in-house cost structure and in this way become more efficient.



Altogether, we can see that outsourcing is expected to help the case companies cut costs and avoid costly investments by focusing more resources on other core activities. Looking closer at the cost driving force it includes both cutting total costs and reallocating costs in terms of moving resources from non-core component production to more downstream differentiating activities (cf. Andersson et al., 2007). In this sense, the cost reduction and financial motives driving forces also seem linked to a focus on core competencies and to handling operation/capacity constraints, which will now be addressed.

5.1.2 Operation and Capacity Constraints

Capacity is often expressed as a driving force for outsourcing, and is sometimes even considered as a major driving force (see Harrison and Kelly, 1993; Fine and Whitney, 1999). In line with this, operation and capacity constraints are a driving force for outsourcing for the companies studied and is linked to a reluctance to make investments in non-core areas such as basic sawmill component production, hence resources can be better employed (cf. Dooria Kungsäter, Kährs, Svenska Fönster and Elitfönster). Here, the focus on outsourcing is driven by a capacity overload or where the WPM firms are having operational constraints that might require capital investments. This drives the firms to consider outsourcing to an external source (cf. Harrison and Kelly, 1993), where outsourcing could offer increased responsiveness, avoiding bottlenecks (Quinn and Hilmer, 1994; Cánez et al., 2000; Gilley and Rasheed, 2000) and improved operational volume flexibility (Hendry, 1995).

Elitfönster's outsourcing of blanks was done in order to cope with operation constraints, to avoid investments in certain activities and at the same time take a technological step forward. Elitfönster's outsourcing strategies more and more include the tendency to use outsourcing to relieve capacity overload (cf. Fill and Visser, 2000). Svenska Fönster's main driving force is capacity constraints, which is closely related to enabling an expansion without increasing the size of the present plant. This driving force is clearly linked to not handling everything in-house and creating flexibility in the production. The Kährs case illustrates this driving force by their unwillingness to invest and increase the capacity in the M/B-component manufacturing. Even though Dooria Kungsäters' main driving force was to focus more resources on differentiation, their outsourcing was also driven by a wish to improve the production flow and layout.

Outsourcing is also expected to enable improved business cycle flexibility. For example, when Kährs is exhibiting market downturns, they drown in fixed costs; and during high peaks they have difficulties using scale advantages to produce enough goods. This is, however, changing where they do not want too high fixed costs and want to avoid investment risks. Now, Kährs reluctantly invests in sawmill-related areas which are considered non-core. Instead outsourcing will be used to create flexibility in the production. Similarly, both Vest-Wood and Elitfönster illustrate a need for flexibility and use outsourcing together with parallel in-house production. Here, they aim to better manage business cycle fluctuations on the market and also assure high utilisation of in-house production resources by using an outsourcing strategy.

5.1.3 Utilisation of External Capabilities

Deavers (1997) states that access to world-class-capabilities is one of the top five reasons for firms to initialise outsourcing, and a similar argument is stressed by Greaver (1999), Rothery and Robertson (1995) and Linder (2004). However, in comparison to these previous studies in other contexts, having access to external resource competences or technology advantages does not seem to be a main driving force. The case companies seem to value the possibilities of lowering costs more than competence or technology advantages (cf. Andersson et al., 2007). By doing this, outsourcing would be less dependent on the external sources' capabilities (cf. Fine and Whitney, 1999).

The little need of external competencies/technologies could likely be mainly explained by the fact that there is not necessarily as of today, any developed supplier sector that could directly manage outsourced component manufacturing, and due to the many years of experience of such manufacturing at the customer side, i.e. still an immature market for component

manufacturing (cf. Andersson et al., 2007). In the context studied the suppliers of sawn timber have little manufacturing experience of the components considered for outsourcing. In combination with the relatively little experience of outsourcing at the customer side, this seems to lead to more focus on potential cost reductions and reallocation of resources when considering outsourcing. This reasoning is in line with McIvor (2005), who states that "first-time outsourcers" will do it mainly for cost reasons. Another reason is likely that the components considered are raw material intensive, which put higher focus on cost (e.g. cf. Rundh, 1992; Nord, 2005).

5.1.4 Focus on Core Competence

The willingness to focus more on leveraging core competencies is often stressed as one major argument for outsourcing, often with reference to understanding the strategic dimension of outsourcing (e.g. Bettis et al., 1992; Quinn and Hilmer, 1994; Fill and Visser, 2000; McIvor, 2000a; 2005). This is also true for the cases in question, where outsourcing becomes an important ingredient for the companies when there is a need for concentrating on their core activities, hereby ending the tradition of managing most manufacturing in-house and instead reallocating resources from non-core areas. As seen in the case descriptions, manufacturing of many types of upstream wood components is no longer considered as a core competence and creates little added value for the customer. Accompanying this reasoning is becoming less involved in sawmill activities. Instead, focus is on those activities that enable differentiation on the market (cf. Bragg, 1998), as these are now considered as core competencies of the corporation. Previous studies have, in similar ways, argued that activities creating a basis for competitiveness must be kept in-house, while other non-core activities should be considered as a potential for outsourcing (cf. e.g. Quinn and Hilmer, 1994; Jennings, 1997; McIvor et al., 1997).

While moving towards outsourcing of the manufacturing of upstream wood components, the case companies are defining their businesses more in terms of its customers than its production technology or product attributes. By not handling everything in-house, the WPM firms expect better opportunities to follow the market development and extend product/service offerings. Important areas in focus are the development of distribution and the handling of their customers' requirements and demands (Andersson et al., 2007). There are several examples of the willingness to increase customer focus by product augmentation and extending service offerings. Window manufacturers are offering more and more installation help and consider it interesting to further augment this on the consumer side by also adding service packages. For one of the window manufacturers studied, developing products and services for DIY retailers are also an increasing focus area (cf. Elitfönster). Floor manufacturers consider the management of supply flows and support to customers as important areas of development (e.g. product innovation and renewal of product-life-cycle). For the floor manufacturers, reallocation of resources to marketing and sales activities can also be noted. The door manufacturers have especially increased their spending to enhance marketing and sales activities to become the key suppliers to DIY retailers and construction companies. In particular, the door manufacturing firm Vest-Wood is taking over more responsibility from their customers from the construction sector, see figure 5-2.

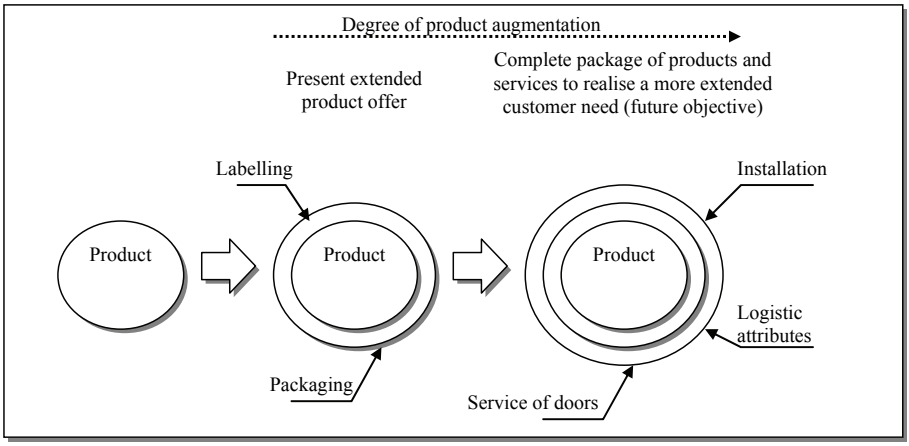


Figure 5-2. Example of Vest-Wood's increased customer orientation

The company is working continuously with extending the offer by adding better packaging and labelling of the doors (a similar development can also be seen at Dooria). In the future such offers for Vest-Wood will even include installation, service of doors and developed logistic services. By doing so, the company is becoming increasingly responsible for supply and coordination, and hereby developing a direct channel to the buyer. It is interesting to see that Vest-Wood describes their sales of doors more in terms of solutions for their customers instead of product characteristics. To handle this, outsourcing becomes a central tool used to reallocate resources from non-core areas, where marketing and sales activities become more important than sawmill related production (cf. Andersson et al., 2007).

5.1.5 Summary and Further Discussion of Driving Forces

We can see from the analysis of the driving forces that the WPM firms are increasingly focusing on outsourcing. In this study I have seen examples of four of the five driving forces, with focus on the cost driving force. The fifth theoretical driving force, utilisation of external capabilities, has not to any large extent been observed.

The drive for outsourcing illustrates the reorganisation of WPM firms' production strategy by wanting to go from buying sawn timber to wood components, where it becomes less important whether or not all the manufacturing of components has been handled in-house. By doing so, the case companies show a strategic development by focusing on differentiating activities yet at the same time show the importance of cost rationalisation. In general, the firms studied are working hard to reduce production costs and reallocate resources from non-core upstream component manufacturing to instead increase customer orientation for increasing competitiveness. By doing so, the cost motives for outsourcing and the focus on core competencies seem to go hand-in-hand. Similar relationships seem to exist between managing operation/ capacity constraints and avoiding investments.

Two questions come to mind here: 1) is it not so that the driving forces are closely related? , and 2) is it not likely that a company will outsource when several driving forces are present? An observation made by Andersson et al (2007) is that these WPM firms' focus on outsourcing to reduce costs is related to the competitive and profitable pressure that exists in each sub-industry. Floor manufacturers experience the highest profitability pressure and window manufactures the least, somewhere in between is the door manufacturers (Ibid.). Here, the authors illustrate that strong profitability pressure seems to lead to a stronger focus on cost rationalisation. Andersson et al (2007) also observe that differences in profitability in combination with factors such as international scope, competitive situation and product characteristics lead to differences in the cost related drive for outsourcing. These observations will be used as a starting point for further discussion.

If comparing the sub-industries studied, we can see that the floor manufacturers have the largest international scope with global marketing channels. The door manufacturers are clearly striving to become more market-oriented and striving to develop their sales channels to create a better position in a European arena. The strategy used is multi-brands (certain major brands for different regions) with mergers and acquisitions to enable a larger geographical scope. The window manufacturers that until now have somewhat acted on national and even more local markets seem to be striving towards an increased international presence. The possibility of product differentiation also varies for the cases studied. Floor manufacturers are under tough competition in a fragmented market with substitution threats from laminate flooring where they have trouble differentiating their products. The door manufacturers also have difficulties differentiating their products and as a consequence have focused resources on marketing and sales as well as extended service offers. The window manufacturers seem to have better potential to differentiate products by technology development and developing quite complex products (e.g. developing energy efficient windows and integrating technology with windows[46]). Figure 5-3 illustrates the cases' product

[46] Such technology developments are not so much related to wood components and are purchased in from external suppliers (e.g. coatings on glass, glass material development for improved energy efficiency and lock systems), i.e. not handled by an outsourcing situation.

differentiation possibility and international scope (cf. Brege et al., 2004a; Andersson et al., 2007).

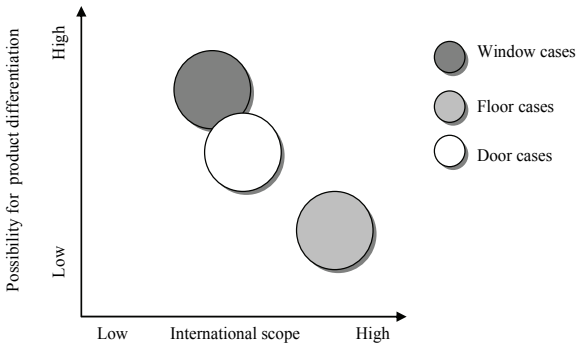


Figure 5-3. Relative product differentiation vs. international scope (Adaptation based on: Brege et al., 2004a; Andersson et al., 2007)

Combining the WPM firms' different profitability position with the possibility for product differentiation and international scope, it seems as the driving forces are interrelated with a starting point from cost reduction and reallocating of resources. The floor manufacturers that are under strong competitive pressure consider cost rationalisation as the major driving force leading to also focus on divestments and avoid investments in capacity constraints. At the same time, their difficulty to differentiate their products on the market leads to working hard to go from production oriented companies to more market oriented ones, which becomes related to focus on core competencies and divest non-core areas (also cf. Andersson et al., 2007). The window manufacturers cost reduction driving force is more linked to avoiding new investments (i.e. managing capacity constraints). The door manufacturer's driving force for cost reduction is more linked to the reallocating of costs from non-core activities to increase the resources focused on service development and marketing and sales activities. One central aspect, which is to facilitate increased flexibility, seems to lay within all the discussed above WPM firms' driving forces for outsourcing; for example, it seems possible to realise cost and financial or operational flexibility in particular by initialising outsourcing in the WPM sector.

Further comparing the driving forces of the cases studied, the initiative for outsourcing seems to differ somewhat. Kährs' outsourcing strategies are linked to a problem-driven trigger where there is a need to lower costs but also to avoid fixed costs that are too high and investments. In line with this, several of the other case companies also have a somewhat similar linkage to a problem-driven trigger for outsourcing (cf. Tarkett Wood, Dooria Kungsäter and Svenska Fönster). The initiative can come from for example a stagnated market, low business flexibility, or from a profit to loss situation (cf. Kährs, Tarkett Wood and Dooria Kungsäter). Similarly, outsourcing focus is driven by capacity overload triggered by a company reaching capacity limits (and would not like to expand more on-site (cf. Svenska Fönster)) or strong cost pressure from customers (cf. Dooria Kungsäter). Here, the main focus is on overall cost rationalisation and avoiding investments, which puts outsourcing in focus. On the other hand, both Vest-Wood and Elitfönster seem more opportunity-driven in their outsourcing initiative with their aim being to improve customer focus. Accordingly, the case companies can be

positioned where companies with relatively little experience of outsourcing seem more problem driven in their outsourcing initiative, see figure 5-4.

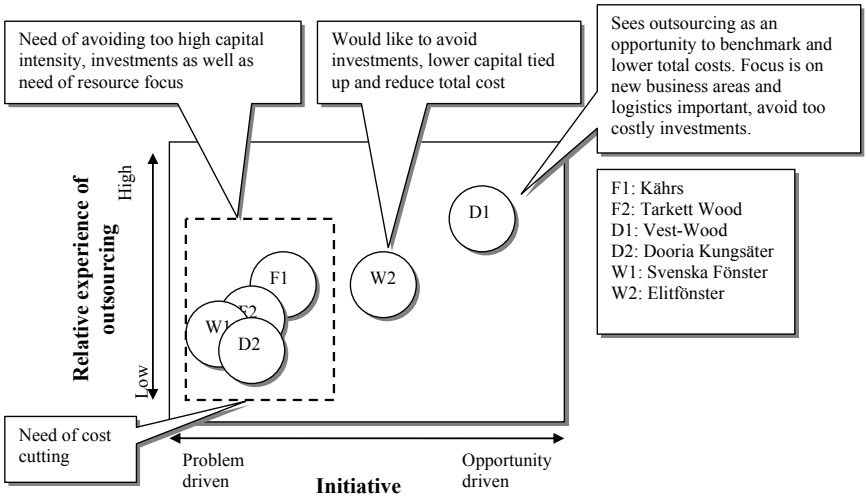


Figure 5-4. Illustrating the initiative for outsourcing with linkage to initiation reason

In line with McIvor (2005) companies with little tradition of outsourcing seem to put strong focus on cost cutting in combination with avoiding investments and lowering fixed costs in the formulation of their outsourcing initiatives (cf. Kährs, Tarkett Wood, Dooria Kungsäter and Svenska Fönster). In comparison, longer relative experience seems to lead to a more opportunity driven view of outsourcing (cf. Vest-Wood). For Vest-Wood, excellence in all their processes has the highest priority, and they are extremely focused on their cost situation when examining whether their production units are efficient enough. To benchmark in-house costs with external suppliers' becomes a clear driving force for outsourcing. Somewhat similar, Elitfönster is more and more using outsourcing to improve capacity flexibility and also is reallocating costs in their strive towards becoming more customer oriented.

5.2 Key Factors Addressed When Considering Outsourcing

Starting this chapter from looking more at the expected advantages of outsourcing, discussed in the driving forces section (5.1), this section will analyse what key factors are addressed when in-fact considering outsourcing. This will take its starting point from the analysis model developed from the theoretical framework (see section 2.5), which in this case includes three main analysis areas: (1) focus areas for outsourcing - component importance, (2) capability benchmarking, and (3) supplier related risks. The section will end by combining the three analysis areas and further discussing the main findings.

5.2.1 Focus Areas for Outsourcing - Component Importance

The companies' approach towards outsourcing is in line with the literature, as they address the focus on core activities and outsourcing other non-core activities as an explicit or implicit starting point in order to decide what to outsource (cf. Quinn and Hilmer, 1994; Jennings, 1997; McIvor et al., 1997; Fill and Visser, 2000; McIvor, 2000a; 2005). Components with a high potential for outsourcing are those that create little differentiation and add little value for customers. These are often located upstream in the value chain and are not considered to be a foundation for competitive advantage and seen as non-core. Using Venkatesan's (1992) logic, these components also cannot be classified as core components when they do not have a large impact on what customers perceive as most important (e.g. not indispensable for creating distinctive products to sustain in a competitive position and investments in these areas are not prioritised). Such areas for component manufacturing will probably receive neither the attention nor the resources needed to develop their productivity, and therefore it would be more suitable to outsource (cf. Greaver, 1999).

All case studies indicate a smaller need for managing sawmill activities in-house. By means of outsourcing, the companies studied instead intend to reallocate resources to manufacturing later in the value chain, which will enable differentiation, especially in terms of customer value (cf. also section 5.1.4). These are activities that the firm considers as central determinants for competitive advantage that can contribute to the creation of core products (cf. Prahalad and Hamel, 1990). This line of reasoning agrees with Fill and Visser (2000), who state that the firm must own the activities that differentiate them. There are actually some differentiating components that are considered for outsourcing. This applies especially for Kährs' wear-layer demand, where some volumes will be outsourced (e.g. closing one production line). Such outsourcing is linked to handling operational constraints, a better usage of raw material and limited availability of raw material in close proximity (also cf. section 5.1 about driving forces for outsourcing).

Components considered for outsourcing seem more decomposable by being easier to define in terms of tolerances and measurements. In general, components considered for outsourcing appear to have relatively well defined interfaces that are decomposable from the system that form the complete product (cf. Fine and Whitney, 1999), see figure 5-5.

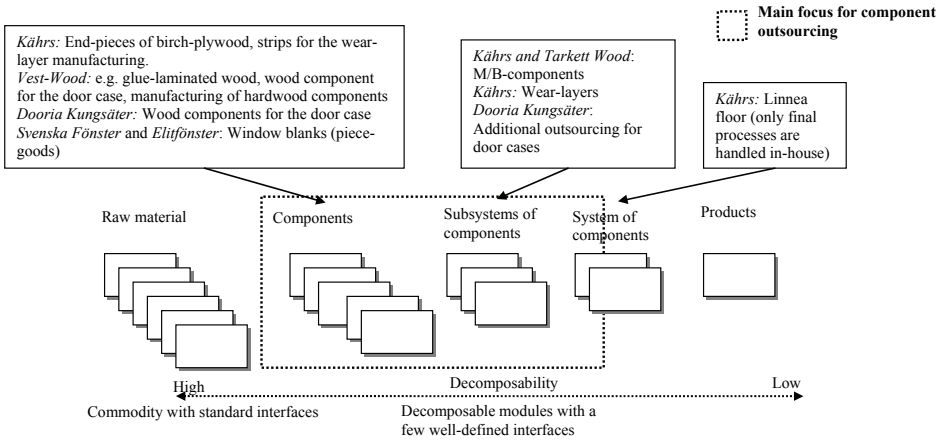


Figure 5-5. Decomposability of the components considered for outsourcing (cf. Venkatesan, 1992; Fine and Whitney, 1999, p. 51)

This can be compared with the final activities involved in the manufacturing of complete products, which include a large number of different steps and different variants. Here, craftsmanship is often a requirement and difficult to automate (cf. e.g. the Kährs, Svenska Fönster or Elitfönster), which makes such outsourcing more difficult to define in terms of operational requirements (cf. Venkatesan, 1992; Fine and Whitney, 1999). Examples of this are the profiling and surface treatment (cf. Kährs, Tarkett Wood and Vest-Wood) and the final assembling of windows (cf. Elitfönster and Svenska Fönster).

Just outsourcing activities considered problematic to manage in-house means a risk of losing crucial skills that can undermine the long-term competitiveness (cf. Lonsdale and Cox, 1997, McIvor, 2000b, Abrahamsson et al., 2003). This is something that literature often claims is a risk due to firms' tendency to consider their core competencies on the basis of what they do best (cf. Lonsdale and Cox, 1997; McIvor, 2000b). However, for the cases studied it does not seem as the components considered non-core and for outsourcing are items problematic to manage. For example, Elitfönster has a parallel production that is nowadays larger than the components outsourced to the supplier. Kährs' in-house manufacturing is more efficient than the potential suppliers'. In addition, if Kährs initiates outsourcing of the two main components considered, this will include parallel production. In line with this, Vest-Wood also applies outsourcing in combination with parallel production and has teams to help the supplier develop.

Altogether, we can see that components located at the end of the value chain (that are important in the eyes of the customer) and create a basis for differentiation and competitiveness, will be kept in-house (e.g. cf. Venkatesan, 1992; Quinn and Hilmer, 1994), see table 5-2. In line with this, the case companies define their outsourcing strategies for upstream components that do not distinguish them in the market place.

Table 5-2. Companies' studied major view of core and non-core components

	Considered non-core:	**Considered core:**
Attribute of component considered:	Little differentiation/add little value for customers	Intended basis for competitiveness/ basis for differentiation
Component location:	Often not even visible in complete product	Linked to the firms considered core competencies, visible for customers
Interface:	Decomposable and quite well defined interfaces	More difficult to define as single components (integrated in manufacturing)
Value chain position:	Often sawmill related, located in upstream in the value chain	End of value chain close to customer
Outcome:	Potential for outsourcing	Mainly keep in-house

5.2.2 Capability Benchmarking

When considering outsourcing the supplier capability should be evaluated and compared with the in-house performance (e.g. Venkatesan, 1992; McIvor et al., 1997; Insinga and Werle, 2000; McIvor, 2000a; 2005). This section will look at cost and non-cost related factors (cf. McIvor, 2005), with focus on analysing the Kährs and the Elitfönster cases, but when possible also be linked to the other cases studied.

5.2.2.1 Cost Related Benchmarking

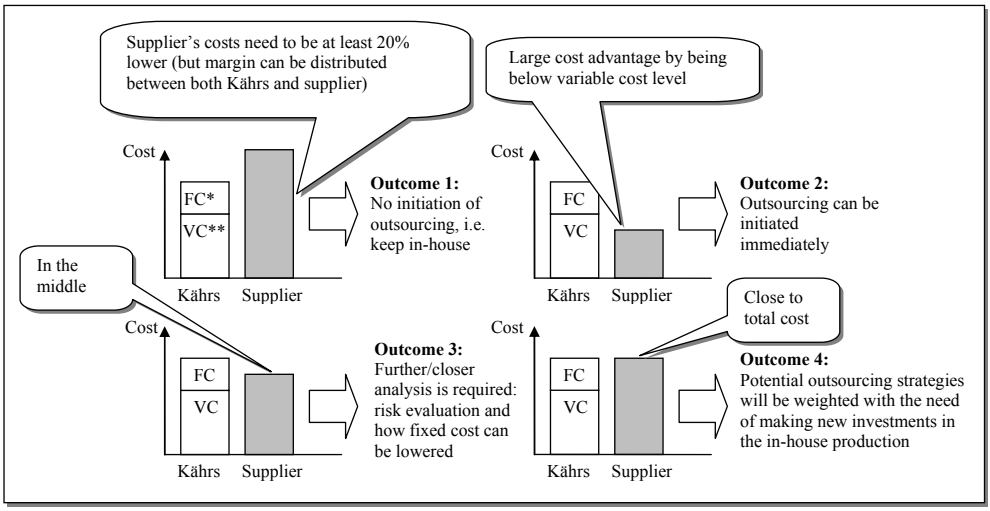
From a customer perspective, this section looks at potential external sources' cost capability advantages compared to in-house, and how the cost analysis is addressed at the WPM firms. This is in line with McIvor (2000a; 2005), who argues that a cost analysis is a main stage to address when making the capability benchmarking when considering outsourcing.

Regarding outsourcing, a first step for the cases studied is naturally to look at their own costs and then compare them with external sources' cost position for the components considered. Overall the cases put focus largely on the component cost analysis when considering outsourcing. Variable costs together with new investments or avoiding investments are the main analysis elements considered. WPM firms see their in-house production relatively efficient and demand cost reductions of around 15-20% when outsourcing these often low margin components (cf. Kährs, Elitfönster, Vest-Wood, Svenska Fönster and Dooria Kungsäter). Two of the cases exemplify the difficulty to accurately calculate the cost reduction possibilities when outsourcing (cf. Dooria Kungsäter and Svenska Fönster). Similarly, previous studies have stated the difficulties for companies to fully comprehend all the cost elements when considering the make-or-buy decision (e.g. Higgins, 1955; Walker and Weber, 1984; Davis, 1992; Ellram and Maltz, 1995; McIvor et al., 1997). One risk is then,

that the cases studied overestimate the expected cost savings that could be made by outsourcing to upstream suppliers (cf. Davis, 1992; Barthélemy, 2003).

Possibilities for a Supplier to take over the outsourcing at Kährs

It is essential to analyse how, in fact costs can be lowered if a supplier takes over the outsourcing, especially if it performs the same activity in a similar way (cf. Augustson, 1998; Greaver, 1999; Abrahamsson et al., 2003). Otherwise such an outsourcing strategy may just result in a transfer of costs towards upstream suppliers, which in the end does not necessarily imply lower costs. For Kährs this can be linked to the fact that they are concerned about the possible risk that a supplier will initially keep prices low to get the contract and then, soon after, when dependency is greater, raise the prices. This reasoning can be related to a transaction cost theory and the risk of supplier appropriation, e.g. a risk that the supplier takes advantage of the dependency situation to make unmotivated price increases (cf. Walker, 1988). This was something that happened somewhat for their first "test outsourcing" of M/B-components and since then they seem to put even greater focus on the cost analysis. When considering outsourcing Kährs' analysis is very much based on the supplier's ability to reach costs as low as in-house variable cost levels, see figure 5-6.



* Fixed costs
** Variable costs

Figure 5-6. Model for analysing costs when considering outsourcing

As seen in figure 5-6, costs must be reduced by at least 20% to make outsourcing interesting as fixed costs will still remain or at least will take some time to get rid of. From a transaction cost theory perspective, this can be linked to *ex post* transaction costs when adapting and handling an activity through the market instead of in-house governance (cf. Rindfleisch and Heide, 1997). A supplier cost position below the variable cost or above the total cost makes the decision easy (also cf. Tarkett Wood, Dooria and Vest-Wood). If the supplier's cost position is between total and variable costs a further analysis is needed where more parameters need to be considered (e.g. possibility to eliminate fixed costs and risk considerations). If the cost offered is too close to the present total costs, Kährs will evaluate the need for new investments (e.g. the investment costs of upgrading the machinery). The

investment factor is very important for Kährs, as they traditionally have had fixed costs that were too high and in the future will try to become more flexible and get more variable costs.

Earlier studies in other contexts have illustrated that additional costs that have not been considered in the initial outsourcing analysis can make the actual cost reduction much lower than expected (e.g. Bengtsson, 2005). For Kährs such potential additional costs (or what Williamson (1985) would call *ex post* costs to manage the outsourcing agreement) are not considered very much in the actual outsourcing analysis, but the 20% margin required is to protect from such unexpected costs. When considering outsourcing it is important to take into account the fact that suppliers need to make a profit that normally is made by the firm considering outsourcing (cf. Brück, 1995; Ellram and Billington, 2001). Kährs accounts for that by also arguing that the required 20% cost reduction does not necessarily mean exclusively reduction of costs in-house. Instead the case study indicates that this margin can be distributed between the supplier and the manufacturer.

There is possibly no supplier that can directly manage Kährs' component manufacturing as of today. As shown in the larger investigation about the M/B-component manufacturing, an external supplier considering taking over this component manufacturing will have trouble creating enough cost advantages in comparison with the most effective production in-house. This is interesting when previous outsourcing studies have argued that a main question for a company to consider is if they should strive to build its capability in-house or turn to best-in-class suppliers (McIvor et al., 1997). As an example McIvor et al (1997) mention several companies which found that their internal costs were not even near the low costs of external suppliers. Almost the opposite is true for Kährs, where it is not even certain that there are any suppliers available that can directly offer enough low or at least any lower costs when outsourcing (even finding a supplier that can offer manufacturing capacity for the component considered for outsourcing is difficult). Altogether, two things can be concluded: (1) Kährs has very cost efficient large scale manufacturing and (2) for the M/B-component manufacturing, fixed costs are not very large, or at least Kährs are not in a direct investment need. If comparing with Kährs' own manufacturing, a) the need for new investments, b) equivalent labour costs, and c) the need of a supplier profit margin, make outsourcing to suppliers in the Scandinavian countries less interesting, as they can not offer low enough costs.

The no well developed supplier market makes Kährs evaluate alternative options. Here, from a transaction cost theory perspective the small number of suppliers that exist for Kährs would imply higher risks for opportunism, and in-house governance would be more preferable (Williamson, 1975) (which has been the main outcome of Kährs intended outsourcing of M/B-components so far). However, the company plans to more and more have parallel production that will offer opportunities for large scale production in-house, benchmarking, as well as continue to keep buying competence. By doing this, it could be possible for a supplier to take advantage of Kährs' reluctance to make new investments in non-core manufacturing. In the case description we can see that a supplier could take over some volumes of non-standard M/B-components that do not fit the large scale production and production from less efficient production lines. A supplier taking over such component manufacturing would not need to be as cost efficient as the most efficient in-house production line. For these components the Kährs case indicates that a Scandinavian supplier could be interesting, e.g. could compete with a nightshift in a less cost rational plant.

Possibilities for a Supplier to take over outsourcing at Elitfönster

In general, Elitfönster believes that the requirements of cost reduction should be related to the competitive situation and the established margins that exist in the industry. Here, a margin is also needed to account for potential hidden costs. As seen from the case description, a 10% cost reduction for Elitfönster is not enough; the cost reduction should instead be at least 15% (if including a supplier profit margin the cost reduction offered by a supplier must be even larger). If this cannot be accomplished, Elitfönster argues that the supplier does not have a sustainable business model and outsourcing will probably not be initiated.

Which costs should be compared with a potential supplier's offer depends on the unit of analysis. If closing a whole factory and outsourcing the manufacturing, the possibility to rationalise overhead costs is of course evaluated. However, on a component level the variable manufacturing costs are more in focus. The reason for this is because it is not certain that all of the overhead can be rationalised when outsourcing one component manufacturing in a window manufacturing plant and without closing the whole plant. That is to say that such indirect costs are more difficult to comprehend in the outsourcing analysis (cf. Abrahamsson et al., 2003). This is also in line with Bengtsson et al (2005) who argue that administrative costs seldom are reduced much when outsourcing production. For Elitfönster, much attention is also paid to the necessity of making new investments (one main driving force for the outsourcing of blanks). Elitfönster is less specific about the required/materialised cost levels when outsourcing the blanks. However, the main arguments from Elitfönster's perspective regarding their component supplier's cost reduction possibilities can be pointed out in some main bullet points:

- *Timing and helping to avoid investment risks*: the previous machinery had some shortcomings (Elitfönster wanted to take a technological step forward). The supplier could take advantage of Elitfönster's unwillingness to invest and the supplier was willing to make the investments needed.

- *The supplier could offer a new production set up and an improved product:* by finger-jointing and investing in a higher degree of automatisation that could lead to overall lower labour costs.

- *By applying a new technology setup for the manufacturing of the window blanks, the supplier could use a low-value commodity*, which leads to lower total raw material costs. The new technology setup (manufacturing finger-jointed components) also enables taking a larger span of sawn timber from the sawmill product output, which results in being able to take over larger outsourced volumes, than if just transferring the in-house production setup at Elitfönster.

- *The supplier integrated the component mill with the sawmill* to reduce transportation and handling costs.

For the window blanks, there seems to be a margin that leaves room for an additional middleman to handle the manufacturing, which does not exist for the M/B-components at Kährs. Here, Elitfönster is looking into the possibility of outsourcing the window blank manufacturing to a specialised component manufacturer (which is not a traditional raw material supplier). The assumption here is that supplier performance uncertainties in outsourcing can be decreased by outsourcing to a specialised company, with the expected competence to handle both the buying of wood and manufacturing technology to be able to efficiently produce wood components (e.g. applying a finger-jointing technique).

Can Costs be lowered when Outsourcing to a Supplier with little Experience?

In comparison with sawn timber suppliers, WPM firms have much longer in-house experience in manufacturing. From the case descriptions it is seen that the WPM firms take into consideration that the suppliers are not necessarily more cost competitive than the in-house production (cf. Kährs, Elitfönster, Svenska-Fönster and Vest-Wood). At the same time, the potential suppliers' relatively low experience of managing component manufacturing complicates outsourcing and increases the uncertainty of the suppliers' price estimate (cf. Kährs, Svenska-Fönster and Dooria Kungsäter). Then there is a question related to the cost analysis; is the price estimate given by the supplier correct enough to make it a profitable outcome? Linked to this is an expressed fear that a dependency situation could make it possible for a supplier to increase the price when not having done an adequate enough price estimate from the beginning (cf. Elitfönster, Kährs and Svenska Fönster), see also section 5.2.3. Here, an important aspect is then how a company considering outsourcing really can be sure that a potential supplier has made a sufficient and sustainable cost estimate. For example in the case of Kährs, the supplier after six months needed to increase the price levels by 30% (not NWP). The underlying reason was that the supplier did not have a profitable business model to begin with, which most likely was caused by an inadequate cost analysis (cf. Poopo et al., 1998; Auguste et al., 2002). The supplier ended up with financial difficulties and Kährs stopped to "test-outsource" these components. For their latest outsourcing analysis of M/B-components, their purchasing department has tried to create an in-depth understanding of how the supplier's costs in both Sweden and potential low-cost-countries relates to the in-house's. Another example of a somewhat non profitable supplier business model also occurred when Kährs' purchased sawn timber for their mid-layer. The single sourcing of sawn timber put Kährs in a vulnerable situation. This illustrates the importance of outsourcing strategies having profitability potential for both parties, without which the cooperation is likely not durable in a longer term perspective (cf. Abrahamsson et al., 2003). Altogether, an important factor seems to be that the supplier can continue to make a profit and that the estimates are thorough enough to assure profitability based on the revenues created from the outsourcing agreement itself (cf. Ellram and Billington, 2001).

5.2.2.2 Non-Cost Related Benchmarking

In the case descriptions there are several examples of the uncertainty about the suppliers' capability in terms of quality and supply reliability if outsourcing. The combination of having few if any developed suppliers that can directly handle the manufacturing and the uncertainty of quality level and supply reliability, even make the case companies wait with fully initialising their outsourcing (cf. Kährs, Tarkett Wood, Svenska Fönster). Vest-Wood has teams to help the supplier develop; however, developing suppliers to required performance levels can be costly and will increase dependency (cf. Quinn and Hilmer, 1994). Such issues must be thoroughly analysed, otherwise a situation could arise where the potential advantages enabled by outsourcing are levelled out by the need to have larger safety stocks which in turn will tie up more capital due to the uncertainty of supplies from outsourcing partners (cf. Elitfönster, Svenska Fönster and Kährs). The two in-depth case studies will be used to further analyse non-cost factors.

The Kährs case shows that potential suppliers, for example, in general have the normal know-how of drying timber but lack the special competencies needed to produce dried timber suitable for component manufacturing. Here, the suppliers neither have the quality nor the price level to take over outsourcing. Based on the case description two observations can be made: (1) for Kährs a main driving force for outsourcing is to enable cost reductions, (2) however, in comparison with suppliers, they have a higher capability both in terms of cost and

competence/ experience. One choice would of course be for Kährs to invest, however, investments in such manufacturing are not prioritised. Another option to cope with a non-developed supplier market is to change to a new material for the component manufacturing. The assumption here is that there are suppliers that could manufacture such components. However, what puts such an outsourcing strategy on hold is the fact that the alternative raw material cost is much higher than the material currently used.

The Elitfönster case shows that it is not easy to find well developed raw material suppliers with competence and experience. The starting point was that supplier uncertainties could be decreased by outsourcing to a larger sawmill company with the required size, competence and financial possibilities to handle the manufacturing of the components. However, as indicated in the case, the outsourcing to the supplier has not been totally satisfactory. The outsourcing resulted in initial quality problems (e.g. warehousing with inadequate temperatures that deteriorated the products) and supply difficulties. This resulted in a need for reactive development of the supplier. Some quality problems and delays can still exist which results in costly, extra activities and creates imbalance in the production line which can even result in production interruptions (cf. NTT, 2007). Thus, in this context there seems to be no guarantee of partnering with a larger raw material supplier.

In general, Elitfönster finds that suppliers from the primary wood industry do not have the right competencies for handling outsourced component manufacturing. The interviewees of Elitfönster have several times expressed a sense of frustration as the suppliers from the primary wood industry focus only on volume, operational efficiency and cubic metres with little consideration for the quality of the final product and the customer needs. Somewhat similar arguing can be found in the case studies of Vest-Wood, Kährs and Svenska Fönster. The management states that Elitfönster needed to secure high quality components, continued supply of blanks to grow, avoid costly extra activities that disturb production of windows (e.g. extra puttying) and also keep knowledge in-house to avoid ending up in too large a dependency situation. The outcome is that Elitfönster once again has a large in-house production of these components (which is also due to the late acquisition strategy). By doing this, the outsourcing for Elitfönster becomes a capacity outsourcing and a way to balance the in-house production.

5.2.2.3 Combining the Capability Benchmarking Analysis

The companies studied do not necessarily outsource due to external source's comparative capability advantages, which could be difficult to develop in-house (see also section 5.1). For several of the cases studied it is seen that they have difficulties finding a supplier that is as efficient as the in-house production or even sufficiently developed to "test-outsource" some volumes. Similarly, the costs can be lowered when outsourcing but uncertainty in quality and volume at the suppliers can make parallel in-house production necessary (cf. Elitfönster). Thus, non-core components are challenging to outsource when it is difficult to find developed suppliers and can even put the outsourcing somewhat on hold. There are examples of outsourcing to suppliers in the cases studied but they are also related to the need of supplier development and capacity outsourcing (cf. Vest-Wood and Elitfönster), relatively small volumes (cf. Dooria Kungsäter), and using alternative material with developed suppliers (cf. Kährs and Vest-Wood). From the analysis it appears that:

1) Sawn timber suppliers are not necessarily more capable component suppliers and even finding potential suppliers of these components can be difficult.

2) The cases studied put little confidence in the competence base of the sawn timber suppliers. It is often expressed in the cases that delivering components requires a different focus than sawn timber, where normal competence about raw material and volume focus is not enough.

These factors complicate outsourcing as it might involve a need to actively develop the supplier to required performance levels (Quinn and Hilmer, 1994). The search for potential suppliers and a development process can be time consuming and rather expensive in terms of increased transaction costs (cf. Williamson, 1985). In fact there is a risk that WPM firms will fail to account to include costs of searching suppliers and contracting, which from a transaction cost theory perspective can make in-house governance more suitable (Williamson, 1985 Rindfleisch and Heide, 1997). Such *ex ante* costs especially occur during the situation of a limited supplier market (McIvor, 2005).

5.2.3 Supplier Related Risks

Supplier related risks have been touched upon in the above section (5.2.2) and will now be further addressed. When considering outsourcing several risks arise where dependency seems to be a major issue. For the cases studied this is related to the idea that the component outsourcing strategy includes decreasing the supplier base, which entails high demands on supply reliability (cf. Lonsdale and Cox, 1997; McIvor, 2005). A main difficulty for the cases is also finding alternative suppliers when outsourcing the wood components. Based on the case descriptions, table 5-3 maps the cases' main risks considerations.

Table 5-3. Mapping the risks considered by WPM firms when considering outsourcing

	Risks				
	Low substitutability Components vulnerable to supplier failure	Supplier competencies	Limited supplier market	Appropriation risk	Overall dependency risk
Kährs	X	X	X	X	X
Tarkett wood	X		X	X	X
Vest-Wood	X			X	X
Dooria K.	X	X			X
Svenska F.	X	X	X	X	X
Elitfönster	X	X	X	X	X

The mapped risks in table 5-3 will be discussed in detail in the below section, starting with the components vulnerable to supplier failure. The section will end by summarising the managerial decisions taken to manage the risks.

Low Substitutability - Components Vulnerable to Supplier Failure

For the WPM firms the components considered for outsourcing are less important for competitive advantage, however, the supply of components is of very strategic importance as they are often the first input to the plants and decisive items for continued manufacturing (i.e. components are vulnerable to supplier failure). The combination of bulky goods and lack of space in manufacturing plants also makes it difficult and costly to build safety-stocks and this is not preferable or even possible for the firms studied (cf. Elitfönster, Kährs and Svenska Fönster). Uncertainty of supply or inferior quality of components result in costly extra activities, production interruptions, and can even stop the whole production (cf. Kährs, Elitfönster and Svenska Fönster). This puts WPM firms studied in a very vulnerable situation.

Supplier Competencies and Limited Supplier Market for Component Manufacturing

For the WPM firms studied there are not necessarily any given outsourcing supplier partners directly capable of managing a supplier role in an outsourcing agreement, i.e. there is as of today no developed sector to directly manage outsourced component manufacturing (especially cf. Kährs, Elitfönster, Tarkett Wood, Svenska Fönster). This no well developed supplier market is, for example, linked to the difficulty to find sawn timber suppliers that have enough capacity (or even built capacity), financial capability, experience and competencies to handle the manufacturing of the intended component outsourcing. Suppliers to the WPM firms studied have, to a large extent, only delivered sawn timber and have relatively little experience of such component manufacturing. Outsourcing to a supplier without sufficient competence and reliability in supplying components, or who deliver components of inferior quality or who cannot handle the outsourced volumes, risks bottlenecking as a result. For example, for Elitfönster the dependency risk and securing volumes were main reasons for the company to realise that they needed a parallel in-house production. The outsourcing of window blanks has not been working satisfactorily and the supplier has not communicated properly when they were having delivery/quality problems. At the same time, Elitfönster reduced the staff responsible for puttying operations and expects a certain level of quality of the goods delivered from the supplier. Repairing blanks of low quality is costly and creates unbalance in production and can even result in an overall profit loss. The outcome for Elitfönster is a reversed outsourcing decision by increasing in-house production. Through parallel production the firm secures certain volumes, keeps the knowledge in-house and avoids becoming too dependent (also cf. NTT, 2007). Another example of this is with the M/B-components; Kährs has been trying to find suitable suppliers but there have been problems related to lack of competence, lack of equipment and the price mechanism. Kährs does not get any market advantage by manufacturing this component in-house and the only reason for them to make this component is that nobody else is efficient enough.

As a consequence of the limited supplier market and uncertainty of supplier competencies, the WPM firms need to handle risks, such as dependency by single sourcing and transfer of competence. Here, there is a strategic vulnerability for the customer side where a lack of supplier commitment or the right supplier's competencies lead a risk of supplier failure (cf. Quinn and Hilmer, 1994; Lonsdale and Cox, 1997). As a result, complete outsourcing of the components seems to be a less feasible strategy. Instead, firms like Kährs and Svenska Fönster will "test-outsource" volumes of the components considered suitable for outsourcing to learn and see what problems arise. For alterative raw material, such as wood panels, there can be well developed supplier groups for component manufacturing but the hindering factor seems to be too high raw material cost for the often low margin components the WPM firms focus on outsourcing (cf. Kährs).

Appropriation Risk

The companies studied are especially concerned with what Walker (1988) called appropriation risk, i.e. the risk of unmotivated price increases (cf. Elitfönster, Kährs, Vest-Wood, Svenska Fönster and Tarkett Wood). Elitfönster sees the risk of appropriation in terms of a power balance between the supplier and Elitfönster and how this will affect the price development of outsourced components (similar considerations are expressed by Svenska Fönster). To handle the risks of supplier appropriation, Elitfönster tries to find financial incentives, to have a call option if the supplier fails, and to avoid any kind of opportunistic behaviour. In addition, to handle the appropriation risk, Elitfönster prefers to see the suppliers' cost estimations to avoid any unmotivated price increases. Also, their parallel production puts cost-efficiency pressure on the supplier; the management assumes that a yearly ~2% cost increase can be restrained by parallel production. Vest-Wood and Kährs also apply parallel production thinking, which is aimed to lower dependency and put requirements on cost-efficiency at the supplier. By doing so, the case companies studied can consider in-sourcing if a supplier tries to increase the prices, and parallel production allows them to keeping buying competence in-house. Another example of avoiding too high a dependency on single sourcing with linkage to avoiding appropriation risks, is that Kährs is unwilling to sign supplier contracts for more than a 3-year basis. If there is no production in-house and no alternative suppliers the company would find itself in a very exposed situation and they run the risk that the supplier shortly after an outsourcing agreement, will try to increase the prices (cf. Lonsdale and Cox, 1997).

Overall Dependency Risks

The risk of becoming dependent on the supplier seems, among other things, to be a result of a limited supplier market and the supplier might start acting opportunistically (cf. Williamson, 1985). For many of the companies studied, there are not really any or only a few sawn timber suppliers that can directly take on a supplier role in an outsourcing agreement. This puts the WPM firms studied in a vulnerable situation where outsourcing to a few suppliers increase the risk of supplier opportunism as well as increase the need of reliability of the supplies, see figure 5-7.

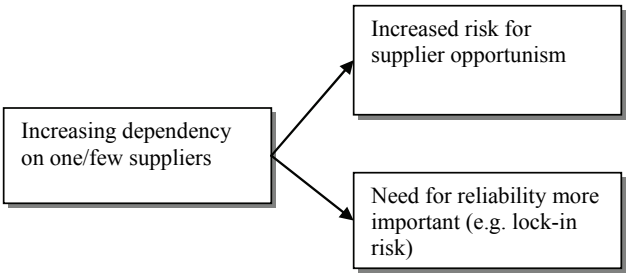


Figure 5-7. Outsourcing to a limited supplier market increases dependency risks

As a consequence of this limited supplier market, accompanied risk of opportunism, and component supply vulnerability, the full realisation of the outsourcing strategies is less feasible (cf. Kährs, Tarkett Wood and Svenska Fönster). The dependency risks discussed are related to the risks discussed in the theoretical framework (cf. Walker, 1988; Quinn and Hilmer, 1994; 1999; Lonsdale and Cox, 1997; Gilley and Rasheed, 2000) and thus are not a unique phenomenon for the WPM firms studied. Similarly, the disappointments of suppliers' capability to provide high quality components and overall cost levels have been noted earlier in an outsourcing context (see e.g. Bengtsson et al, 2005).

The difficulties in finding developed suppliers that have the resources, scale/size, experience and/or competencies to directly handle the outsourced component manufacturing exemplify that there are no given supplier partners directly available. Thus, illustrating that all context do not have developed supplier markets and given supplier sectors to directly take over intending outsourcing. In combination with components being critical in the production, this might result in a need to help suppliers with their development for managing outsourcing. Under such circumstances, Quinn and Hilmer (1994) claim quite the opposite, and state that internal manufacturing is more suitable when there are risks of having to develop a weak supplier to required performance levels that will demand very costly investments and expenses. In line with this, Lonsdale and Cox (1997) express that there seems to be a need for a well developed supplier market when it is time to fully outsource and close own capacity. If there is a no well developed supplier market and only one supplier available, it seems difficult that such party could carry out an outsourced activity better and in a more efficient way than the outsourcing company (cf. Abrahamsson et al., 2003). During the circumstances in which only small numbers of contracting partners are available, there would also be larger risks for supplier opportunism, which leads to appropriation risks with accompanied higher prices (cf. Williamson, 1985; Walker, 1988; Lonsdale and Cox, 1997).

Managerial Decisions to Manage Dependency Risks

To handle the supplier related risks, several managerial decisions are made by the cases studied, and are addressed in this section with focus on the use of parallel production.

There are indications in the cases that if the supplier market does not develop by itself, the companies intend to develop some suppliers by transferring knowledge. However, developing suppliers and working on a single-sourcing basis leads to high interdependency and can be costly (Quinn and Hilmer, 1994; Lonsdale and Cox, 1997; Lonsdale, 1999). It is also considered risky that a supplier is dependent on the volumes from only the outsourcing company. The WPM firms would prefer if the supplier instead worked for several customers to better spread the risks and create cost advantages. Such a partnership should theoretically allow better opportunities for collective pooling effects (cf. Williamson, 1979) and lower the overall dependency (cf. Lonsdale and Cox, 1997). The dependency risk is also linked to the fear of ending up in a lock-in situation where the company cannot decide how much they want to buy. Instead, the supplier decides how much he wants to sell (cf. Svenska Fönster and also Kährs). For several of the cases a no well developed supplier market thus constitutes a risk for becoming too dependent on one supplier and may also result in a need for parallel production (cf. Elitfönster, Kährs and Vest-Wood). Table 5-4 maps the observed supplier related risks and the accompanied managerial decisions:

Table 5-4. Observed supplier related risks and managerial decisions

Risks:	**Managerial decisions**						
	Need of safety stocks	Actively develop suppliers	Not just selecting lowest price	Parallel production	Trying to find some main suppliers	Wait with out-sourcing	Option program to control supplier
Low substitutability - Components vulnerable to supplier failure	X		X	X	X	X	
Supplier competencies	X	X		X	X	X	
Limited supplier market		X		X		X	X
Appropriation risks				X	X	X	X

To lower the dependency risks the companies studied will, when realising their outsourcing strategies, try to have a few major suppliers to avoid too much dependency which might occur when a single sourcing strategy is applied (cf. Svenska Fönster, Elitfönster, Dooria Kungsäter, Kährs and Tarkett Wood). They can also consider paying a higher price to get a supplier that can offer high reliability in supplies (cf. Vest-Wood) or find financial incentives to have a call option if the supplier fails and also try to avoid opportunistic behaviour (cf. Elitfönster). They will also apply a parallel production in-house (cf. Kährs, Elitfönster and Vest-Wood). In fact, several of the cases studied see parallel production as a very likely potential strategy to

manage dependency risks. Here, it is interesting to see that components, which are not necessarily considered as a core competence to manufacture, could be very risky to outsource. This complicates the outsourcing and an initial mixed strategy in terms of combining outsourcing with parallel production can then be necessary (cf. Kährs, Elitfönster and Vest-Wood). There seems to be some major reasons for when parallel production is a suitable strategy:

(A) High component vulnerability. The components considered for outsourcing are often the first input to the plants and are crucial if production interruptions are to be avoided. Lacking reliability in supplies, insufficient tolerances or lack of quality would cause production interruptions. By outsourcing and fully closing their own in-house capacity a firm will become very dependent on the supplier.

(B) A limited supplier market. In this context for the companies studied, outsourcing all manufacturing of a component to a sawmill can be difficult because of the large volumes in combination with not having any given outsourcing supplier partners. Outsourcing to a limited supplier market will mean large risks for dependency, which is linked to the difficulty of outsourcing to a supplier market where the firm needs to find developed suppliers that have the capability to directly handle the outsourcing. By parallel production this risk can be more easily managed (i.e. to better assure reversibility of the outsourcing).

(C) Little confidence in supplier competencies and little experience. The sawn timber suppliers may not have the experience of handling this type of component manufacturing. For such suppliers it can be difficult to directly change focus (e.g. in terms of increasing customer orientation and start making components) (cf. Hayes and Wheelwright, 1984; Lilliecreutz, 1996). In addition to that, we have seen examples of the little confidence of raw material suppliers' competence (e.g. cf. Svenska Fönster, Kährs, Elitfönster, Dooria Kungsäter). Parallel production will offer possibilities for supplier control and benchmarking, at the same time the risk of lock-in and supplier appropriation can be kept at a low level.

(D) In a situation of financial focus/avoiding investments and creating production flexibility. In situations of limited developed supplier markets parallel production can be a good way to balance in-house production and at the same time avoid new investments. For example, the company may be in a situation where investments and/or high fixed costs are to be avoided. By applying parallel production, resources can be focused on activities that create differentiation and competitive edge. At the same time market downturns and peaks in terms of volume changes can be better managed by putting investment responsibility on the supplier.

5.2.4 Summary and Further Discussion of Key Factors Addressed

Looking at the factors addressed by the customer when considering outsourcing in a WPM context in the above analysis, many of the main factors are similar for the cases studied. However, some differences between the cases can be noticed that are mainly linked to how supplier related risks are considered, which seem related to an indicated different degree of outsourcing experience, see figure 5-8.

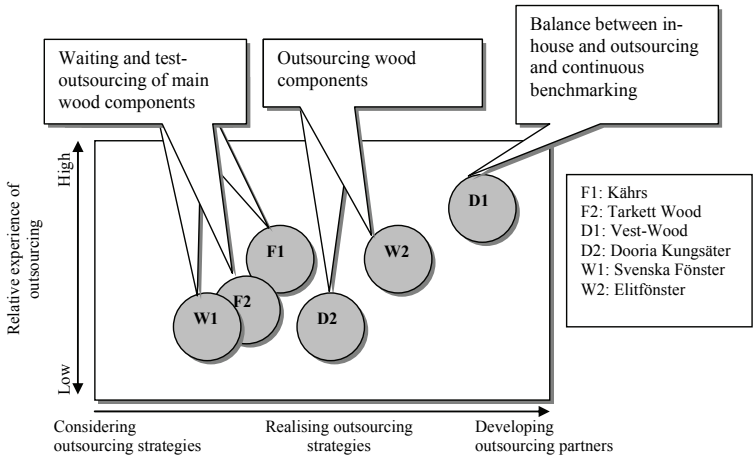


Figure 5-8. Relative experience and respective stage in initialised outsourcing programmes

For Vest-Wood the no well developed supplier market is not considered as a hinder for outsourcing to the same extent as for several of the other cases studied. The case takes more responsibility in developing their outsourcing partners to the required performance levels. The company has supportive functions in terms of special teams, which in a more proactive way assist suppliers in the initial outsourcing process, where competence is transferred to the suppliers in order to develop the processes and production flow. This makes the firm less dependent on finding suppliers that are already developed and parallel in-house production ensures a reversibility of the outsourcing decision (i.e. maintaining buyer competence).

In line with the other cases studied, Vest-Wood puts the main focus on costs when considering outsourcing. However, the use of outsourcing differs. Vest-Wood considers the in-house production more as a supply base that needs to be benchmarked with external sources and hereby ensure competitiveness in their processes. The hallmark is excellence in all processes and outsourcing becomes a part of the overall strategy. The company only considers outsourcing if they can be sure that it will be profitable from a cost viewpoint. Vest-Wood has clear guidelines of when to choose to initiate outsourcing and when to decide that internal governance is more favourable. By doing this they do not fear appropriation risks or overall dependency to a supplier to the same extent as the other case companies studied. Outsourcing is used much more as a tool to benchmark the in-house production by parallel production. There is, all the time, a balance between focusing on outsourcing and considering in-sourcing of an already outsourced activity to ensure excellence in all production processes.

In comparison, Elitfönster has parallel production for both products and components mainly to avoid supplier appropriation and production interruptions by keeping buying/manufacturing competence, to lower dependency risks, and to balance the in-house production. Securing volumes to be able to grow and avoid any risk of production interruptions are important for Elitfönster when applying parallel production. Kährs has clearly defined the outsourcing strategies and the management has previous experience of outsourcing. However, the non-developed supplier market for component manufacturing complicates the initiation of outsourcing for Kährs, and is very concern of the supplier costs and quality levels. These cases can be compared with Svenska Fönster and Tarkett Wood that have clear outsourcing strategies, which have not been realised to a full extent (e.g. "test-outsourcing"). Here, the low substitutability of components in combination with a limited supplier market makes dependency too high. For Svenska Fönster appropriation risks and overall dependency are especially a concern. Dooria Kungsäter has until now only initialised outsourcing for a wood component where supplier competencies can really be ensured, but additional outsourcing would be preferable if suitable suppliers could be found, however, the company does not intend to develop such suppliers by themselves.

In general for all the WPM firms studied, it must be assured that costs can be lowered when outsourcing and also thereafter, and linked to this is the consideration of investment needs, where a supplier can help to take on investment risks by taking over the outsourcing. Outsourcing strategies for the companies studied include those components that contribute little to distinguishing themselves in the market place and are often not even visible in the final product. Related to handling operation and capacity constraints, there are some examples that show that outsourcing may be a preferable strategy even though the component in question creates differentiation (cf. Kährs).

We have in the previous analysis seen that components with relatively well defined interfaces and good decomposable characteristics can still be very risky to outsource due to the high dependency of supplies and vulnerability to supplier failure (see section 5.2.3). Outsourcing such components to a limited supply market will further increase the dependency (Lonsdale, 1999). The risk of insufficient competence levels can demand supplier development (which is indicated in the cases studied), which can be costly and time consuming (Quinn and Hilmer, 1994). In line with this, McIvor (2005) argues that the number of feasible suppliers is the most important area of analysis when considering supply market related risks. Altogether, it seems important not to forget that even components that are considered suitable for outsourcing (e.g. creating little differentiation and customer value) can be strategically very vulnerable to supplier failure and there is a necessity to address the supplier capabilities when considering outsourcing. Thus, it is not certain that components, just because they do not create any differentiation, should be completely outsourced as is often argued in literature. Dependency risks linked to not having any given outsourcing supplier partner, leads to alternative strategies, where an outsourcing strategy in combination with parallel in-house production can many times be suitable to initialise outsourcing (see also further discussion at the end of this section). On the basis of the analysis, an illustrative model of the cases' analysis of the outsourcing decision can be formulated with some key factors considered, see figure 5-9.

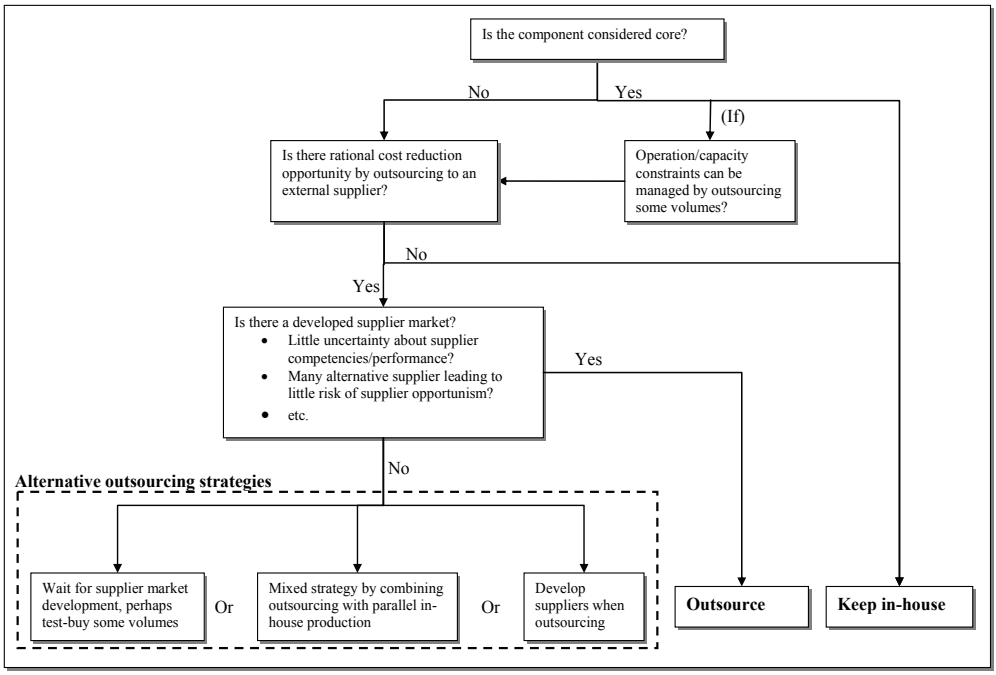


Figure 5-9. A model of the cases' analysis of the outsourcing decision

We can see from figure 5-9 that the outsourcing decision is not a simple one and it is not always a clear cut question whether to make or buy (cf. Wasner, 1999). The above analysis also indicates that the two basic theoretical perspectives, resource-based theory and transaction cost theory, can be linked to the WPM firms outsourcing strategies but not to the extent that it is considered to be the only focus analysis areas (see also figure 5-10). As seen in figure 5-9, the companies studied initially considers what are core and non-core, which can be related to resource-based theory in terms of competitive aspects such as differentiation and customer focus (cf. Barney, 1991; Prahalad and Hamel, 1994; Quinn and Hilmer, 1994). Here, all the WPM firms studied recognise the need of focusing on what creates differentiation and competitiveness on the market. Following the view of core and non-core is a focus on cost capability benchmarking.

Considering the case companies' cost analysis it is mainly focusing on component production costs, which help the companies studied to decide the cost reduction potential, financial performance improvements, and supplier capability. From a perspective of transaction cost theory the sum of transaction and production costs should be considered together to understand whether to outsource or not (cf. Williamson, 1985). Governance costs can somewhat be linked to avoiding too many suppliers and wanting a margin when outsourcing to protect from eventual emerging transaction costs (cf. Williamson, 1981; 1985; Rindfleisch and Heide, 1997). However, in this industrial setting, transaction cost theory can mainly be linked to what Williamson (1975; 1985) termed as supplier opportunism risks and with what Walker (1988) called the appropriation risk. For the cases studied, such supply related risks seem to especially be a hazard when there is not necessarily any given outsourcing partners developed (cf. Williamson, 1975; Walker, 1988). We can see from the previous analysis that

under such circumstances both the supplier competence base and substitutability of components outsourced need to be thoroughly addressed. This analysis is also linked to investigating the number of available suppliers on the market (cf. McIvor, 2005).

Altogether, production cost analysis becomes a main factor in deciding whether or not to outsource or keeping the production capacity in-house. The supplier related risks can be related to transaction cost theory and focus areas for outsourcing to resource-based theory, see figure 5-10.

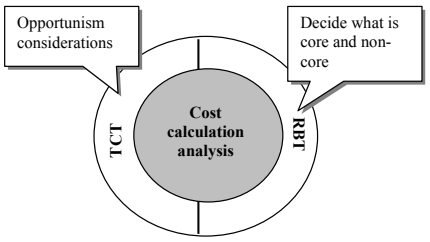


Figure 5-10. Main elements when the WPM firms studied consider outsourcing

This view seems to differ somewhat from previous literature that often argue that the outsourcing decision at firms can mainly implicitly or explicitly be explained by a transaction cost theory perspective (cf. e.g. Walker, 1988; Augustson, 1998; Lonsdale, 1999; 2001), resource-based theory perspective (Venkatesan, 1992; Quinn and Hilmer, 1994) or a mixed theoretical approach (Brandes et al., 1997; McIvor, 2000a;). There can be several plausible reasons for the main focus placed on the cost calculation part. One possible reason could be the difficulty of operationalising and applying these theoretical approaches. Transaction cost theory seems especially difficult to be developed into practical tools to be used during outsourcing decisions. There have been examples of the difficulties to apply the transaction cost theory concept in practice (see e.g. Walker and Weber, 1984; Probert, 1996). Result from a study conducted by Walker and Weber (1984) implied that comparative production costs, compared with transaction costs, most strongly influenced the make-or-buy decision. As emphasised by Walker and Weber, the strong influence of production costs when outsourcing may well be because of the relative ease of determining production costs compared with measuring transaction costs.

We have also seen from the analysis of driving forces for outsourcing (section 5.1) that production cost reduction in terms of overall cost cutting and the reallocation of resources are major driving forces for outsourcing. Therefore, it can be said that the WPM firms' outsourcing analysis is linked to the expected outcome of outsourcing by the strong focus on cost reduction. In addition to that, there is as of today no developed sector to manage outsourced component manufacturing for the WPM firms. Under such circumstances, Abrahamsson et al. (2003) and Lonsdale and Cox (1997) argue that external suppliers will likely not be able to perform the activity in a more efficient way than the outsourcing company, which would put further focus on assuring that cost really can be reduced when considering the outsourcing. At the same time, the WPM firms are extensively raw material focused and have traditionally been fairly integrated by managing most manufacturing activities in-house and have little experience of conducting outsourcing programmes, which could also lead to more focus on cost. The later is in line with McIvor (2005), who argues that organisations that outsource for the first time will do it for reducing their cost levels.

What should be Considered as Strategic Important when Outsourcing?

In general, literature gives little guidance of how close to the core and how much organisations should outsource (Harland et al., 2005) and it can be difficult for companies to decided what is core in a long-term perspective (cf. Lonsdale and Cox, 1998; Berggren and Bengtsson, 2004). The literature has previously mainly provided an understanding of what is core and non-core based on a resource-based theory perspective on a strategic level (e.g. Venkatesan, 1992; Quinn and Hilmer, 1994). However, McIvor (2005) argues that there is a risk of using such core/non-core terminology and just defining non-core activities as those where an external supplier/competitor has capability advantages. It can still be strategically important in the eyes of the customer (Ibid.). Along similar lines, Lonsdale and Cox (1997), Lonsdale (1999) and McIvor (2000b) warn for defining non-core activities as those being problematic to manage.

In addition to that, my study has shown that components can also be very strategic important for the continuation of the in-house production (i.e. vulnerable for supplier failure). The vulnerability of components considered for outsourcing is due to the fact that: (1) *components are critical for the firms' production and would often be the first input in the production*, (2) the *lack of quality, volume or supply reliability can stop or interrupt the whole production*, (3) *components are not as substitutable if compared with sawn timber (in combination with few or no alternative suppliers)*. Here, operational critical items can become very strategic important for a company when outsourcing such items, for example, risks of production interruptions can lead to profit loss. Outsourcing of items critical in the production system of the customer will put large requirements on an external party's competencies and supply reliability.

Altogether, this raises the question of what key factors should be addressed when outsourcing? My analysis suggests that an operational perspective should also be added to the discussion, see figure 5-11.

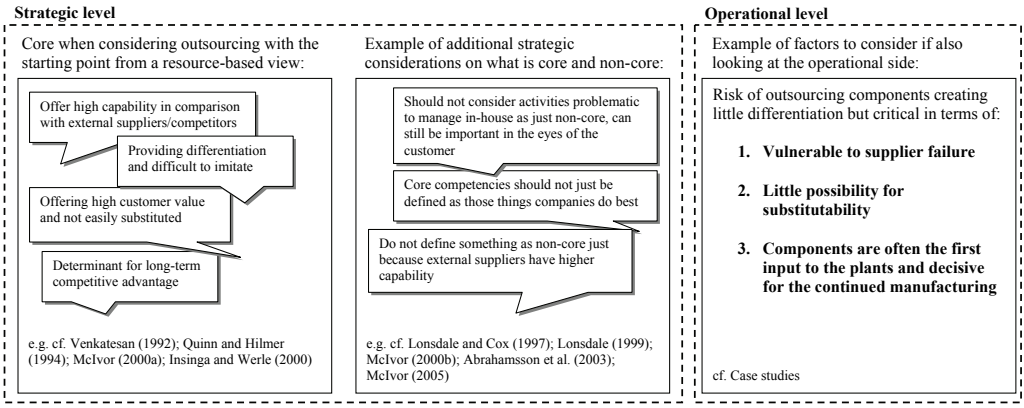


Figure 5-11. Adding operational consideration to the core competence approach

By adding an operational perspective, it can be discussed if it is suitable to define strategic important activities only on the basis of what creates a differentiation and what is important in the eyes of the customer, as is often argued in literature (see e.g. Venkatesan, 1992; Quinn and Hilmer, 1994). One question is: could there be a risk of mismatch when it comes to what should be considered as strategic important in a longer time perspective if only taking a core competence approach based on competitive aspects in the outsourcing strategy? If a firm only

keeps items they do best it is not certain that these, in a long term perspective, will match those creating a unique customer differentiation to distinguish the company in the market place (also cf. Lonsdale and Cox, 1997; Doig et al., 2001; McIvor, 2000b; Beattie, 2005), or those operational critical in the manufacturing to avoid production interruptions as illustrated by this thesis. A mismatch can likely lead to a risk of decreasing ability for companies to develop cross-functional skills (cf. Lonsdale and Cox, 1997), especially when the view of core competencies by companies are seen as quite static and involve existing skills (Lonsdale and Cox, 1998). Similarly, it can lead to losing critical skills that can undermine the long-term competitiveness (Prahalad and Hamel, 1990; Quinn and Hilmer, 1994; Arnold, 2000; Doig et al., 2001).

A suggestion from my analysis is that it can be dangerous from both a strategic and an operational perspective for a customer to not systematically consider the risk of supplier failure in combination with the vulnerability of components considered for outsourcing (e.g. quality and supply sensitivity). In outsourcing situations, such analysis seems especially necessary with today's sensitive production setup and lean operations, with more and more use of concepts such as just-in-time delivery. Lacking reliability or quality of critical components can result in levelled-out cost advantages from a need for reparations or having a larger safety stock and more capital tied up, for example. The above discussion leads back to a concern of what should be considered as potentially strategic important when considering outsourcing. Figure 5-12 combines a strategic level of outsourcing from a resource-based view starting point (e.g. Venkatesan, 1992; Quinn and Hilmer, 1994; McIvor, 2000a; Insinga and Werle, 2000) with the suggestions of this thesis to add an operational level to the discussion.

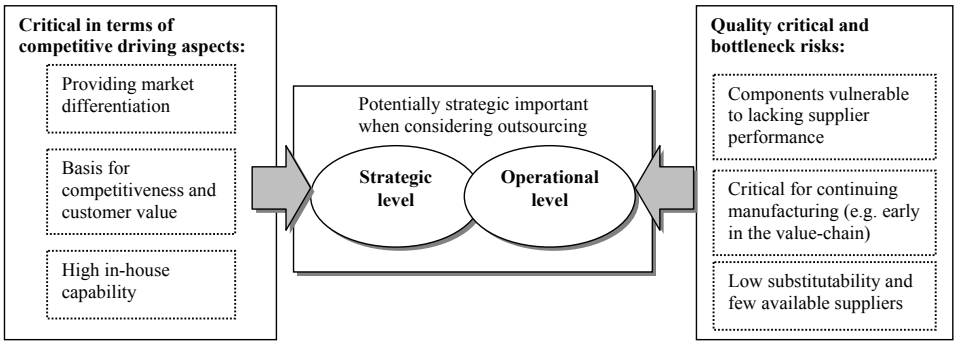


Figure 5-12. If also addressing an operational perspective when considering outsourcing

Figure 5-12 shows that the strategic level focuses on what is critical in terms of competitive driving aspects to decide what is core (e.g. Quinn and Hilmer, 1994; McIvor, 2000a). The lacking aspect, which the operational level focuses on, is that a component can still be very critical to avoid production interruptions. If such components with little substitutability are outsourced, they will be very vulnerable to lacking supplier performance and are very strategically important for the outsourcing company. My analysis suggests that the vulnerability of components considered for outsourcing at least needs to be thoroughly evaluated when considering outsourcing (cf. Insinga and Werle, 2000). Thus, it does not seem as if it is enough to just consider what is core and non-core, if not at the same time securing the operational side when outsourcing.

About Outsourcing: Identified Advantages of Parallel Production

Another observation from my analysis concerns the application of parallel production to manage high supplier related risks. By keeping some production in-house the internal performance can at all times be matched with that of suppliers' and in this way keep thorough track of the costs. At the same time the outsourcing process becomes more reversible by maintaining buyer competence. Based on the cases studied and the analysis chapter some main advantages of a mixed strategy can be identified (cf. Kährs; Elitfönster; Vest-Wood):

(a) Lowered component dependency. As discussed earlier, outsourcing components critical for the production can be risky. Parallel production lowers the component dependency and the risks of production interruptions when outsourcing components crucial for the continuation of the production. Applying such a strategy seems especially important when there are few alternative suppliers and outsourcing components located at the beginning of the value chain.

(b) Improving reversibility of outsourcing decisions. Parallel production in-house assures to some extent improvement of the reversibility of outsourcing, which is a main issue to address in outsourcing strategies (cf. Lonsdale, 1999). By keeping capacity in-house the volumes outsourced can be moved back to in-house governance. If the start up of a component manufacturing is complex it seems an especially good idea to keep competencies in-house (cf. Elitfönster). This can likely also help the company with what Abrahamsson et al. (2003) called the outsourcing trap, where complete outsourcing leads to larger external value-adding and the outcome of outsourcing programmes will have an impact on both the financial results and competitiveness.

(c) Keeping buyer competence and keeping track of the supplier market development. Outsourcing and fully closing in-house capacity would mean declined information about the supplier market development. By doing this a company will have less information if an increase of costs is really motivated. By parallel production the outsourcing company can keep buying competence and keep better track of the market development.

(d) Lower risk of supplier appropriation, i.e. the risk of unmotivated price increases (cf. Walker, 1988). Total outsourcing can involve a risk of losing commercial negotiation ability (cf. Kährs, Elitfönster and Svenska Fönster). Parallel production can directly restrain price increases and the outsourcer can lower volumes outsourced if the supplier makes unmotivated price increases, which can help to steer/control the supplier (cf. Elitfönster; Vest-Wood).

(e) Enable process benchmarking. Parallel production enables benchmarking in-house operations with external suppliers. If outsourcing the whole production, there is a risk of losing control of how efficient the supplier or in-house production really is. In line with this, Heywood (2001) states that all companies must continuously analyse their business processes to see how competitive they are.

(f) Lower the risk of outsourcing problematic activities. One risk with outsourcing is when the company chooses to outsource activities that they consider problematic without accurately revising how these may contribute to long-term sustainable competitiveness (Lonsdale and Cox, 1997; McIvor, 2000b). Such an outsourcing strategy brings a risk of losing activities that can be critical for long-term competitiveness or risk decreasing the innovation and cross-functional skills (Ibid.). By outsourcing and parallel production in-house the company avoids just divesting problematic activities.

(g) Managing financial risks and creating production flexibility. By applying parallel production strategy, new investments to increase in-house capacity can be avoided and investment risks can be pushed towards the supplier. By having parallel production and outsourcing a part of the manufacturing of components, their own production units can at all times have a high rate of utilisation and demand peaks can be outsourced to external suppliers. In doing so, a company can create opportunities for growth without costly investments.

Altogether, it seems as parallel production will be suitable when there are (1) high risks of dependency due to too few suppliers (limited supplier market), (2) low substitutability, and (3) high uncertainty of the supplier capability (e.g. scale, experience, supply reliability, cost reduction, quality of components delivered). Outsourcing in combination with parallel in-house production provides an interesting way to handle the dependency issue in outsourcing strategies. Here, my study indicates that parallel production seems to be a realistic alternative for situations of non-developed supplier markets.

5.3 Outsourcing from a Supplier Side

In this section the supplier side of outsourcing is analysed, and is based on the case study of the sawmill company NWP. The analysis will take its starting point from the analysis model developed in the theoretical framework (see section 2.5), which for the supplier side includes three main analysis areas: (1) focus areas for value-adding, (2) capability benchmarking, and (3) business related risks. The section will end by combining the three analysis areas for further discussion.

5.3.1 Focus Areas for Value-Adding

The fact that raw material costs are a large part of the total manufacturing costs and large investments are required, makes the sawmill focus on high throughput and large capacity (necessitated to maximise output and volume yield to assure profitability) (Nord, 2005). However, the basic idea of the supplier studied is that forward integration by taking over outsourcing will lead to a more competitive position and higher profitability (cf. Harrigan, 1985; Lilliecreutz, 1996; Auguste et al., 2002). Selling components will also lead to the possibility to access new distribution channels, i.e. components to the WPM sector and other end-users (cf. Porter, 1998; Fransson and Rehme, 2005a).

Looking at the definition of NWP's value-adding strategy, it is in line with forward integration by moving towards further finishing of semifabricated products (cf. Vesey, 1978; Scherer and Ross, 1990). A main business idea of the supplier studied is based on developing value-adding strategies, which incorporate: (1) manufacturing components based on sawn timber, (2) further processed timber in combination with other materials and new production techniques. Thereby, the supplier's view of value-adding strategies somewhat differs from other sawmill companies, which often applies, nowadays, rather "standard" activities such as planing and additional drying (drying to orders) when stating that they are applying value-adding strategies (see e.g. Roos et al, 2002; Staland, Navrén and Nylinder, 2002).

The characteristics of the M/B-component manufacturing can be mapped with the literature about augmented product offers discussed in chapter 2, see table 5-5 (the supplier's situation is indicated with a grey shadow in the table). As expected, from the perspective of the supplier studied, taking over wood component manufacturing mainly encompasses a product level and not systems or solution selling.

Table 5-5. Mapping the supplier's focus areas for value-adding (marked with grey shadow)[47]

	Supplier situation: deliver product	**Non-supplier situation: deliver systems**
Characteristics of object:	Taking over component manufacturing	Product-service package
Offer:	Product and mainly guarantee supply reliability	Product and services package with often complementary consultative expertise
Supplier role:	Supplying components	Systems with varied degree of consultative role
Supplier's know-how about customer (outsourcing need)	Low (not managed the type of component manufacturing before)	Medium-high
Value of single order	Low	High
Purchasing function:	More transaction based	Relation based
Delivery:	Single products or related families of items.	Including maintenance, repair and operating (can also be with a consultative dimension)
Financial/warehousing responsibility:	Mainly customer	Often supplier
Price and costs:	Price as focal point	Improving total cost situation
Technical integration	Low	High
Heterogeneity	Specified components	Varied degree
Distribution power:	Customer	Supplier
Time perspective:	Caution and risk for distrust	Flexible
Success factors for supplier:	Mainly be able to cut costs	System design by the supplier and also a consultative role.

We can also see from the case description that a change in the position of the customer in terms of outsourcing activities will affect the role of the supplier. Here, delivering M/B-components to Kährs means a change in the existing products provided, where the role is changed by going from a raw material supplier to also a component interface. This is in line with, Lilliecreutz (1996), who argues that the possibility for the supplier to change and develop is mainly linked to the needs of the customer. Then, a change of the position of the customer can provide opportunities for the supplier (cf. Lilliecreutz, 1996; Auguste et al., 2002). In line with this development, the vertical position of the supplier is extended by the forward integration (cf. Barnes and Sinclair, 1985; Scherer and Ross, 1990). Here, the supplier is able to control more elements of the production process that can create differentiation in comparison to other competitors (Porter, 1998). However, few other alternative suppliers of the components in combination with items being critical in customer's production, create low substitutability and would make the buying situation more dependent (cf. Lonsdale and Cox, 1997; 2000).

[47] Adaptation based on: Bonaccorsi et al (1996); Hannaford (1976); Mattsson (1973; 1982; 1986); Hammarkvist et al (1982); Bansard et al (1993); Millman (1996); Mullins (1997); Azimont et al (1998); Galbraith (2002); Miller et al (2002). For the supplier studied the components taken over are considered as end-products.

5.3.2 Capability Benchmarking

For a supplier intending to take over outsourced activities it is important to capture values that their customers failed to do (cf. Auguste et al., 2002). To investigate this further, in line with the analysis model, this section will look at cost and non-cost factors.

For the case studied, the area of capability seems mainly related to trying to find cost advantages. This is in line with the view of Porter (1998), who argues that creating cost advantages is a main objective when forward integrating. Here, it is important to find cost reduction possibilities to avoid cost transfers upstream (cf. Augustson et al., 1998; Abrahamsson et al., 2003). The cost focus would put the supplier in more of a rationalisation corner with focus on developing operational capabilities (Abrahamsson and Brege, 2004).

5.3.2.1 Cost Related Benchmarking

While the customer in focus (Kährs) has scale advantages in their manufacturing, the supplier's expected advantages are more related to eliminating process steps and making the whole manufacturing process more efficient by avoiding double processes (see table 5-6). Here, by improving the production technical setup, the supplier could manage to sort out the timber suitable for component manufacturing already after the first sawing in the sawmill.

Table 5-6 Areas for cost reduction that were expected to be developed if taking over outsourcing activities

			Location:	
Why:	**What does it imply:**	**How:**	**Sawmill**	**Component manufacturing**
Avoiding double processes	Avoiding double drying and stacking	Integrating component mill with sawmill	X	X
Improved use of raw material	Improving production process and both wood species => can use more dimensions => getting a larger span items that can be used	Integrating component mill with sawmill and sorting already at first sawing, improving production processes	X	
Eliminating production processes	Avoiding final production in sawmill	Integrating component mill with sawmill	X	
Keeping investment costs at low level	Not needed to invest fully to attain necessary equipment	Working with partner with equipment		X

Also in literature an expected advantage of forward integration is avoiding double processes, improving the production process and eliminating process activities, which can be linked to the possibility to create economies of combined operations (cf. Rundh, 1992; Porter, 1998). An expected outcome will then be a more rationalised production setup (cf. Silberston, 1972; Harrigan, 1984; Porter, 1998). For the supplier studied, this setup also enables a better utilisation of the raw material with a larger span of wood dimensions where both spruce and pine could be used for the manufacturing. This seems related to working for high yield and

trying to maximise the off-set from the initial sawmill production output (cf. Nord, 2005). In addition to that, by changing the manufacturing process, the handling of wood lamellas could be reduced, which means an easier transportation of components and a more rationalised production.

A critical element is the integration of the component mill with the initial sawmill production that could enable: (1) avoiding double stacking and drying of the timber, (2) eliminating the dry sorting and grading station for the timber (a costly and time consuming station), and (3) not needing to pack the timber twice/avoiding unnecessary transportation costs. These elements seem especially important for low-value goods (e.g. the M/B-components). Thus, by putting operations together NWP can gain improved efficiency and find cost advantages (cf. Silberston, 1972; Porter, 1998; Harrigan, 1984). By the limitations of the customer to improve/rationalise their raw material production in the same way as a supplier can, an opportunity exists for the supplier (cf. Rundh, 1992; Porter, 1998). The possibility of eliminating production processes can be linked to Bain (1968, p. 177), who argues that such advantages are especially apparent where technologically complementary productive processes can be brought together at one single site. Similarly in a related context, Rundh (1992) shows that one of the primary strategic benefits with forward integration in the pulp and paper industry is the possibility to lower costs by combining operations on-site. The supplier studied wanted to keep investments at a low level, which was intended to be done by working with another sawn timber supplier that had the machines required for the final production steps of M/B-components. However, some investments to build the component mill were of course necessary. If we disregard such necessary investment costs, the supplier studied estimated to reach a manufacturing cost close to or even lower than Kährs has today.

However, NWP and the floor manufacturer did not agree on the price levels for the outsourcing, thus no suitable pricing model could be developed that matched both parties (Auguste et al., 2002). Here, the cost advantages that were to be developed were not enough to make Kährs initiate this outsourcing. Kährs required that NWP could produce M/B-components at a cost lower than Kährs variable cost level. From a supplier perspective it is argued that such a cost advantage is difficult to create when the customer has a functioning production and is not in an immediate need for investments (see figure 5-13). Taking over outsourcing for a supplier seems, therefore, more suitable when the customer is in need of making new investments and/or would like to avoid fixed costs that are to high.

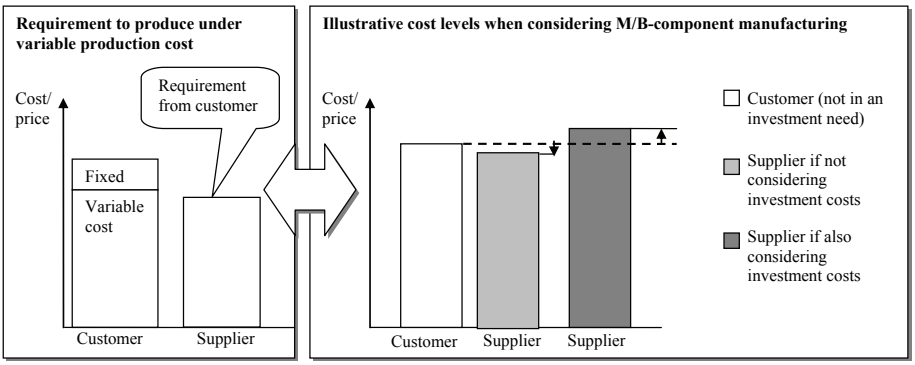


Figure 5-13. Difficulties to offer cost advantages when the customer is not in need of investment and the supplier must make their own investments

For the M/B-component manufacturing, relatively large investments at the supplier would still consume small volumes of sawmill production output, and create large dependencies on one customer. The M/B-component project with the floor manufacturer Kährs, would require investments of about SEK 20-25 million in a new production line at the supplier site. However, such investments (which is large for NWP) would still only consume ~3% of the total output of sawn timber from all the sawmills in the group or ~8% of the output from the Östavall sawmill (i.e. it consumes rather small volumes of a certain sawn timber output). Thus, for a value-adding strategy in the context studied, and the component considered, it seems as if large investments are needed to invest in rather a small part of the total production, which is linked to the divergent production flow.

5.3.2.2 Non-Cost Related Benchmarking

Taking over a new type of component manufacturing requires a development of competencies and building experience, which is in line with the theory discussed (cf. Hayes and Wheelwright, 1984; Lilliecreutz, 1996). This is also in line with Porter (1998), who states that integration (whether downstream or upstream) is a special case of entering into a new business area. With reference to Klein and Hiscocks (1994), the situation of moving towards a value-adding strategy in the context studied is mapped out in figure 5-14.

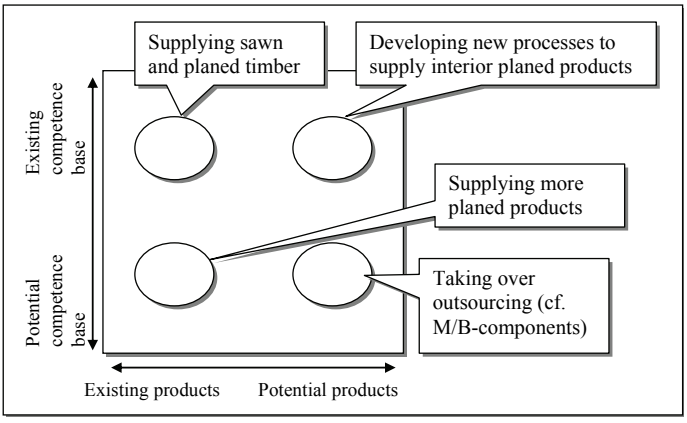


Figure 5-14 Developing competencies if moving towards a component manufacturing (Adaptation based on: Klein and Hiscocks, 1994, p. 202)

As seen in figure 5-14, going from existing products to potential products is the movement of going from raw material commodities to more adapted components. Accompanying, this movement is the development of the existing competence base (cf. Klein and Hiscocks, 1994; Lilliecreutz, 1996; Porter, 1998). Klein and Hiscocks (1994) and Hayes and Wheelwright (1984) argue that this is a consideration that many companies miss. For example, one challenging area for NWP is to reach the high drying requirements (this is the same main issue expressed by the customer). In addition, the supplier studied must develop competencies to meet requirements for tolerances and handling the gluing of timber (including knowledge of what type of input of sawn timber is optimal to use).

As also expressed in the case study, the change of production flow in the initial sawmill will require capability development. Thus, the company studied must be able to manage this new type of component manufacturing and also fit it with the production output from the sawmill (e.g. wood specific competence but also building experience of how to assemble the components starting from a sawn timber output). Here, taking over the component

manufacturing is linked to increased quality requirements. Supplying sawn timber with some shortcomings is more acceptable ("there are always alternative suppliers"). However, the requirements are much higher when supplying complete components where the customer increases its dependency on the customer (cf. Lilliecreutz, 1996). Items with inferior quality can cause production interruptions at the customer. In the long run complaints from-end users about the floors due to the components quality can even lead to high claims of damage.

5.3.3 Business Related Risks

A business related risk is that a sawmill, like the one studied, needs to sell/use all of the parts of a sawlog including consequence products and by-products (e.g. chips and sawdust) to assure profitability (cf. Nord, 2005). The need of finding off-set for all product output makes it more difficult to adapt to customer/component mill requirements. For the M/B-component manufacturing, NWP will only want to use the lower quality fraction for this type of manufacturing. If the supplier could direct the sawmill production to get only timber output suitable for component manufacturing, more outsourcing could potentially be taken over. However, a sawmill production cannot just be adjusted to maximise the yield of downstream activities and cannot steer the production output based only on customer/component mill requirements. (also cf. Nord, 2005). Such strategy will result in too many consequence products with non-standard dimensions that are difficult to sell. There is the risk that the supplier will be forced to sell such sawn timber to the closest lower standard dimension, which will result in an overall profit and volume loss (see also Nord, 2005). Hence, an important issue for a sawmill like NWP is to assure that any consequence product as a result of a value-adding strategy can be sold to other customers, otherwise, the whole business of the sawing of logs risks becoming unprofitable.

A basis for developing cost advantages for NWP was to change the sawmill value chain to match the requirements from the outsourcing taken over. For example, taking over outsourced volumes of the M/B-component manufacturing will mean changes in the sawmill manufacturing processes. With the present production setup, the timber is first sorted by quality after the drying process and mainly sorted by dimension in the green sorting. To avoid double processes and eliminate production processes it is important to be able to already at the green sorting station sort out timber suitable for component manufacturing. There are also the increased requirements on the moisture quota if manufacturing M/B-components. However, the supplier studied cannot just dry the entire timber output to this low moisture quota, because this would cause a bottleneck situation and more quality problems on all the sawn timber. This will also cause more costly timber as this is a time consuming task and neither will all other customer demand such dried timber. Thus, too much drying due to taking over outsourced component manufacturing can affect the whole sales of sawn timber. Therefore, a supplier in the context studied will likely not want to dry more than necessary but must instead develop a technical concept that enables them to sort the timber before the drying process. The production setup must also allow for taking the timber directly to the component mill, i.e. integrating the sawmill with the production line of the M/B-component manufacturing is therefore essential to cut process steps.

In addition to a need for changing production setup, there are also operational limits present that create business risks. Becoming a component supplier means that a certain quality class and dimension of sawn timber that is optimal for the component should be used. For the M/B-components it is not optimal or possible to use sawn timber of too high a quality class. Here, customers, such as Kährs, are using a certain quality of sawn timber as input for their component manufacturing and will not pay more for timber of a higher quality than necessary.

The difficulty for the supplier studied has been to produce enough raw material of the right quality and dimension to be able to manufacture the M/B-component. NWP cannot just use more expensive sawn timber because this will not create any profitability for the total sawing of timber. Here, the timber of a higher value should instead be sold to other customers at a higher price (Nord, 2005). The supplier studied also cannot just increase the input of raw material and saw more because there is a need to off-set the increased volumes of other products as a consequence of needing more timber for the M/B-component manufacturing (i.e. the divergent production flow). There is also a limited availability of logs for input to the sawmills: NWP saws as much as they can find and will soon reach the capacity limit of the present plant. Thus, operational limitations are present in the sawmill (cf. Scherer, 1975). This complicated the creation of suitable pricing models for the potential customers conducting outsourcing and increased dependency on one customer (cf. Auguste et al., 2002).

The option to manage a limited in-house sawmill capacity would be to start buying sawn timber of the right quality externally. However, this does not seem to be a possible strategy for the type of component manufacturing; buying more sawn timber leads to increased costs and the loss of the potential to eliminate process steps that an integrated sawmill and component mill offer. Here, it is costly and difficult to transport sawn timber that is still stacked and drying all of the timber at Östavall will create a bottleneck. At the same time, to buy large volumes of sawn timber externally would result in building a component manufacturing that is dependent on a purchasing organisation, which for the component production considered is difficult to realise. As indicated in the case, the risk is that NWP ends up in somewhat the same situation as Kährs but with a smaller scale production. This makes a customer like Kährs the upper limit for NWP. This means that even larger sawmills can have limited possibilities for certain component manufacturing, to take over outsourcing from several large customers of the same type (i.e. if NWP would deliver components to Kährs they could not just double their component capacity to deliver to another floor manufacturer). The outcome is that the supplier studied will be able to handle a certain volume of M/B-components but cannot expect to gain increased cost advantages by spreading the cost of the factory on a growing unit production. Thus, there can for certain components, be limitations for an expansion of the component manufacturing to develop economies of scale (cf. Bain, 1965; 1968; Scherer, 1975; Chandler and Hikino, 1990). As a consequence, the supplier studied would be very dependent on one single customer for the type of component manufacturing (cf. Stuckey and White, 1993). This also causes investment risks for the supplier studied where fixed costs must be managed whether the market is experiencing high or low peaks (cf. Porter, 1998). If the company is not able to have several customers they will either need to have long-term contract or be able to convert the plant, thus allowing for the making of other types of components to lower investment risks (e.g. if customers change to alternative materials). However, as seen in the case descriptions, both of these alternatives are not easily feasible; manufacturing can be rather dedicated to one specific manufacturing and it is less interesting from a customer point of view to write long-term contracts and apply a parallel production (cf. Kährs and Elitfönster).

5.3.4 Summary and Further Discussion of Outsourcing from a Supplier Side

For the supplier studied taking over outsourcing means a strategic choice to enter a new business that also leads to new business risks (cf. Stuckey and White, 1993; Lilliecreutz, 1996). A main risk seems related to difficulties in creating cost advantages and ending up in an overall non-profitable situation accompanied by high investments (cf. Auguste et al., 2002; Abrahamsson et al., 2003). There is also the need of developing new competencies and managing a new production setup (cf. Klein and Hiscocks, 1994).

A supplier like NWP would be more skilled at using the raw material and rationalising the sawmill-related operations. However, the customer has many years of experience from the component manufacturing, which makes it more difficult to have capability advantages from the start. It is not likely that the supplier studied will have a larger scale in their component manufacturing (e.g. will only take over ~10% of M/B-components). In addition to that, taking over outsourced M/B-component manufacturing seems to consume relatively small volumes of the total sawn timber output (~8% of the Östavall sawmill output). According to Porter (1998), this means that the supplier will not become exclusively specialised in such component manufacturing for the specific component considered (i.e. comparing relative volumes a customer like Kährs would be much more specialised).

Considering the stated main needs of a supplier to be able to successfully take over outsourcing as argued by Auguste et al (2002), it seems the problem lies in the difficulty of creating scale advantages in component manufacturing and finding an overall suitable pricing strategy. For the supplier studied, the limitation of economies of scale in the component manufacturing when having such large customers puts focus on finding other cost advantages. Looking at the applicability and feasibility, the possibilities for direct cost advantages when taking over outsourced component manufacturing, such as M/B-components, are mainly economies of combined operations (see table 5-7).

Table 5-7. Expected cost advantages in certain component manufacturing for a sawmill taking over outsourcing[48]

Area	Applicability	Feasibility
Economies of scale in the component manufacturing	Low when working with larger customer and/or for certain outsourced components (however, apparent in initial sawmill production)	Low for the component considered - Initial very large sawmill scale required or finding component that can consume large part of sawmill output or basing production on a purchasing organisation
Economies of combined operations	High	Medium-high
Economies of scope in component manufacturing	Low (however, apparent in initial sawmill production by the large product assortment)	Low
Lowering factor costs	Medium-low	Medium-low (e.g. investing for automation and better raw material use)

Looking at the sawmill activities a focus on economies of scale can of course be identified (cf. Bain, 1965; Scherer, 1975, Porter, 1998). The limited possibility to create economies of scale in the component manufacturing when taking over outsourcing is interesting when previous studies in other contexts have argued that these should provide an especially strong motivation for initialising outsourcing (see e.g. Brück, 1995; Brandes et al., 1997; Bragg, 1998; Greaver, 1999; Cachon and Harker, 2002). Here, a supplier with a larger capacity (cf. Porter, 1998) by collecting pooling effects from several customers (Williamson, 1979), should be able to offer lower costs. From a theoretical viewpoint this is of course not impossible (cf. Scherer, 1975; Chandler and Hikino, 1990). Economies of scale in component manufacturing can be created but will require a very large initial sawmill production input/output. Even a WPM firm studied expects that a supplier should be able to reach large scale manufacturing (cf. Vest-Wood). However, this is something not possible even for the relatively large sawmill company studied, which is linked to component specificity, the divergent production flow and also the limited internal capacity. Another alternative to increase the possible scale is to base the component manufacturing on a purchasing organisation, but this can be limited by a low-margin-component (cf. Kährs) or by difficulty sourcing the raw material, which leads to increased costs (cf. NWP). Thus, it should not be assumed that a forward integration will lead to tying up many customers, as is normally argued about forward integration (cf. Porter, 1998).

Economies of scope for the supplier studied seems mainly linked to the sawmill production line, where a divergent production flow creates a lot of different products (i.e. every input results in a number of various outputs). By the main focus on scale in the sawmill it seems to be able to combine economies of scale with scope (cf. Bailey and Friedlaender, 1982). Economies of scope in the sawmill is not so much linked to trying to use excess capacity.

[48] cf. Bain (1965); Verdin and Williamson Silberston (1972); Scherer (1975); Panzar and Willig (1981); Bailey and Friedlaender (1982); Hayes and Wheelwright (1984); Harrigan (1984); Chandler and Hikino (1990); Abrahamsson and Brege (1995); Porter (1998)

Instead, the broad product assortment and resulting economies of scope in the sawmill production are more of a consequence of the heterogeneity of the raw material. In general there is a need for the sawmill to off-set their divergent production output to assure profitability, which puts more focus on throughput and large scale (Nord, 2005). Component manufacturing seems more specific to the outsourcing taken over, where investments in a production line for M/B-component manufacturing, to a large extent, will be limited to making such components. There have been indications that the initial production equipment in a component mill could be used for other products but for the manufacture of components more investments would be required (e.g. finger-jointing equipment for making window blanks).

Factor cost advantages can be somewhat leveraged by improving the use of the sawn timber (i.e. lower spillage and converting spillage and consequence products to other types of products) and using more types of sawn timber. This seems especially important when the raw material cost is such a large part of the total cost (cf. Tayles and Drury, 2001; Nord, 2005). Another way is investing in a higher automation (also cf. Kährs and Elitfönster). Developing cost advantages by economies of information and relationships (cf. Porter, 1998) when taking over outsourced manufacturing is not indicated very much in the case. One reason may be that this is a new business area for the supplier. In addition, the customer's demands and requirements included consideration of a somewhat fixed manufacturing volume and specification of component manufacturing. Nevertheless, when working closely with the customer, improved communication is expected. By transparency in demand between the integrated units it is likely that economies of internal-control could be developed later on (cf. Porter, 1998). It is indicated in the case that the supplier could somewhat fine-tune the production output from the sawmill to fit the component manufacturing (cf. Porter, 1998). Hereby the integrated sawmill and component mill can work together to reduce costs by coordinating operations and being aware of the in-house demand. While the discussion in the theoretical framework chapter in terms of entry costs is related to overcoming economies of scale (see also Porter, 1998), the entry costs for the supplier studied is more related to the needed investments to start manufacturing components. Such investments may cause entry barrier for smaller companies (cf. Porter, 1998).

With reference to authors with another theoretical frame of reference in comparison with transaction cost theory, the overall supplier capability related to problem solving is likely quite low (Hammarkvist et al., 1982). The focus of the supplier is mainly on being able to create cost reduction, which illustrates more of a price reducing role (cf. Håkansson et al., 1976; Ford et al., 2003). The divergent upstream raw material flow makes it more difficult adapt to customer requirements. At the same time, the supplier has not handled this type of manufacturing before, which likely would make the transfer ability lower (cf. Hammakvist et al., 1982).

From a supplier perspective when taking over outsourcing, business related risks seem to result in difficulties in lowering costs, managing the need of having several customers to lower the interdependency with related investment risks, and also related to capability development, see table 5-8.

Table 5-8. Consequences linked to business related risks when of taking over outsourced manufacturing

Examples of business related risks	**Location:**		**Consequence:**		
	Initial sawmill production	Component manufacturing	Difficult to create cost advantage	Increased dependency to single source	Need to develop competence
Long customer experience/ New type of manufacturing		X	X		X
Larger investments still consume little of sawmill production output, which leads to a high investment risk	X	X	X		
Need of changing the value chain	X		X		
Divergent production flow	X		X		
Need to off-set sawmill output (cannot fully customise)	X		X	X	
Coping with limited in-house capacity	X	X	X	X	
Limited to have several large customers	X	X	X	X	
High requirements on manufacturing/ Low sustainability of components		X		X	X

When the project was not initialised the managerial decisions showed a more reactive pattern. Here, if there is no contract with a customer the case studied is unwilling to invest in component manufacturing. This is interesting because, according to the case description, several customers are willing to "test-outsource" if the supplier studied would start component manufacturing. Instead NWP considers that it would be more beneficial to work with some smaller customers or first become a qualified sub-supplier to assure fully off-setting production output.

Altogether, it seems as the supplier considering taking over outsourced manufacturing, looks at somewhat similar dimensions as the WPM firms studied. There is a main focus on costs and investments needs. A resource based perspective is linked to the fact that the supplier studied has little experience of the outsourcing considered, which puts focus on developing competencies and experience to manage the new manufacturing (cf. Klein and Hiscocks, 1994). Regardless of the cost reduction that could be created by the supplier, this was not good enough from a customer perspective; this also relates to the difficulties of the investment costs of the supplier that becomes an entry barrier (also cf. Porter, 1998).

5.4 A Combined Customer and Supplier View

As an end to the analysis, I will shortly combine the customer and supplier view of the outsourcing analysis. This section is based on the previous analysis of outsourcing from a customer and supplier perspective with a focus on the Kährs and the NWP cases.

Focus Areas for Outsourcing and Value-Adding

The focus of the customer to integrate forward and outsource upstream wood component manufacturing is in line with the supplier's willingness to integrate forward. What is considered non-core by the customer (cf. Quinn and Hilmer, 1994) is expected to be interesting new areas for the supplier by forward integration (cf. Lilliecreutz, 1996; Porter, 1998). For Kährs, a no well developed supplier market where it is difficult to find suppliers as cost efficient as the in-house production, leads to difficulty with outsourcing large scale of M/B-components. As an alternative strategy, Kährs will consider outsourcing more non-standard components (that are not necessarily suitable for the large in-house production and components manufactured at their less rational production plants). Such focus areas for outsourcing at Kährs is linked to an unwillingness to invest in their present in-house component manufacturing and improve their business cycle flexibility.

Capability from a Supplier and Customer Perspective

From the previous analysis chapters, we can see that both the customer's and the supplier's capability analysis are linked to a strong focus on costs. One explanation can of course be that Kährs's focus on costs leads to a need for NWP to also focus on this subject. Taking over outsourcing puts great demands on actually materialising expected cost advantages (cf. Davis, 1992; McIvor et al., 1997; Bengtsson, 2005; McIvor, 2005). From a capability perspective, there are several challenges that need to be considered for both the customer and the supplier. Economies of integration for the component manufacturing considered are not so easily created for the supplier studied and relates to the difficulties of the divergent production flow. For the supplier, having several large floor customers outsourcing M/B-components would require a very large initial scale production in the sawmill or require buying sawn timber externally, but both of these alternatives are more or less limited. The consequence is that a customer like Kährs is almost the upper limit that NWP could manage when having limited internal capacity in the sawmill and having less possibility to base the component production on a purchasing organisation. At the same time, as seen in the supplier case, the customer (Kährs) was not interested in buying smaller volumes and NWP cannot steer the production output from the sawmill based only on customer/component mill requirements. Accompanying that, the supplier's competence base must be developed when entering this new business area (cf. Hayes and Wheelwright, 1984; Lilliecreutz, 1996).

Taking over outsourcing seems difficult when the customer is not in an immediate investment need and a supplier needs to make investments of his own (i.e. more difficult to be cost competitive in comparison with the in-house customer production). If one does not consider the necessary investments in the production it seems that the supplier studied could offer somewhat lower costs in comparison with the customer production. But the problem here is related to the fact that the supplier must also make investments to start the component manufacturing, which adds extra costs ("there is a capital cost due to made investments"). For the supplier there are in fact relatively large investments involved in taking over outsourcing if no present manufacturing exists. Therefore, the basis of the supplier's costs seems very important, which leads to the need of keeping investment costs low. In addition, there is a

need for some kind of profit margin on the performed business (cf. Ellram and Billington, 2001). This illustrates that it is important that a value-adding strategy is driven by real possibilities to create a profitable business, and not as a way to off-set sawmill products (particularly when the cases studied have shown that it is very difficult to become as cost efficient as the customer and when, at the same time, new financial costs are added due to new investments). One finding is of course that it seems beneficial for a supplier to take advantage of a customer's reluctance to invest in a certain type of production and wish to avoid fixed costs that are too high. This seems especially important for suppliers with no present production of the item considered. This view is confirmed by analysing Elitfönster's consideration when first deciding to outsource the blank manufacturing. Here, the company wanted the supplier to make the investment and Elitfönster could at the same time avoid a costly upgrade and investment risks.

Looking at the cost analysis for the M/B-components raw material and labour costs constitute more than 70% of the costs, which means that this is the area where cost reduction for a supplier should be found (cf. Tayles and Drury, 2001). The customer's viewpoint is that one important area is reducing labour costs when the raw material costs are somewhat similar regardless of whether the supplier or Kährs is buying the raw material. The same phenomenon can be found in the Elitfönster case, which means that their supplier invested in automated production to cut labour costs (also the raw material cost could be reduced by better raw material utilisation and enabling a larger volume of sawn timber to be used for the blank manufacturing). This outsourcing analysis is in line with Brück (1995), who claims that suppliers' lower labour costs can make other advantages small in comparison. Kährs required that NWP could produce M/B-components at a cost lower than their present variable cost level. However, as seen in the two case studies, NWP and Kährs did not agree on the price levels for the outsourcing of component manufacturing and the project is put on hold. Thus, the cost reduction that was offered was not enough to make Kährs initiate this outsourcing. This confirms the argument of Abrahamsson et al (2003), which state that if there is a no well developed supplier market and only one supplier available, there could be a slight chance that an external supplier would have higher capability. Based on the above analysis two observations can be made: 1) Kährs and NWP are somewhat looking at different costs, and 2) they have different views on how cost advantages can be developed. Kährs shows an interesting way of reasoning by not wanting to make investments in non-core component manufacturing yet at the same time not allowing the supplier to add the investment costs necessary (i.e. investments necessary to start the manufacturing of M/B-components). In such circumstances it seems very difficult to agree on cost levels to create a basis for an outsourcing agreement.

Supplier Risks and Business Related Risks

While the competence base and production setup at the supplier must be developed, the components considered for outsourcing in this context are very critical if production interruptions are to be avoided. A customer like Kährs would like to avoid too high a dependency on a single supplier and would prefer to see that a potential supplier works with several other customers to avoid the dependency of volumes outsourced (cf. Lonsdale and Cox, 1997). However, as seen in the supplier analysis it is not certain that the component manufacturing considered can be expanded in volume just by adding several large customers.

Using the framework developed by Stuckey and White (1993), the supplier and customer situation seems to result in a high dependency for both parties. This is related to having few or no suppliers who can directly take over outsourcing, and that the supplier studied is limited to having several large customers, which together results in a high trading risk (Ibid.). We have seen in the earlier analysis, that the dependency risk due to having too few directly available suppliers makes the customers more reluctant to enter an outsourcing agreement. This is likely to hinder the realisation of the customer's outsourcing strategy and also the development of suppliers (cf. Lonsdale and Cox, 1997). The supplier's and the customer's dependency situation is illustrated in figure 5-15 (cf. Kährs and NWP).

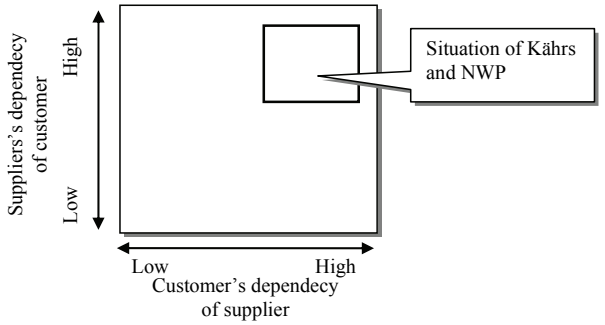


Figure 5-15. Mapping dependency considerations (Adaptation based on Lilliecreutz, 1996, p. 38)

Quite the opposite of this situation, Kährs would prefer a situation with some main suppliers to lower dependency risks (cf. Lonsdale and Cox, 1997; McIvor, 2005). The limited supplier market makes outsourcing more difficult and involves several supply risks (cf. Lonsdale and Cox, 1997; 1998). Under the circumstances where there is only a small number of contracting partners available, there would also be larger risks for supplier appropriation (Walker, 1988) and opportunism (Williamson, 1975; 1985). Here, the lock-in-effects that can enable increased possibilities for the supplier (cf. Lilliecreutz, 1996), seem to create too high dependency that make the customers studied more unwilling to fully close their own capacity to initialise outsourcing of components with low substitutability (cf. Lonsdale and Cox, 1997; Lonsdale, 1999; Cox et al., 2003). Therefore, there seems to be a need for a well developed supplier market when outsourcing and fully closing their own capacity (cf. Lonsdale and Cox, 1997; Abrahamsson et al., 2003). At the same time, from a dependency point of view the supplier considers it risky to have only one main customer where there is a chance that the customer will switch material (or supplier) and where relatively large investments are needed.

6 Findings and Propositions

From the basis of the analysis chapter and the starting point from the research questions formulated, this chapter addresses the findings of this thesis and presents propositions. The research questions formulated in chapter 1 are:

1. *What major driving forces for initialising outsourcing can be identified in the WPM sector and how do these driving forces relate to theoretical driving forces derived from studies in other contexts/ industrial settings?*

2. *What key strategic and operational factors are addressed when a customer is considering outsourcing?*

3. *What key strategic and operational factors are addressed when a supplier is considering taking over outsourcing?*

I will start by addressing the driving forces for outsourcing.

6.1 Driving Forces for Outsourcing

In my study I have seen examples of four of the five driving forces that were aggregated on the basis of the theoretical framework chapter, which indicates that the WPM firms' driving forces for outsourcing relate rather well to driving forces derived from studies in other contexts. The cost reduction focus is a main driving force for outsourcing, which is in line with McIvor (2005), who argues that organisations that outsource for the first time will do it for reducing costs. Related to this driving force there seems to be a wish to: become less integrated with non-core sawmill activities, stop the tradition of handling everything in-house, and to focus more on what is considered to be core competencies for competitiveness.

I have also identified some aspects that indicate that there is a difference in the driving forces of outsourcing for the WPM firms studied compared to studies in several other industrial sectors. The fifth theoretical driving force, utilisation of external capabilities, has not to any great extent been observed. Here, the companies studied do not outsource for accessing outside sources' competence or technology advantages that are difficult to attain in-house. In comparison with suppliers from the primary wood industry, the WPM firms studied often have several decades of component manufacturing experience. In other industrial sectors, utilisation of external capabilities is stated to be a main argument for outsourcing, for example: (1) manufacturing companies in the metal working and machinery sector in the USA (Harrison and Kelly, 1993), (2) pharmaceutical sector (Quinn, 2000); (3) hardware- and software-systems (Saunders et al. 1997; Lonsdale and Cox, 2000) or (4) automotive context (Fine and Whitney, 1999). Considering previous studies of IT-outsourcing, external sources' competence/technology advantages are also very apparent when discussing arguments for outsourcing (see e.g. Saunders et al., 1997; Willcocks and Lacity, 1998; Augustson, 1998; Quinn, 1999; 2000; Kern et al., 2002; McIvor, 2005). Similarly, in broad cross-industry contexts, utilisation of external capabilities, is one of the main arguments for firms initialising outsourcing (see Rothery and Robertson, 1995; Deavers, 1997; Linder 2004). Even for more support services this is a central element (see Benson and Ieronimo, 1996). However, for the firms studied this has not been found as a main driving force in their outsourcing initiative. Instead, the cases studied seem to value cost reduction potential and avoiding investments more (cf. Andersson et al., 2007). Based on these findings, I suggest that:

- **P1a: When the customer has only limited outsourcing experience a main driving force for initialising outsourcing will be reduction of costs.**

- **P1b: A lack of a developed sector to manage outsourced component manufacturing in combination with a long manufacturing experience at the customer, result in outsourcing strategies that have little to do with accessing external sources' capabilities that would be difficult to develop in-house.**

6.2 Key Factors Addressed when Considering Outsourcing

Resource-based theory can be linked to the studied companies' focus on what is core and non-core based on mostly competitive driven aspects (cf. Barney, 1991; Venkatesan, 1992; Quinn and Hilmer, 1994). Transaction cost theory can mainly be linked to supplier opportunism risks (cf. Williamson, 1975; 1990; Rindfleisch and Heide, 1997) and appropriation risk (cf. Walker, 1988). The application of transaction cost theory by considering the cost effects of both transaction costs and production costs are not noted to any large extent in the cases when they are considering outsourcing. Potentially, the margin that is argued by the cases studied to be needed, implicitly indicates the protection from eventual emerging transaction costs when outsourcing. Nevertheless, the component cost analysis is a main focus area when the companies studied consider whether to outsource or keep capacity in-house, which is related to the capability of the external supplier (also cf. McIvor, 2005). Here, the "gut feeling" on the customer side seems important when considering outsourcing. This observation exemplifies that transaction cost theory is difficult to operationalise and apply in practice, which several earlier studies have also noted (e.g. Walker and Weber, 1984; Probert, 1996). Instead, transaction cost theory remains as a main theoretical area to explain and understand why companies choose to handle some activities within the borders of the company and some under the governance of external vendors (cf. McIvor, 2005; Andersson et al., 2007).

This thesis illustrates that all industrial contexts/settings do not have developed supplier markets, something often assumed in literature. Here, components that create little differentiation and market advantage can still be very risky to outsource due to the high dependency of supplies and the fact that there is not any given outsourcing supplier partners (the components are often the first input to the plant and decisive for continuing the production). A non-developed market is linked to the fact that today there are not necessarily any or only a few companies that can directly take on a supplier role in an outsourcing agreement of component manufacturing (e.g. enough size, developed scale, financial capability, competencies and experience). We have also seen that partnering with a large supplier with sufficient scale and financial ability is not a guarantee that the supplier will have the necessary competencies to handle the manufacturing. External sources are not necessarily more capable and just the task of finding potential suppliers can be very difficult. Here, there is a risk that the supplier does not perform as expected (e.g. delivering low quality or supply delays). At the same time the customers studied have long experience of managing this type of component manufacturing.

In summary, key strategic and operational factors that are addressed when a customer is considering outsourcing in a WPM context are related to costs and also linked to the capability of suppliers, see also table 6-1.

Table 6-1. Key factors addressed on both a strategic and operational level from a customer perspective in a WPM context

Analysis area	**Strategic level**	**Operational level**
Focus areas for outsourcing – Component importance	Competitive driven aspects to decide what is core and non core.	Components can be vulnerable for supplier failure (e.g. located upstream in the value chain).
Capability benchmarking	Cost calculation in focus and the supplier market development.	Supplier performance/ experience.
Supplier related risks	Dependency on one/few suppliers and appropriation risk.	Component substitutability.

In literature, there is often a heavy focus on the strategic level of outsourcing where the attention is given to a core competence approach to decide what should be outsourced (cf. McIvor, 2005). Here, activities that create a basis for competitiveness must be kept in-house, while other non-core activities are potential for outsourcing (see e.g. Welch and Nayak, 1992; Venkatesan, 1992; Quinn and Hilmer, 1994; McIvor et al., 1997; McIvor, 2000a; Insinga and Werle, 2000). However, several studies have witnessed the risks of only focusing on a core competence approach when making the outsourcing decision and not adequately distinguishing between core and other non-core activities (see e.g. Lonsdale and Cox, 1997; McIvor, 2000b; Lonsdale's, 2001; Abrahamsson et al., 2003; McIvor, 2005). This can particularly be a hazard when the view of core competencies are often seen by companies as quite static and involve existing skills (Lonsdale and Cox, 1998).

In addition to this, my thesis illustrates the importance of also evaluating the supply and component vulnerability in outsourcing strategies. Here, the availability of the components considered for outsourcing is critical if production interruptions are to be avoided. They are often the first input to the plants and decisive for continuing the manufacturing. Lacking reliability in supplies, wrong tolerances or lack of quality could cause production interruptions. A conclusion is that components can be very strategically important even though they are not necessarily considered as a core competence to manufacture, nor create little market differentiation and customer value. Therefore there seems to be a mismatch risk on what should be considered as strategic important if only taking a core competence approach based on competitive aspects. Such mismatch risks seem especially present if a company retains those things they do best (also cf. Lonsdale and Cox, 1997; McIvor, 2000b) when it is not certain that these things will match those critical to the manufacturing. An important question in outsourcing is thus how to consider the strategic level of outsourcing without neglecting the operational level, which can be critical for the outcome of the outsourcing strategy. I suggest that an operational level should also be added when considering outsourcing. What is needed are models that support an outsourcing decision from both a strategic and an operational level (cf. Insinga and Werle, 2000), where the operational level interacts with the strategic level. If companies neglect the operational level when considering outsourcing there can be a risk that the expected advantages on a strategic level will be evened out (e.g. need to have larger safety stocks which in turn will tie up more capital or even result production interruptions that lower the total profit). Based on the above discussion the following can be suggested:

- **P2a: A heavy resource-based focus in terms of a core competence approach in the formulation of outsourcing strategies risk forgetting that components can still be vulnerable to supplier failure.**

The above proposition (P2a) seems especially critical with today's often sensitive production setup where there is a focus on lean operations, which often use concepts such as just-in-time delivery.

Under the circumstances of not having any given outsourcing supplier partner with few, if any, directly available suppliers, it seems uncertain that traditional outsourcing models (in terms of make vs. buy where alternative outsourcing strategies have mainly been linked to different ownership options) can just be directly applied (e.g. Quinn and Hilmer, 1994; McIvor, 2000a; Insinga and Werle, 2000). In the context studied, a managerial decision when considering outsourcing is to keep parallel production in-house; thereby applying a mixed strategy approach. Thus, instead of just closing the in-house production (which is common practice when conducting outsourcing) (e.g. cf. Rothery and Robertson, 1995; Greaver, 1999), the firms studied often intend to keep their own production capacity in-house. This approach illustrates that the question of whether to outsource or not should not necessarily be considered as just an "in or out" decision (cf. Wasner, 1999) and that successfully managing outsourcing could be considered as a competence (cf. Fine and Whitney, 1999; McIvor, 2005). Here, more models need to be developed to support the management when it is suitable to apply mixed strategies (Harland et al., 2005).

While complete outsourcing and capacity closure make subsequent in-sourcing problematic (Lonsdale, 1999; Harland et al., 2005), parallel production helps the company avoid divesting all capability to perform an activity. Thereby, a mixed strategy helps to improve the reversibility of outsourcing, which Lonsdale (1999) states is a main issue to address in outsourcing. By keeping in-house capacity supplier's performance can at all times be benchmarked and competence can be ensured in-house. My study indicates that a mixed strategy is mainly driven by keeping capability in-house and reducing supplier related risks, see table 6-2.

Table 6-2. Identified circumstances when outsourcing in combination with parallel in-house production can be suitable

Analysis areas	**When**	**What does it imply**	**Why**
Focus areas for outsourcing – Component importance	Outsourcing components decisive for continuing the production.	Components are vulnerable to supplier failure.	Manage supplier dependency.
Capability benchmarking	Financial focus and need of business cycle flexibility.	Balance production and avoid too high fixed costs during market/ seasonal downturns.	Manage capacity constraints and let the supplier take the investment risk.
Supplier related risks	Non-developed supplier markets.	Few capable suppliers available and little confidence in supplier competencies.	Manage supplier dependency and appropriation risks.

We can see from the above table 6-2, that a mixed strategy seems to be a suitable strategy when a) the components intended for outsourcing are vulnerable to supplier failure and when suppliers have relatively low previous experience of manufacturing specific/similar components, b) there is a supply market characterised by only a few alternative suppliers leading to a risk of supplier opportunism and the need of reliability becomes more important (i.e. need to keep knowledge of the supplier market), c) there are situations of financial focus and needs for business cycle flexibility. Here, parallel production seems to be able to at least partly cope with many of the often argued supplier related risks of outsourcing that is linked to dependency considerations. This seems relevant particularly in situations where literature has argued that increasing interdependency on one/few suppliers leads to increased risks for supplier opportunism and appropriation (cf. Williamson, 1979; Walker, 1988) and even shifts the power in favour of the supplier (cf. Stuckey and White, 1993; Lonsdale and Cox, 1997; Lonsdale, 2001; Cox et al., 2003). Parallel production will here increase contracting flexibility and improve supplier market transparency. Similarly, dependency on a supplier when outsourcing means increased vulnerability in production when extending the supply chain. Here, supply unreliability or quality problems at one stage can cause multiple problems for a company later in the supply chain (Beattie, 2005), where parallel production will work as a buffer to cope with uncertainty of supplies and their own deficiencies of planning. Altogether, this leads me to suggest that:

- **P2b: A company needs safeguards when conducting outsourcing and in a situation of a non-developed supplier market, parallel production becomes an alternative.**

I see this as an interesting finding, where literature also expresses that more research in the area of combing outsourcing with parallel in-house production is needed (see McKinsey Quarterly Journal, 2001; Harland et al., 2005). The above results can contribute both to the theoretical development in the field of outsourcing (cf. Harland et al., 2005) and provide support to companies in their outsourcing initiatives (see further chapter 7).

Despite the several advantages of parallel production identified, it of-course also includes potential problems, which mainly seem related to:

Not being able to fully rationalise production when outsourcing. Naturally, outsourcing in combination with parallel production will mean that overhead and the manufacturing plant cannot be eased from the balance-sheet to improve financial performance to the same extent as when fully outsourcing and closing in-house capacity (also cf. Vest-Wood). Similarly, partial outsourcing will not offer the same opportunity to downsize the organization in terms of both production workers and management. With the notice that too many outsourcing decisions at firms are driven by the attraction to lower costs and enhance a firm's financial performance (see e.g. Gilley and Rasheed, 2000), it may be difficult for the management to motivate for their owners the reason to keep some production in-house. Linked to this is also the fact that parallel production may be more difficult to manage for complex systems or functions, for example outsourcing of R&D and innovation as addresses by Quinn (1999) or complex IT-system outsourcing (e.g. Kern et al., 2002). Here, combining outsourcing with parallel production seems to require well defined interfaces.

Risk of creating diseconomies of scale. Related to not fully rationalising in-house production when outsourcing and looking at the decision from an economies of scale perspective (e.g. Bain, 1965; Scherer, 1975), partial outsourcing would mean a risk of creation of diseconomies of scale. This is linked to decreasing in-house production but not fully closing the capacity

(i.e. dividing the volume between in-house and supplier production). By doing this it would be more difficult to create scale advantages at the supplier, who then need to lean more towards pooling effects from several customers (cf. Williamson, 1979). In line with applying parallel production where some volumes have been outsourced, this will then lead to higher unit costs if investing in the in-house production (cf. Chandler and Hikino, 1990). Related to this, we have seen examples in the case studies where the in-house production seems attractive to retain as long as no larger investments are needed (cf. Kährs).

Supplier hesitation to invest. When keeping in-house production the switching costs are decreased and lock-in risks can be better managed, which of-course is a positive outcome for the outsourcing company. Also, the benchmarking control is much more transparent when applying parallel outsourcing (cf. Vest-Wood and Elitfönster). At the same time, we have seen from the case studies that a customer keeping their own in-house production leads to a supplier concern that the customer is too short sighted in their outsourcing. There seem to be indications that such factors can lead to a hesitation for the supplier to fully invest in building up a production (cf. NWP). This could then potentially complicate the outsourcing for the customer.

6.3 Outsourcing from a Supplier Side

In line with customers' cost focus, a main factor addressed by the supplier studied is creating enough cost reduction to be able to take over outsourcing (cf. Auguste et al., 2002). In this industrial setup, expected cost advantages from the supplier perspective are mainly economies of combined operations and changing the value chain by: (1) avoiding double processes, (2) eliminating process steps, (3) being better at using the raw material, and (4) keeping investment costs at a low level. A critical issue is integrated on-site component manufacturing. If this cannot be realised there is a risk of ending up in the same situation as the customer but with larger costs due to investments made and smaller scale production. This finding has similarities with a study in the related pulp and paper industry context where a primary benefit of forward integration was to lower costs by combining operations (see Rundh, 1992). We can also see from the analysis and case description that specialisation and forward integration by taking over outsourcing is difficult due to the initial divergent production flow. This makes it more complicated than just selecting an interesting outsourcing project and leads to the other main factor addressed, which is the need of matching the divergent production output from the sawmill production with the specific component need of sawn timber, see table 6-3.

Table 6-3. Key factors addressed on both a strategic and operational level from a supplier perspective

Analysis area	**Strategic level**	**Operational level**
Focus areas for value adding	n/a	Off-set all of sawmill's product output and match with the specific component production need of sawn timber.
Capability benchmarking	Cost is in focus of the overall analysis.	Component production setup and changing sawmill value chain.
Business related risks	Dependency to one larger customer and large investments consume small total volumes of sawmill output.	Limited capacity in the sawmill and steering sawmill production output.

As seen from the above table 6-3, taking over outsourced manufacturing cannot just necessarily be considered as a way to off-set a sawmill's product output. As mentioned, this finding is related to a divergent production flow where there has traditionally been a focus on maximisation of yield and economies of scale in the initial sawmill production. Combining such logic with a subsequent component strategy seems not always easy to implement when: 1) a component mill in the context studied is accompanied by relatively large investments and the component manufacturing considered still consume small volumes of total production output from the sawmill and 2) specialising on just one certain component manufacturing; this may negatively affect the overall production output and revenue base. Thus, the strategy to produce the product with highest revenue and profit potential might not always be optimal or even possible from an overall strategic perspective for a sawmill. One outcome found is consequently that a value-adding strategy should not be assumed as a way for sawmill companies to manage a divergent production flow. Therefore, it is critical that the manufacturing taken over is profitable in itself and that the costs that arise are covered by the revenues of the components delivered.

Another contextual finding is that economies of scale in comparison with the customer's large scale component manufacturing can be difficult to reach. Economies of scale in component manufacturing are of course not limited but are challenging to reach due to the initial divergent production flow and component specificity. In order to reach economies of scale in the component manufacturing either a very large initial sawmill production is required or working with smaller customers is necessary. Another alternative can be to find components where more of the production output from the sawmill can be used for component production or base the component manufacturing on purchasing large volumes of the specific timber. However, such alternatives can be limited in the context studied, particularly for low margin components (cf. Kährs and NWP). The difficulty in creating economies of scale is an interesting finding because previous studies in other contexts have argued that large scale to lower costs especially should provide a strong motivation for initialising outsourcing (see e.g. Brück, 1995; Brandes et al., 1997; Bragg, 1998; Greaver, 1999; Cachon and Harker, 2002; Harland et al., 2005).

For the supplier case studied the cost reduction offered was not beneficial enough and for now the intended outsourcing project is put on hold. The question is when can enough cost advantages be created in the context studied? Some main difficulties are: the investment costs needed to start the manufacturing from scratch, and the initial divergent production flow of sawn timber that together hinder the possibilities to have several customers for the component manufacturing considered. Thus, even though some cost reduction can be created, investments costs make the offer to the customer less competitive and production cannot just expand component manufacturing volume by adding several large customers. Therefore, we can see that it is not certain that economies of scale in all contexts and for all components should be assumed to be enough to create necessary cost advantages for a supplier. A large customer with already developed scale advantages can make both economies of scale and combined operations of the supplier insufficient, in particular when investments are also needed for the supplier, see figure 6-1.

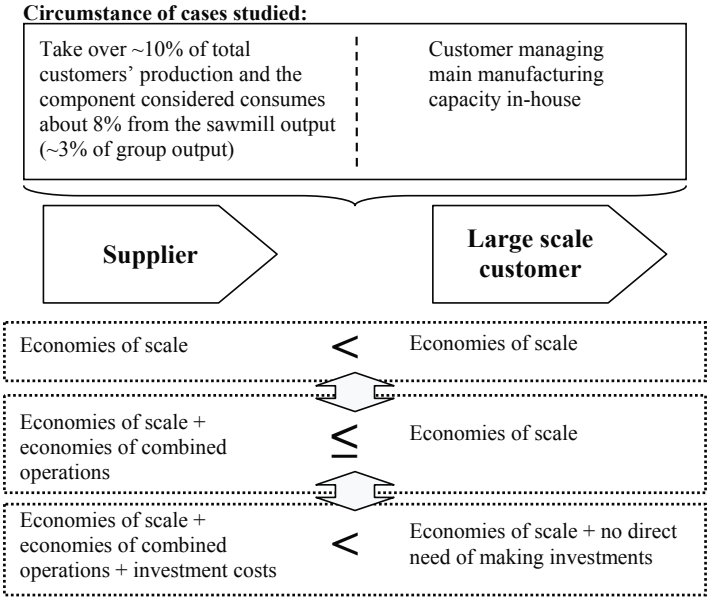


Figure 6-1. Difficulties for a supplier to take over outsourced activities in the situation with a large customer (Kährs and NWP example)

As seen in figure 6-1, the difficulty for a supplier to create enough cost efficiency applies especially under the condition when there is a larger customer and a component where it is difficult to use a large amount of product output from the sawmill (which results in limited internal capacity). In the industrial setting of the WPM sector it seems often necessary for a supplier to build a new plant and start from scratch. Here, customers have a lot of in-house manufacturing experience' and the customers view that external sources are not necessarily more capable and they have low confidence in the competence base of the sawn timber suppliers. In combination with high vulnerability of components considered for outsourcing, the outcome for the customers studied is often that they keep their own production capacity instead of closing the in-house production which is a common practice when conducting outsourcing (cf. Rothery and Robertson, 1995; Greaver, 1999; McIvor, 2005). Together with a need of investment to build a component mill, this puts the supplier at a troublesome starting point when trying to create enough cost reduction to take over outsourcing from the customer, see figure 6-2.

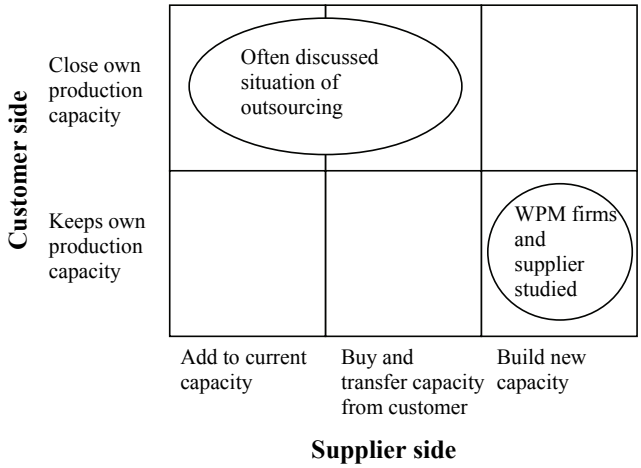


Figure 6-2. Positioning the outsourcing situation in the WPM sector

For a sawmill supplier with no present similar production there is little possibility of just adding a customer's production to the current one. One option is of course to buy the customer's present production plant, but this will make it more difficult to take advantage of possible economies of integration by on-site component manufacturing (cf. Rundh, 1992; Porter, 1998). In conclusion, the realisation of outsourcing strategies seems more likely when the customer is in a direct investment need, which seems especially important to consider when the wood components for outsourcing are often low-margin items. Altogether, this leads me to suggest the following:

- **P3a: Under the circumstances of limited economies of scale, need of new investments and customers keeping their own production capacity, a supplier will have little potential of offering comparable cost advantages.**

- **P3b: Whether or not the customer is in an investment need signifies the importance of timing for a supplier intending to take over outsourcing.**

6.4 Linking back to the Purpose of the Thesis

As a final step in this chapter, I will now take the opportunity to look back on how my findings have contributed to answer the purpose of this thesis, which is to:

…describe and analyse outsourcing from both a customer and supplier perspective in the intersection of two different business logics, in a sector with a relatively low tradition of outsourcing and where there are no given outsourcing supplier partners.

My findings indicate that the development of an outsourcing partnership is more challenging during situations of an industrial setting of two business logics intersecting. The main driving force for outsourcing from a customer perspective is cost reduction but it is not certain that expectations can be fully realised by the supplier side. For a supplier in the primary wood industry, specialisation by forward integration and taking over outsourcing is complicated by the initial divergent production flow that makes it more difficult to just choose a potential valuable customer and only focus on the most profitable product output. In this thesis we have seen the difficulty in developing economies of scale in the component production at the supplier. At the same time, the expectation from a customer side is that economies of scale should be possible to be developed or at least have a few more customers to avoid too high a dependency situation. From a customer point of view there is somewhat of an awareness of the divergent production at sawmills, but with the expectation that a component outsourcing should then have the potential to result in economies of scope at the supplier by producing different types of components from the same raw material, which also can be limited.

Linked to the two different business logics is the tendency that the customer and supplier are looking at different costs in the outsourcing analysis, even though both parties put the main focus on costs. While the supplier is more focused on economies of combined operations with the needed investment costs, customers consider more the potential of large scale component manufacturing and factor costs advantages. This seems to especially apply during situations of well functioning in-house productions at the customer with little need for direct new investments and where a supplier is needed to invest to build up production. An outcome from the customer side is the application of parallel production in-house, however, this could lead to a long-term risk of building diseconomies of scale in the supply chain. Altogether, this would point to a conclusion that it will be easier to outsource and fully close in-house capacity during the interface of developed supplier markets and similar business logics, where homogenous production systems in the supply chain would enable better potential for developing economies scale at the supplier. This leads to the next area of discussion, which is outsourcing during situations where there are no given outsourcing supplier partners.

From both a customer and a supplier perspective my thesis illustrates that it should not be assumed that traditional outsourcing models with a "yes or no" outcome can be directly applicable in all contexts. From a customer perspective, this especially applies to outsourcing models that assume there is a developed market with at least a few suppliers directly available with developed cost advantages (e.g. economies of scale at the supplier is assumed to be given). Alternative ownership configurations at the supplier side, such as joint ventures (e.g. Quinn and Hilmer, 1994), may then not be sufficient enough. My findings do not necessarily relate to a limited market in terms of having just a few dominating suppliers in the market (something that exists in several other industries), but to a difficulty with finding suppliers with developed production systems and experience of the components considered for outsourcing (e.g. enough scale/size or scope, financial capability, and competencies). During the analysis of whether or not to outsource, it is then important to take into account the operational aspects and not base the outsourcing model on a heavy resource-based approach with the predominate focus only on the strategic level. Alternative outsourcing strategies can, for example, be 1) a mixed strategy approach by combining outsourcing with parallel in-house production, 2) taking more proactive responsibility of developing suppliers to sufficient performance levels, or 3) a combination of both alternatives. In summary, my thesis indicates that general outsourcing models should not be assumed to be directly applicable in all contexts, especially during situations where there are two different business logics intersecting.

7 General Conclusions

In this chapter the theoretical and practical contributions are addressed. This thesis has offered the opportunity to study outsourcing in a different context, compared to previously focused industries (see e.g. Lonsdale and Cox, 1998; McIvor, 2005). At the same time both the customer and supplier side have been captured. Some main general conclusions linking both to the field of outsourcing and wood related research can be given.

This thesis contributes to the outsourcing literature field with five different main aspects:

- *Firstly, by providing an understanding of driving forces for outsourcing in this industrial setting/context.*

Harland et al. (2005) express that there is a direct need for more research about the motives of outsourcing. This is a subject that I address in a different context. My study shows that the companies with little tradition and experience of outsourcing initially embrace the potential of cost reduction when formulating their outsourcing initiatives (cf. McIvor, 2005). Related to this driving force is also the need for reallocating costs from non-core areas to more customer close and avoiding investments. In addition to that, I have also found results that indicate that there (in comparison to studies in other industrial contexts) seems to be a difference in the driving forces of outsourcing for the WPM firms studied. Here, access to external sources' competencies and technologies is not necessary a motive for outsourcing. Altogether, my study with accompanied case descriptions will advance the understanding of driving forces for outsourcing initiatives in a different industrial setting.

- *Secondly, by showing through the study that not all contexts/ industrial settings have developed supplier markets for directly managing outsourcing.*

McIvor (2000a) argues that the importance of considering the supply base in outsourcing decisions has not been given enough focus in outsourcing literature. This is a main issue in this thesis. Some studies, such as Lonsdale and Cox (1997), Lonsdale (1999), McIvor (2000a) and Abrahamsson et al. (2003), address the risk of outsourcing to a limited supplier market. However, most previous studies seem to assume that there are at least a few suppliers that can directly take on a supplier role in an outsourcing agreement (e.g. Venkatesan, 1992; Brück, 1995; Cánez et al., 2000). In the context studied there are not necessarily any suppliers from the primary wood industry directly available and the thesis illustrates that firms are considering outsourcing to a non-developed supplier market. The supplier case study further strengthens the customers' view. Altogether, my study can contribute to an improved understanding of supplier related risks when outsourcing (e.g. cf. Lonsdale, 1999, p. 176; 181).

- *Thirdly, by illustrating that more focus needs to be put on the operational side when considering outsourcing.*

More models need to be developed in order to give management support for how in fact outsourcing decisions should be managed (e.g. Lonsdale, 1999; Insinga and Werle, 2000; Harland et al, 2005; McIvor, 2005). For example, Lonsdale (1999) argues that poor results of outsourcing is often due to deficiencies of management decision making and Lonsdale and Cox (2000) argue that managers also need more support when considering outsourcing to understand the accompanied risks. Similarly, many companies have little or no basis for the outsourcing decision analysis (McIvor, 2000a). Previous research have addressed the risks of outsourcing items considered problematic to handle and/or not accurately revise how outsourcing objects may contribute to sustainable competitiveness (see e.g. Lonsdale and Cox, 1997; Lonsdale, 1999, McIvor, 2000b). These examples are related to a risk of outsourcing activities that in fact later can become a major determinant of competitive advantage. This can be considered as making risk assessments of items considered for outsourcing on a more strategic level, with the starting point from a resource-based perspective (cf. McIvor, 2005). In addition to that, my study shows that components that create little differentiation can still be very risky to outsource due to the need of component availability and the fact that there can be a limited supplier market. The results of this thesis show an overall need for more focus on the operational level when considering outsourcing. This is especially when this thesis has illustrated that what can be strategically important and vulnerable to supplier failure is not necessarily considered as a core competence to manufacture. My study will contribute to the literature field of outsourcing by illustrating that a heavy core competence approach in the formulation of outsourcing strategies risk forgetting that components can still be very vulnerable to supplier failure. Not considering the operational level there is a risk that companies neglect issues critical for the outcome of the outsourcing strategy.

- *Fourthly, by showing that the outsourcing analysis is too complex to just be considered as either "in-or-out".*

Already in 1955, Higgins wrote that it is not always a clear cut question of whether to make-or-buy. More recently studies in the field of outsourcing have further put forward the problem of considering the outsourcing decision analysis as only a "make or buy" decision (see e.g. Londale and Cox, 1998; Wasner, 1999; Harland et al., 2005). However, in previous studies, empirical examples of this proposition are not given to any great extent. My study supports the indications in these studies and my case descriptions provide examples. This result should develop the view of outsourcing as becoming an important tool, where both the in-house production and external sources can be considered as a supply base that can be benchmarked at all times. Therefore, one contribution of this thesis is to illustrate that the decision of whether or not to outsource is more complex then a 0/1-decision and there can be a span between the buying and making alternative. Here, it seems not certain that traditional outsourcing models in all contexts can be directly applied (e.g. Venkatesan, 1992; Quinn and Hilmer, 1994; McIvor, 2000a; Insinga and Werle, 2000). By developing the understanding of mixed strategies, the contribution to the field of outsourcing should be even further. For this area, my study contributes directly to the stated need in the recently published article by Harland et al. (2005). The authors emphasise that more research on mixed strategies is needed:

> *"Outsourcing a complete activity remove all internal competences, skills and learning relating to performing that activity, thereby making subsequent in-sourcing problematic. Naturally, it is possible to retain a part of the activities in-house. This might be done in order to retain skills and competencies, to provide knowledge of that market and to reduce potential threats from outsourcee through the presence of internal competition. Once again, there is lack of guidance of how organisations should decide how much to outsource…" // "…There is little research exploring the circumstances in which mixed models might be appropriate. The perceived lack of managerial guidance in existing literature arose constantly." (Harland et al., 2005, p. 843-845)*

Similarly, there is a need to investigate how the buying competence can be kept when outsourcing (cf. McKinsey Quarterly Journal, 2001). Along similar arguments Lonsdale (1999) considers the reversibility issue a critical one to address when formulating outsourcing strategies, which a mixed strategy considers. Altogether, in the area of mixed strategies, my study contributes to the field of outsourcing in three main ways: (1) providing case examples of firms applying a mixed strategy thinking, (2) identifying some advantages of mixed strategies, and (3) discussing under what circumstances a mixed strategy can be a suitable (cf. Harland et al., 2005).

- *Finally, by contributing to the field of outsourcing by illustrating that it can, for certain components, be challenging to develop economies of scale at the supplier in the context studied.*

My analysis points to an understanding that comparative cost advantages are essential from both the customer and supplier view point. However, it is not certain that economies of scale should directly provide a strong motivation for all components in all contexts. Theoretically, the production costs should be lower when buying from external suppliers in comparison with production in-house (Williamson, 1979). This is because suppliers have the possibility for specialisation, with the resulting advantages of economies of scale and the collective pooling effects from several customers (Williamson, 1979; 1985). For such specialised company it is easier to distribute the total costs over more number of units (Scherer, 1975; Chandler and Hikino, 1990). Thus, if a company neglects transaction costs, buying should theoretically always offer lower costs. However, one context specific finding is that from a supplier perspective it is not certain that sufficient economies of scale can easily be developed in the component production. For the supplier studied, this is mainly due to: (1) customers with large scale in their own production, (2) limitations by internal capacity output from present sawn timber manufacturing (limits the possibility to have several customers), (3) difficulty to scale up initial sawmill production or base the manufacturing on a purchasing organisation, (4) component specificity and an initial divergent production flow which means that only a certain amount of sawmill output can be used. Together with investment risks this will make it more difficult for even a relatively large sawmill company to expand the production to spread the cost of the component factory on more produced units. In this sense the development of economies of scale is of course not limited, but can be challenging to reach. This is a contrast to many previous outsourcing studies that often almost always take the suppliers' economies of scale as a given (see e.g. Brück, 1995; Alexander and Young, 1996; Bragg, 1998; Greaver, 1999; Cachon and Harker, 2002).

This thesis contributes to the field of wood related research with two different main aspects:

- *Firstly, by providing case descriptions to show the overall business development in the WPM sector.*

With the exception of some market studies (e.g. Brege et al., 2004a; 2004b), there have been few if any studies that in fact give an in-depth description of the late strategy development of the Scandinavian WPM sector (also cf. Nord, 2005). My case descriptions have a focus on outsourcing but also include the overall business strategy. This will increase the understanding of the movement in the sector. Together with recent studies of the primary wood supply (e.g. Nord, 2005) and WPM's customers (Fransson and Rehme, 2005; Nordigården and Rehme, 2006a), an improved understanding of the whole supply chain can be given. I think it can be argued that the importance of this study is confirmed by the positive response from the Journal of Forest Product Business Research. They found the research done on driving forces in the WPM sector interesting and after further development the journal accepted the article for publication (see Andersson et al., 2007).

- *Secondly, by providing an understanding of value-adding in terms of taking over outsourcing component manufacturing in a WPM context.*

Firstly, my study can be interesting because several previous studies have been more survey based (see e.g. Roos et al., 2000; 2001; Hansen et al., 2002). Secondly, there is a stated need for more research of value-adding strategy in the sawmill industry, for example:

a) In his Licentiate thesis, Nord (2005) asks for more research about sawmill companies' possibilities to improve profitability by applying value-adding strategies.

b) Roos et al. (2000; 2001) say that more research is needed about the development of value-adding strategies and how they can help sawmills improve their revenue base.

Previous studies have indicated that sawmills' value-adding strategies nowadays include more of quite undifferentiated activities such as planing, additional drying or length trimming to order (cf. Roos et al 2002; Staland, Navrén and Nylinder, 2002). Here, this thesis provides an understanding of: (1) value-adding strategies in terms of taking over outsourcing, (2) the scope of value-adding strategies in a WPM customer context and (3) outsourcing strategies considered from both a customer and supplier perspective. In previous studies of sawmills, little attention seems to be given to the considerations of materialising a value-adding strategy. The key factors addressed when considering taking over outsourcing that have been identified in this thesis may contribute to improving the understanding of why there still are rather small total volumes of sawmill production output being further processed other than just planing and extra drying and why most sawmills organise value-adding strategies by more sawmill related operations (see e.g. Roos et al., 2000; Staland, Navrén and Nylinder, 2002).

7.1 Managerial Implications

Based on the findings of this thesis some recommendations can be given to companies in both the primary wood industry and WPM sector.

Recommendations to Suppliers from the Primary Wood Industry

In line with Auguste et al (2002) it is important to capture the values that customers have failed to do. This can for example mean to offer capacity for non-standard components and help a company to balance in-house production. It can also mean to take investments risk. However, a main element for the companies conducting outsourcing is to lower costs. From a supplier perspective this study identifies some possibilities for creating cost reductions:

- *Cost advantages created by significant process improvements:* e.g. eliminating and avoiding double production steps. Integration with sawmill and having enough large in-house raw material base to assure that synergies can be realised are two critical aspects. Otherwise, there is a risk to end up in the somewhat same state as customer but with a smaller scale production and larger fixed costs due to investments made. Even for a relative large sawmill it is not certain that a component manufacturing just can be expanded in volume by adding several large customers, which is linked to the component specificity. By this it cannot just be assumed to gain any larger cost advantages by spreading the cost of the factory on a larger component production.

- *Keeping investments needed at low level*. In this thesis it has been an example that working together with another external supplier can help to lower investments needed in equipment.

- *When the customer is in a need of making investments, it seem to make it easier for the supplier to offer enough cost advantages to make outsourcing interesting from a customer view point.* As seen in the supplier case study, and in the cases studied (cf. Elitfönster, Svenska Fönster, Dooria Kungsäter and Kährs), the need of in-house investments will improve a supplier's possibility to take over outsourcing.

The present production setup must be able to change in accordance with new requirements (e.g. to realise the expected cost advantages). When a value-adding strategy is accompanied by quite large investments that still can consume small volume of sawmill production output, taking over outsourced manufacturing cannot just be assumed as a way to find off-set for sawmill output. Here, it must be assured that the intended component manufacturing fits the present manufacturing of sawn timber. Off-set must still be found for other output as well as for remaining consequence products, i.e. the supplier need to avoid that the outsourced manufacturing taken over results in getting non-standard dimensions on other output that may result in volume and profit loss.

In addition to offer lower costs, focus need also to be put on high quality, supply reliability and communicating when problem occurs in the production. Components considered for outsourcing are very strategic for WPM firms to avoid production interruptions. Moving towards more finished items put high requirements on items delivered. A supplier that intends to take over outsourcing will benefit in the supplier selection audit by thoroughly describe in written form how they intend to handle the manufacturing.

As discussed the WPM companies studied would like to avoid too high dependency to a single supplier. From a customer perspective it would be beneficial for a potential supplier to

find several customers. Thereby, it would be important for the supplier to evaluate this concern and address that the specificity of the component (e.g. need of raw material) match the sawmill output (e.g. enough volumes of sawn timber to start component manufacturing). The supplier cannot become a bottleneck in terms of limiting the capacity that can be delivered to a customer. Here, it is important to be able to increase capacity faster than the outsourcing company does.

Finally, there is somewhat a divergent view of how to best become the supplier to the WPM sector. The study of the window manufacturer Elitfönster shows that they would prefer an intermediary to avoid the volume and operational thinking in the primary wood industry. However, the study of the floor manufacturer Kährs indicates that such additional margins would not be possible for the M/B-component (e.g. the item is a low margin product and cannot be transported any longer distances). Here, an additional middle man will mean negative impact of the profitability of the item outsourced (e.g. double profit margins and more transportation and transit).

Recommendations to WPM Firms

For the firms studied an outsourcing strategy for components can be defined as going from buying mainly sawn timber as a raw material to buying components. The central elements in the outsourcing strategy for the WPM firms studied component manufacturing can be summarised in following main elements: *(1)* components that have the potential for outsourcing are those that create little differentiation and add little value for customers, *(2)* components can be decomposed from the rest of the system that form the final product and seem to have some well-defined interfaces *(3)* outsourcing means decreasing the supplier base to some main suppliers, *(4)* components considered for outsourcing are not viewed as problematic to handle in-house.

The recommendation for WPM firms is to thoroughly consider the vulnerability of the component considered for outsourcing in combination of supplier market evaluation (e.g. number of suppliers and their development). This is to avoid production interruptions or need of increased stocks that cause more capital tied up. Risk of high dependency and uncertainty of suppliers' capability and little experience of outsourcing will complicate the decision. As a start a recommendation is to consider the potential of combining outsourcing with parallel production. This enables to keep both manufacturing and buying competencies. By this the WPM firm can see how the outsourcing develops and at all time benchmark the suppliers' capability of managing the production.

7.2 Further Research

Based on the findings of this thesis several interesting areas for future research can be found:

Further investigate the supplier side in outsourcing, which this thesis has touched upon. For this area it would be interesting to study industrial setting/context where rather large component suppliers have been developed, e.g. automotive or IT-context. Another option would be to extend the approach of this thesis to study more suppliers in Sweden but also see how suppliers from the primary wood industry in other countries have developed (e.g. Canada, Germany or Finland).

Study how application of new technology setups can help sawmill companies to better enable value-adding strategies and integrate forward towards large scale component manufacturing. We have seen in this thesis that initialisation of large scale value-adding strategies can be problematic due to the initial divergent production flow of sawn timber output and component specificity. From the Elitfönster case we can see that the application of a finger-jointed technique enabled a larger span of sawn timber to be used for the component manufacturing and lowered costs. Here, the supplier together with support from the customer could develop the component manufacturing taken over by introducing finger-jointed blanks to the window market. This would be interesting to further study and by this investigate how the introduction of new technology in the component manufacturing can contribute to development of value-adding strategies (i.e. not doing the same thing as the customer has done). For example, from a sawmill perspective study how technology skills accompanied by product development of the component manufacturing taken over will impact the potential for taking over large scale outsourcing.

Apply a survey approach to "test" the findings suggested. Several findings have been provided in this thesis. It would be interesting to test these by a survey approach. If keeping to the context studied in this thesis it can be interesting to broaden the study, for example, to include more companies in the Nordic region to get enough objects to study.

Finally it would be interesting to *further develop the understanding of how mixed strategies can be applied.* This thesis has illustrated how outsourcing can be combined with in-house parallel production (cf. Harland et al., 2005). Of course parallel production will lead to some higher costs when the rationalisation cannot be done to the same extent. Thereby, more research is needed in this area and future studies should investigate: (a) what are the costs of a mixed strategy (it may be an interesting approach to handle supplier related risks in outsourcing and enable process cost benchmarking, but how costly is it)? and (b) how is parallel production present/applied in other contexts (e.g. automotive or IT)?

References

Abrahamsson, M. and Brege, S. (1995). "Distribution Channel Reengineering – Organisation av logistik och marknadsföring i interntationella företag." Research in Management. Report No 9501. Department of Management and Economics, Linköpings universitet, Linköping.

Abrahamsson, M., Andersson, D. and Brege, S. (2003). "Outsourcing - Från mode och trend till balanserat strategibeslut." Management Magazine(05).

Abrahamsson, M. and Brege, S. (2004). "Dynamic Effectiveness - Improved Industrial Distribution from a Continuous Interaction between Marketing and Logistics Strategies." Accepted paper for Journal of Marketing Channels.

Alexander, M. and Young, D. (1996). "Outsourcing: Where's the Value?." Long Range Planning, 29, (5): 728-730.

Anderson, J., C. and Narus, J., A. (1995). "Capturing the Value of Supplementary Services." Harvard Business Review(January and February).

Anderson, J., C. and Narus, J., A. (1991). "Partnering as a Focused Market Strategy." California Management Review,(spring): 95-113.

Andersson, D. (1997). "Third Party Logistics - Outsourcing Logistics in Partnerships. Department of Management and Economics - Linköpings Studies in Management and Economics. Linköping, Linköping Institute of Technology." Dissertation No. 34.

Andersson, D., Fransson, D. and Rehme, J. (2005). "Outsourcing under Uncertainty In the Wood Product Manufacturing Industry." Working paper for the 14 th annual Ipsera Conference. Archamps, France.

Andersson, D., Fransson-Nordigården, D. and Rehme, J. (2006). "Driving Forces for Outsourcing – A Study of Wood Product Manufacturing Firms." Working paper for the 15 th annual Ipsera Conference. San Diego, USA. Further developed and submitted to the Journal of Forest Product Business Research (Andersson, Brege, Nordigården and Rehme, 2007).

Andersson, D., Brege, S., Nordigården, D. and Rehme, J. (2007). "Outsourcing of Wood-Based Component Manufacturing: Driving Forces found in Scandinavian Companies", Journal of Forest Product Business Research, volume 4, article No. 7.

Arnold, U. (2000). "New dimensions of outsourcing: a combination of transaction cost economics and the core competencies concept." European Journal of Purchasing & Supply Management 6: 23-29.

Auguste, B., G., Hao, Y., Singer, M. and Wiegand, M. (2002). "The other side of outsourcing." The McKinsey Quarterly(1).

Augustson, M. (1998). IT outsourcing relationships: a transaction cost analysis of two cases. IMIE licentiate thesis, no. 8. Linköpings studies in Science and Technology Thesis No. 667: LIU-TEK-LIC-1998:02. Division of Industrial Management and Economics. Department of Management and Economics, Linköping, Linköping University.

Azimont, F., Cova, B. and Salle, R. (1998). Solution Selling and Project Marketing: a convergence towards customer intimacy for a joint construction of offer and demand. IMP, 14th Conference, Competitive Paper.

Bailey, E., E and Friedlaender, A. F. (1982). "Market Structure and Multiproduct Industries." Journal of Economis Literature XX (september): 1024-1048.

Bain, J., S. (1965). Barriers to New Competition. Cambridge, Harvard University Press.

Bain, J., S. (1968). Industrial Organization. New York, John Wiley & Sons, Inc.

Bansard, D., Cova, B. and Salle, R. (1993). "Project Marketing: Beyond Competitive Bidding Strategies." International Business Review 2(2): 125-141.

Barnes, C., S., Sinclair, S., A. (1985). "Forward integration in the building product market and its impact on the financial performance of selected forest products firms." Forest Products Journal, 35(11/12).

Barney, J. (1991). "Firm Resources and Sustained Competitive Advantage." Journal of Management 17(1): 99-120.

Barthélemy, J. (2003). "The seven deadly sins of outsourcing." Academy of Management Executive 17(2).

Beattie, A. (2005). Outsourcing - Unchained malad: business is becoming ever more exposed to supplier problems. Financial Times.

Bengtsson, K., Björklund, L., Wennerholm, H., (1998), Värdeoptimerat virkesutnyttjande, SIMS, Rapport 50., SLU.

Bengtsson, L., Elg, U. and Lind, J.-i. (1997). "Bridging the Transatlantic Publishing Gap: How North American Reviewers Evaluate European Idiographic Research." Scand. J. Mgmt. 13(4): 473-492.

Bengtsson, L. and Skärvad, P.-H. (2001). Företagsstrategiska perspektiv. Lund, Studentlitteratur.

Bengtsson, L., Berggren, C., Lind, J. (2005). Alternativ till outsourcing, Malmö. Liber.

Bengtsson, L. (2005) Outsourcing av produktion i svensk verkstadsindustri, Alternativ till outsourcing, Bengtsson, L., Berggren, C., Lind, J. Malmö, Liber.

Benson, J. and Ieronomi, N. (1996), "Outsourcing decisions: Evidence from Australian-based enterprises." International Labour Review, 135 (1).

Berggren, C. and Bengtsson, L. (2004). "Rethinking outsourcing in manufacturing - a tale of two telecom firms." European Management Journal 22(2): 211-224.

Bettis, A., Bradley, S. P. and Hamel, G. (1992). "Outsourcing and industrial decline." Academy of Management Executive 6(1): 7- 22.

Blaxill, M., F. and Hout, T., M. (1991). “The Fallacy of Overhead Quick Fix.” Harvard Business Review July-August.

Bonaccorsi, A., Pammolli, F. and Tani, S. (1996). "The Changing Boundaries of System Companies." International Business Review 5(6): 539-560.

Bragg, S., M. (1998). Outsourcing - A Guide to. Selecting the Correct Business Unit. Negotiating the Contract. Maintaining Control of the Process. New York, USA, John Wiley & Sons, Inc.

Brandes, H. (1993). Inköp i Förändring - En studie av förändring i svenska storföretages inköpsverksamhet. Department of Management and Economics - Linköping studies in Science and Technology. Linköping, Linköping university. Licentate thesis, No 379.

Brandes, H., Lilliecreutz, J. and Brege, S. (1997). "Outsourcing - success or failure? - findings from five case studies." European Journal of Purchasing & Supply Management 3(2): 63-75.

Brandes, O., Brege, S., Brehmer, P.-O. and Lilliecreutz, J. (2005). Global Coopetition in "Chambre Separée, Unpublished working paper, Linköping University, Linköping.

Brege, S. (1979). Marknadsförändring och företagsstrategi - från produktionsorientering till marknadsorientering, Del 1: Analys med utgångspunkt från ett skogsindustriellt vertikalt marknadssystem. Ekonomiska institutionen (Linköping Studies in Management and Economics). Linköping, Linköpings universitet. Dissertation, no 2.

Brege, S., Milewski, J., Berglund, M., Fredriksson, G. (2004a). Trähus, limfog och dalahästar – en studie av tillväxt och strategisk utveckling in svensk vidareförädlande industri, Trä- och Möbelindustriförbundet (TMF), Stockholm.

Brege, S., Johansson, H.-E. and Pihlqvist, B. (2004b). Trämanufaktur - Det systembrytande innovationssystemet. Vinnovas analys VA 2004:02 (Diarienr: 2003-01477).

Brege, S., Nordigården, D. and Rehme, J. (2006a). “Outsourcing and Supplier Related Risks - External Measurements in Balanced Scorecards” Working Paper for the annual Information Technology in Business (ITIB) conference, June 2006, Warszawa, Poland. Accepted paper for International Journal of Knowledge Management Studies (IJKMS).

Brege, D., Nordigården, D. and Rehme, J. (2006b). “On Outsourcing Strategies: the Opportunities of Parallel Production - Studies of the Leading Floor and Window Manufacturers in Europe” Working Paper for the annual Information Technology in Business (ITIB) conference, June 2006, Warszawa, Poland.

Brege, S., Nordigården, D. and Rehme, J. (2006c). “Outsourcing i träindustrin”. Working Paper for the annual Plan-conference. August 2006, Trollhättan.

Brege, S., Nordigården, D. and Rehme, J. (2006d). “Outsourcingstrategier för industriella träkomponenter – en studie av trämanufakturledet.” IMIE International Graduate School of Management and Industrial Engineering (IMIE Research Report No. 1: 2006).

Brehmer, P.-O., (1999). “Towards a Model of Lean Freight Transport Operations.” Linköpings Studies in Management and Economics, Diserations No. 38, Logistics and Transport Systems, Linköping.

Brusoni, S., Prencipe, A. and Pavitt, K. (2001). "Knowledge Specialisation, Organizational Coupling, and the Boundaries of Firm: Why Do Firms Know More Than They Make?" Administrative Science Quarterly 46: 597-621.

Brück, F. (1995). "Make versus buy: The wrong decision cost." McKinsey Quarterly(1): 29-47.

Butterworth, C. (1996). "Supplier-driven partnerships." European Journal of Purchasing and Supply Management 2 (4): 169-172.

Cachon, G., P. and Harker, P., T. (2002). "Competition and Outsourcing with Scale of Economies." Management Science 48(10): 1314-1333.

Cánez, L., E., Platts, K., W. and Probert, D., R. (2000). "Developing a framework for make-or-buy decisions." International Journal of Operation & Production Management 20 (11): 1312-1330.

Carlsson, M., and Lind, J. (2005) Ekonomistyrning – hinder eller stöd för produktuveckling, Alternativ till outsourcing, Bengtsson, L., Berggren, C., Lind, J. Malmö, Liber.

Chandler, A. D. and Hikino, T. (1990). Scale and scope: the dynamics of industrial capitalism. Cambridge, Mass., Belknap Press.

Christopher, M. (1994). Logistics and supply chain management. Burr Ridge, Ill., Financial Times/Irwin.

Christopher, M. and McDonald, M. (1995). Marketing - An Introductory Text. England, Macmillan.

Cohen D. and Sinclair, S. The Strategic Management Paradigm and the Wood Building Product Industry: A Model of Strategies and Firm Profitability." Forest Science, 38 (4): 786-805.

Cox, A. (1996). "Relational competence and strategic procurement management - Towards an entrepreneurial and contractual theory of the firm." European Journal of Purchasing & Supply Management, 2 (1): 57-70.

Cox, A., Lonsdale, C., Watson, G. and Qiao, H. (2003). "Supplier relationship management: a framework for understanding managerial capacity and constraints." European Business Journal 15(3): 135-145.

Cox, A. W. (2004). Supply chains, markets and power mapping buyer and supplier power regimes. London; New York, Routledge.

Davis, E., W. (1992) "Global Outsourcing: Have U.S. Managers Thrown the Baby Out with the Bath Water?" Business Horizons July-August.

Deavers (1997). "Outsourcing: A Corporate Competitiveness Strategy Not a Search for Low Wages." Journal of Labor Research XVIII(4).

Desclos, P.-M. (2000). Geneva Timber and Forest Discussion Paper: Market for Secondary Processed Wood Products, 1999-2000. ECE/TIM/DP/21.

Doig, S., J., Ritter, R., C., Speckhals, R., K. and Woolson, D. (2001). "Has outsourcing gone too far?" McKinsey Quarterly(1): 25-37.

Donaldson, B. (1988). Sales Management - Theory and Practice. London, UK, Macmillan Business.

Dunn, D., T. and Thomas, C., A. (1986). "Strategy for Systems Sellers: A Grid Approach." Journal of Personal Selling & Sales Management(August): 1-10.

Eisenhardt, K. (1989). "Building Theories from case study research." Academy of Management Review 14(4): 532-550.

Ellram, L. and Billington, C. (2001). "Purchasing leverage considerations in the outsourcing decision." European Journal of Purchasing & Supply Management(7): 15-27.

Ellram, L., M. and Maltz, A., B. (1995). "The Use of Total Cost Ownership Concepts to Model the Outsourcing Decision." The International Journal of Logistics Management, 6(2): 55-66.

Espino-Rodrigez, Tomás, F., Pardrón-Robaina, V., (2006). "A review of outsourcing from the resource-based view of the firm", International Journal of Management Review, Vol. 8, Issue 1, pp 49-70.

Fransceschini., F et al. (2003). "Outsourcing: Guidelines for a structured approach", Benchmarking: An International Journal, Vol. 10, No. 3: 246-260.

Fill, C. and Visser, E. (2000). "The outsourcing dilemma: a composite approach to the make or buy decision." Management Decision 38(1): 43-50.

Fine, C., H. and Whitney, D., E. (1999). Is The Make-Buy Decision Process a Core Competence? 4th ISL conference, Florence, Italy.

Foote, N., Galbraith., J., Hope., Q. and Miller., D. (2001). "Making solutions the answer." The McKinsey Quarterly(3): 84-93.

Ford, D. (1980). "The development of Buyer-Seller Relationships in Industrial Markets", Understanding Business Markets, Ford, D., (ed.), (1997), 2nd edition, The Dryden Press, London.

Ford, D., Gadde, L.-E., Håkansson, H. and Snehota, I. (2003). Managing Business Relationships. West Sussex, Wiley.

Fransson, D. (2004). "Byggvaruhuskedjors kravställningar på sina leverantörer: en studie av bygghandeln i Sverige", Department of Management and Economics. Linköping, Linköping University Master's Thesis: LITH-EKI-EX; 2004:33. Now: Daniel Nordigården.

Fransson, D. (2005). "Outsourcing Strategies for Wood Product Manufacturing Firms - Driving Forces and Strategic Development". Department of Management and Economics. Linköping, Linköping University. Licentiate Thesis (Thesis No. 1170, Liu-Tek-LIC 2005:25). Now: Daniel Nordigården.

Fransson, D. and Rehme, J. (2005a). "Byggvaruhuskedjors påverkan på leverantörer - en studie av bygghandelns utveckling i Sverige". IMIE International Graduate School of Management and Industrial Engineering (IMIE Research Report No. 2005:1). Linköping. ISBN: 91-85299-81-2. Now: Daniel Nordigården.

Fransson, D. and Rehme, J. (2005b). "From Product Supplier to System Provider - Changing role for Europe's largest wooden door manufacturer." Working Paper for Internet Technology in Business (ITIB2005) conference, St. Petersburg. Originally from doctoral course in Industrial Selling (Fransson, 2004). Now: Daniel Nordigården.

Garaventa, E. and Tellefsen, T. (2001). "Outsourcing: The Hidden Costs." Review of Business(Spring): 28-31.

Gilley, M., K. and Rasheed, A. (2000). "Making More by Doing Less: An Analysis of Outsourcing and its Effects on Firm Performance." Journal of Management 26(4): 763-790.

Gottfredson, M., Puryear, R. and Phillips, S. (2005). "Strategic Sourcing - From Periphery to the Core." Harvard Business Review(February).

Grant, R., M., (1991). "The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation." California Management Review,(spring): 114-135.

Greaver, M. F. (1999). Strategic outsourcing: a structured approach to outsourcing decisions and initiatives. New York, AMACOM.

Günter, B. and Bonaccorsi, A. (1996). "Project Marketing and System Selling - In Search of Framework and Insight." International Business Review 5: 531-539.

Haldi, J. and Whitcomb, D. (1967). "Economies of Scale in Industrial Plants." The Journal of Poliitcal Economy 75(4): 373-385.

Hamel, G., Doz, Y., L. and Prahalad, C. K. (1989). "Collaborate with Your Competitors - and Win." Harvard Business Review(January-February): 133-139.

Hamel, G. and Heene, A. (1994). Competence-based competition. Chichester, Wiley.

Hamel, G. and Prahalad, C. K. (1994). "Competing for the Future." Harvard Business Review 72(4): 122-128.

Hammarkvist, K.-O., Mattsson, L.-G. and Håkansson, H. (1982). Marknadsföring för konkurrenskraft. Malmö, LiberFörlag.

Hammer, M. (1990). "Reengineering Work: Don't Automate, Obliterate." Harvard Business Review 68(4): 104-112.

Hammer, M., Champy, J., Svensson, P. and Institutet för säljträning och ledarutveckling (1994). Reengineering the Corporation: ett radikalt nyskapande av processer för att uppnå dramatiska resultatförbättringar i organisationen. Göteborg, ISL (Institutet för säljträning och ledarutveckling).

Hannaford, W., J. (1976). "System Selling: Problems and Benefits for Buyer and Seller." Industrial Marketing Management 5: 139-145.

Hansen, E., Seppälä, J. and Juslin, H., ”Marketing Strategies of Softwood Sawmills in Western North America”. Forest Product Journal 52(1): 19-25.

Harland, C., Knight, L., Lamming, R. and Walker, H. (2005). "Outsourcing: assessing the risks and benefits for organisations, sectors and nations." International Journal of Operation & Production Management 25(9): 831-850.

Harrigan, K. R. (1984). "Formulating Vertical Integration Strategies." The Academy of Management Review 9(4): 638-652.

Harrigan, K. R. (1985). "Vertical Integration and Corporate Strategy." Academy of Management Journal 28(2): 397-425.

Harrison, B. and Kelly, M., R. (1993). "Outsourcing and the Search for Flexibility." Work, Employment & Society 7(2): 213-235.

Hayes, R. H. and Wheelwright, S. C. (1984). Restoring Our Competitive Edge – Competing Through Manufacturing. USA. John Wiley and Sons.

Hendry, J. (1995). "Culture, Community and Networks: The hidden costs of outsourcing." European Management Journal 13(2): 193-200.

Henningsson, M. (2005). “Retail Trade Demands on Distributors - Strategic and Operational Implications.” Department of Management and Economics - International Graduate School of Management and Industrial Engineering (dissertation No. 90). Linköping, Linköping University. Licentiate Thesis.

Heywood, B., J. (2001). The Outsourcing Dilemma - the search for competitiveness. London, Financial Times Prentice Hall (Pearson Eduction).

Higgins, C. (1955). "Make-or-Buy re-examined." Harvard Business Review 33(2): 109-119.

Håkansson, H., Johanson, J. and Wootz, B. (1976). "Influence Tactics in Buyer-Seller Processes." Industrial Marketing Management 5: 319-332.

IMP-Group. (1982). “An Interaction Approach”, Understanding Business Markets, Ford, D., (ed.), (1997), 2nd edition, The Dryden Press, London.

Insinga, R., C. and Werle, M., J. (2000). "Linking outsourcing to business strategy." Academy of Management Executive 14(4): 58-70.

Janicki, G. (2001). "Suppliers Get no Guarantees." Automotive Industries(April).

Javidan, M. (1998). "Core Competence: What Does it Mean in Practice." Long Range Planning 31(1): 60-71.

Jennings, D. (1997). "Strategic guidelines for outsourcing decisions." Strategic Change 6: 95-96.

Johanson, J. and Mattsson, L.-G. (1987). "Interorganizational Relations in Industrial Systems: A Network Approach Compared with the Transaction-Cost Approach." Int. Studies of Mgt. & Org. XVII(1): 34-48.

Johansson, J., E., Krishnamurthy, C. and Schlissberg, H., E. (2003). "Solving the solution problem." McKinsey Quarterly(3): 116.

Kanter, R. M. and Langhed, K.När de stora elefanterna dansar: 90-talets utmaningar inom strategi, ledarskap och personlig karriär. Stockholm.

Krajlic, P. (1983). Purchasing must become supply chain management, Harvard Business Review, No. 5.

Kern, T., Willcocks, L., P. and van Heck, E. (2002). "The Winner's Curse in IT Outsourcing: Strategies for Avoiding Relational Trauma." California Management Review, 44(2): 47-67.

Klein, J. A. and Hiscocks, P., G. (1994). Competence-based Competition: A Practical Toolkit. Competence-Based Competition. G. Hamel and A. Heene. West Sussex, John Wiley & Sons.

Kotler, P. and Armstrong, G. (2001). Principles of marketing. Upper Saddle River, N.J., Prentice Hall International.

Lakenan, B., Boyd, D. and Frey, E. (2001). Why Cisco Fell: Outsourcing and Its Perils. Strategy+Business.

Lamming, R. (1993). Beyond Partnership – Strategies for Innovation and Lean Supply. Hertfordshire, Prentice Hall.

Leininger, M. (1994). Evaluation Criteria and Critique of Qualitative Research Studies. Critical Issues in Qualitative Research Methods. J. M. Morse. Thousand Oaks, Calif., Sage.

Lekvall, P. and Wahlbin, C. (2001). Information för marknadsföringsbeslut. Göteborg, IHM Publishing.

Lilliecreutz, J. (1996). En leverantörs strategi - från lego- till systemleverantör. Ekonomiska institutionen, Linköping Studies in Management and Economics. Linköping, Tekniska högskolan i Linköping. Dissertation.

Linder, J., C. (2004). "Transformational Outsourcing." MIT Sloan Management Review(Winter): 52-58.

Long, C. and Vickers-Koch, M. (1995). "Using Core Capabilities to Create Competitive Advantage." Organizational Dynamics, 21(1): 6-17.

Lonsdale, C. and Cox, A. (2000). “The historical development of outsourcing: the latest fad?”, Industrial Management & Data Systems 100/9.

Lonsdale, C., (2001). “Locked-in to Supplier Dominance: On the Dangers of Asset Specificity for the Outsourcing Decision.” The Journal of Supply Chain Management, Spring: 22-27.

Lonsdale, C. (1999). "Effectively managing vertical supply relationships: a risk management model for outsourcing." Supply Chain Management: An International Journal 4(4): 176-183.

Lonsdale, C. and Cox, A. (1998). Outsourcing: A Business Guide to Risk Management Tools and Techniques Earlsgate Press.

Lonsdale, C. and Cox, A. (1997). "Outsourcing: risk and rewards." Supply Management 3: 32-34.

Lovelock, C. and Wright, L. (2002). Principles of Service Marketing and Management. Upper Saddle River, New Jersey, Prentice Hall.

Mattsson, L.-G. (1973). "System selling as a Strategy on Industrial Markets." Industrial Marketing Management 3: 107-120.

Mattsson, L.-G. (1986). Systemförsäljning, Marknadstekniskt Centrum.

Mattsson, L.-G., Hammarkvist, K.-O. and Håkansson, H. (1982). Marknadsföring för konkurrenskraft. Malmö, Liber-Hermods.

McIvor, R. (2005). The outsourcing process: strategies for evaluation and management. Cambridge, Cambridge University Press.

McIvor, R. (2000a). "A practical framework for understanding the outsourcing process." Supply Chain Management: An International Journal 5(1): 22-36.

McIvor, R. (2000b). "Strategic Outsourcing: Lessons from a System Integrator." Business Strategy 11(3): 41-50.

McIvor, R., T., Humphreys, P., K. and McAleer, W., E. (1997). "A strategic model for the formulation of an effective make or buy decision." Management Decision 35(2): 169-178.

Merriam, S. B. (1994). Fallstudien som forskningsmetod, Studentlitteratur.

Miller (2002). "The Problem of Solutions: Balancing clients and capabilities." Business Horizons(March-April): 3-12.

Millman, T. (1996). "Global Key Account Management and System Selling." International Business Review 5(6): 631-645.

Morse, J. M. (1994). Critical issues in qualitative research methods. Thousand Oaks, Calif., Sage.

Mullin, R. (1996). "Managing the Outsourced." Journal of Business Strategy(July/August).

Mullin, R. (1997). "Taking Customer Relations to the Next Level." Journal of Business Strategy(January/February): 22-26.

Nord, T. (2005). Structure and developments in the solid wood value chain. Department of Civil and Environmental Engineering - Division of Structural Engineering - Timber Structures. Luleå, Luleå University of Technology. LTU-LIC--05/57--SE.

Nordigården, D. (2006a). “Outsourcing and suppliers – critical issues to consider, measure and monitor when outsourcing”, Icke-monetär styrning – sex doktoranders perspektiv, Nils-Göran Olve och Carl-Johan Petri (Editors). Ekonomiska informationssystem, Linköpings universitet.

Nordigården, D., (2006b). ”Development of Mixed Strategies – Combining Outsourcing with In-house Parallel Production”. Unpublished working paper, originally intended for IPSERA Doctoral conference, Supply Management Institute, European Business School, September 14, 2006.

Nordigården, D. and Rehme, J. (2006a). “DIY-Retailers’ Development and Supplier Consequences - A Study of the Swedish DIY Market” Paper for the annual ITIB2006 conference, Warszawa, Poland. Originally from doctoral course in Marketing Channels (Nordigården, 2005).

Nordigården, D. and Rehme, J. (2006b). “Moving Towards Dynamic Effectiveness - A case study of the largest wooden door manufacturer in Europe” Paper for the ITIB2006 conference, Warszawa, Poland. Originally from doctoral course in Marketing and Logistics (Fransson, 2005).

Normann, R. (1984). Service Management: Strategy and Leadership in Service Business. New York, John Wiley and sons.

Panzar, J. C. and Willig, R. D. (1981). Economies of Scope. Sustainability Analysis, AEA Papers and Proceedings, Vol. 71, No 2.

Patel, R. and Davidson, B. (2003). Forskningsmetodikens grunder: att planera, genomföra och rapportera en undersökning. Lund, Studentlitteratur.

Penrose, E. T. (1995). The theory of the growth of the firm. Oxford, Oxford Univ. Press.

Peteraf, M., A. (1993). "The Cornerstones of Competitive Advantage: A Resource-Based View." Strategic Management Journal 14: 179-191.

Piachaud, B. (2005). "Outsourcing Technology - Here are guidlines for establishing sourcing partnerships that are effective and truly strategic." Research - Technology Management May-June.

Poppo, L. and Zenger, T. (1998). "Testing Alternative Theories of the Firm: Transaction Cost, Knowledge-Based, and Measurement Explanations for Make-or-Buy Decisions in Information Services." Strategic Management Journal 19(9): 853-877.

Porter, M. E. (1981). “The Contribution of Industrial Organization to Strategic Managmenent.” The Academy of Management Review, 6 (4): 609-620

Porter, M. E. (1996). “What Is Strategy?” Harvard Business Review, Harvard Business School Publication Corp. 74: 61.

Porter, M. E. (1998). Competitive strategy: techniques for analyzing industries and competitors: with a new introduction. New York, Free Press.

Porter, M. E. (2004). Competitive Advantage - Creating and Sustaining Superior Performance. New York, Free Press.

Power, M., Bonifazi, C. and Desouza, K., C. (2004). "The outsourcing traps to avoid." Journal of Business Strategy 25(2).

Prahalad, C. K. and Hamel, G. (1990). The Core Competence of the Corporation. Harvard Business Review, Harvard Business School Publication Corp. 68: 79.

Probert, D., R. (1996). "The practical development of a make or buy strategy: the issue of process positioning." Integrated Manufacturing System 7(2): 44-51.

Quinn, B., J. (1999). "Strategic Outsourcing - Leveraging Knowledge Capabilities." Sloan Management Review 40(4): 9.

Quinn, B., J. (2000). "Outsourcing Innovation - The New Engine of Growth." Sloan Management Review(Summer): 13-28.

Quinn, J. B. and Hilmer, F. G. (1994). "Strategic Outsourcing." Sloan Management Review(Summer): 43-55.

Rammohan, R. (2004). How to tap the opportunities for outsourcing. Financial Times.

Reve, T. (1990). The Firm as a Nexus of Internal and External Contracts. The Firms as a Nexus of Treaties. M. Aoki, B. Gustafsson and O. Williamson, E. London, UK, Sage Publications.

Rindfleisch, A. and Heide, J., B (1997). "Transaction Cost Analysis: Past, Present, and Future Applications." Journal of Marketing 61(Otober): 30-54.

Rothery, B. and Robertson, I. (1995). The Truth About Outsourcing. Vermont, USA, Gower.

Roos, A., Flinkman, M., Jäppinen, A. and Warensjö, M. (2001). "Adoption of Value-adding Processes in Swedish Sawmills", Silva Fennica 34(4).

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

Roos, A., Flinkman, M., Jäppinen, A., Lönner, G. and Warensjö, M. (2002). "Identifaction of Value-adding Strategies in the Swedish Sawn Industry." Scand. J. For. Res 17: 90-96.

Rundh, B. (1992). Forward Integration as Business Strategy. Karlstad, Department of Economics and Business Adminstration, University of Karlstad.

Saunders, C., Gebelt, M. and Qing, H. (1997). "Achieving Success in Information Systems Outsourcing", California Management Review, Vol. 39, No. 2 (Winter).

Sardén, Y. (2005). Complexity and learning in timber frame housing :the case of a solid wood pilot project, Department of Civil and Environmental Engineering, Luleå University of Technology, Luleå, Doctoral Thesis (2005:43).

Scherer, F. M. (1975). The economics of multi-plant operation: an international comparisons study. Cambridge, Mass., Harvard U. P.

Scherer, F. M. and Ross, D. (1990). Industrial Market Structure and Economies Performance. Boston, Houghton Mifflin Company.

Silberston, A. (1972). "Economies of Scale in Theory and Practice." The Economic Journal 82(325): 369-391.

Sink, H., L., Langley Jr, J., C. and Gibson, B., J. (1996). "Buyer observation of the US third-party logitics market." International Journal of Physical Distribution and Logistics Management 26(3): 38-46.

Skinner, W. (1969). "Manufacturing – missing link in corporate strategy." Harvard Business Review, May-june.

Spekman, R., E. (1988). "Strategic Supplier Selection: Understanding Long-Term Buyer Relationship." Business Horizons(July-August): 75-81.

Staland, J., Navrén, M., Nylinder, M. (2002). "Såg 2000 Reslutat från sågverksinventeringen 2000." Institutionen för skogens produkter och marknader. Rapport No. 3.

Stalk Jr., G., Evans-Clark, P. and Shulman, L. (1992). Competing on capabilities: The new rules of corporate strategy. Harvard Business Review, Harvard Business School Publication Corp. 70: 54.

Strauss, A. and Corbin, J. (1998). Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. Thousand Oaks, Sage.

Stuckey, J. and White, D. (1993). "When and When Not to Vertically Integrate." Sloan Management Review(Spring): 71-83.

Swartling, D. (2005). "Insourcing av produktion: Erfarenheter från sex företag." Alternativ till outsourcing, Bengtsson, L., Berggren, C., Lind, J. Malmö, Liber.

Tayles, M. and Drury, C. (2001). "Moving from Make/Buy to Strategic Sourcing: The Outsource Decision Process." Long Range Planning(34): 605-622.

Turner, D. and Crawford, M. (1994). Managing Current and Future Competitive Performance: The Role of Competence. Comptence-Based Competition. G. Hamel and A. Heene. West Sussex, John Wiley & Sons.

Walker, G. (1988). "Strategic Sourcing, Vertical Integration, and Transaction Costs." Interfaces 18(3): 62-73.

Walker, G. and Weber, D. (1984). "A Transaction Cost Approach to Make-or-Buy Decision." Administrative Science Quarterly 29(3): 373-391.

Warensjö, M. (1997). "Såg 95 – Sågverkens production och virkesbehov m.m. 1995". Institutionen för virkeslära, rapport nr 251.

Wasner, R. (1999). "The process of outsourcing: strategic and operational realities". Linköping, IMIE International Graduate School of Management and Industrial Engineering, Linköping University.

Webster Jr., F. E. (1992). "The changing role of marketing in the corporation. Journal of Marketing, American Marketing Association. 56: 1.

Welch, J., A. and Nayak, P., R. (1992). "Strategic sourcing a progressive approach to the make-or-buy decision." Academy of Management Executive 6(1): 22-31.

Venkatesan, R. (1992). "Strategic Sourcing - To Make or Not To Make." Harvard Business Review(November-December): 98-107.

Verdin, P. J. and Williamson, P., J. (1994). Core Competences, Competitive Advantage and Market Analysis: Forging the Links. Competence-Based Competition. G. Hamel and A. Heene. West Sussex, England, John Wiley & Sons.

Vesey, J., T. (1978). " Vertical Integration: Its Affect on Business Performance." Managerial Planning, May-June.

Wernerfelt, B. (1984). "A Resource-Based View of the Firm." Strategic Management Journal 5: 171-180.

Willcocks, L., P. and Lacity, M., C. (1998). "The Sourcing and Outsourcing of IS: Shock of the New?", Strategic Sourcing of Information Systems – Perspectives and Practices, Edited by Willcocks, L., P. and Lacity, M., Wiley & Sons, West Sussex, England.

Williamson, O. E. (1975). Markets and hierarchies: analysis and antitrust implications: a study in the economics of internal organization. New York, Free Press.

Williamson, O. E. (1979). Transaction-Cost Economics: The Governance of Contractual Relations Journal of Law and Economics 22 (2), October, 233-261. Reprinted in Industrial Organization (1990). O. E. Williamson. Brookfield, USA, Edward Elgar Publishing Inc.

Williamson, O. E. (1981). "The Economics of Organization: The Transaction Cost Approach." The American Journal of Sociology, 87(3): 548-577.

Williamson, O. E. (1985). The economic institutions of capitalism: firms, markets, relational contracting. New York, Free Press.

Williamson, O. E. (1990). The Firm as a Nexus of Treaties: an Introduction. in The Firm as a Nexus of Treaties. M. Aoki, B. Gustafsson and O. E. Williamson. London, UK, Sage Publications.

Williamson, O. E. (1991). "Comparative Economic Organization: The Analysis of Discrete Structural Alternatives." Administrative Science Quarterly 36(36): 269-296.

Williamson, O. E. (1996). The mechanisms of governance. New York, Oxford University Press.

Williamson, O. E. and Masten, S. E. (1999). The economics of transaction costs. Cheltenham, Edward Elgar.

Winkleman, M., Dole, D., Pinkard, L., Molloy, J. and et al. (1993). "The outsourcing source book." Journal of Business Strategy 14(3): 52-56.

Winterscheid, B., C. (1994). Building Capability from Within: The Insiders' View of Core Competence. Competence-Based Competition. G. Hamel and A. Heene. West Sussex, John Wiley & Sons.

Von Platen, F. and Nord, T., (2004). “Mer trä i byggandet – underlag för en national strategi att främja användning av trä i byggandet, DS 2004:1, Regeringskansliet – Näringsdepartementet.

Yin, R., K. (2003). Case Study Research: Design and Methods. Thousand Oaks, Sage.

Yin, R. K. (1989). Case study research: design and methods. Newbury Park, Calif., Sage Publications.

Yoon Paul, K. and Naadimuthu, G. (1994). "A Make-or-Buy Decision Analysis Involving Imprecise Data." International Journal of Operation & Production Management 14(2): 62-69.

Appendix 1. List of interviewees and secondary data

This appendix provides an overview of interviewees and secondary data used for the compilation of the cases.

Table 1. Interviewees of round (1) and round (2) for the Licentiate Thesis

Interviewee:	**Company:**	**Position:**	**Interview date:**	**Location:**
Becker, F.	Kährs	CEO	040526 (1); 041119 (2)	Nybro
Edin, M.	Tarkett Wood	R & D Manager	040831 (1); 041115[1] (2)	Hanaskog
Isaksson, A.	Elitfönster	Plant Manager[2]	040609 (1)	Vetlanda
Jemjeby, P.	Tarkett Wood	Process Manager	040831 (1); 041115[1] (2)	Hanaskog
Johannesson, B.	Dooria Sverige	Managing Direktor	040621 (1); 041111 (2)	Kungsäter
Karlén, J.	Tarkett Wood,	Product Manager	040831 (1)	Hanaskog
Liw, T.	Svenska Fönster	Manager purchasing	041101 (2)	Edsbyn
Mortensen, J., B.	Vest-Wood	Group Director	040607 (1); 041123[5] (2)	Løgstør, Denmark
Olsson, P-O,	Svenska Fönster	Manager sales	041101 (2)	Edsbyn
Ranheim, L-P.	Dooria	R & D Manager	041111 (2)	Kungsäter
Renman, N.	Dooria Kungsäter	Managing Director	040621 (1) 041111 (2)	Kungsäter
Schough, S.-G.	Elitfönster	CEO[2]	040609 (1); 041109 (2)	Vetlanda
Sigurdson, O.	Svenska Fönster	Managing Director	040601 (1) 041101 (2)	Edsbyn

Table 2. Interviewees of in-depth study

Interviewee:	**Company:**	**Position:**	**Interview date:**	**Location:**
Becker, F.	Kährs	CEO	051007; 051202; 051222[5]; 060109[3] (Kalmar).	Nybro
Isaksson, A.	Elitfönster	CEO/ Technology Manager	051031; 060113 (Vetlanda)	Lenhovda
Johnsson, A.	Elitfönster	Production manager	060113	Vetlanda
Lundh, A.	Elitfönster	Production manager of IGF	051212; 060113 (Vetlanda)	Lenhovda
Schough, S.-G.	Elitfönster/ INWIDO	CEO/ Group Director/ Board Director	051103	Malmö
Stolpe, M[4].	Elitfönster	Project Manager (blanks)	2004-11[4]	Vetlanda
Thorsell, P.	Kährs	Purchasing Director,	051111; 051202, 060123[5].	Nybro

[1] Primary data was also collected by a meeting with the executive management group (results from the first study was presented and discussed). Nine managers were present at that meeting.

[2] Anders Isaksson is nowadays CEO Elitfönster; Schough is nowadays CEO and Group Director of INWIDO.

[3] Presentation at a seminar: included a presentation by the CEO (ca 1h) and an open discussion about 1 1/2h. I also discussed with the interviewee after seminar.

[4] Interview made by technical consultant.

[5] Telephone interviews

Table 3. Supplier case study of Norrskog Wood Products (NWP)

Interviewee:	**Position:**	**Interview date:**	**Location:**
Bengtsson, J.	Mill Manager,	060223; 060502 (Ånge); 060609	Östersund/Ånge
Jakobsson, S.-G.,	Technical Manager	060223; 060502; 060609	Östersund
Ottosson, E.	Sales Manager	060223; 060502	Östersund
Warg, A.	CEO[6]	060222; 060223; 060323[5] 060502; 060609	Östersund
Presentation	Management at NWP	060502	Östersund

Table 4. Secondary material

Case	**Secondary data**
Kährs	Annual report: 2002; 2003, 2004 Business strategy presentations 2004; 2005, 2006 (internal material). Company's and group's website Company presentation about hardwood wood supply situation in Sweden 2006 EMAS environmental statement 2003; 2005 Outsourcing calculation material (internal and confidential[7] material) Press releases Product catalogues
Tarkett-Wood	Annual report 2002, 2003 Business strategy presentation 2004 (internal material) Company's website Press releases Product catalogues
Vest-Wood	Annual report 2001/02, 2002/03 Business strategy material (internal material) Company's website Company profile presentation Press releases Product catalogues
Dooria Kungsäter	Annual report 2001/02, 2003 Group company's website
Elitfönster	Annual report 2002; 2003; 2004; 2005 Company's and owner's website Press releases Product catalogues Article with Group Director in NTT, #12 2007
Svenska Fönster	Annual report 2002; 2003 Product catalogues
NWP	Annual report 2005, 2004 Business strategy material (internal material) Product catalogues

Complementing questions have also been sent to the participating company representatives by e-mails and/or by telephone calls.

[6] In addition, discussions about NWP's strategy have been held with the CEO during the whole research process.

[7] The confidential material could not be used in the case description.

Appendix 2. Literature review: driving forces for outsourcing

Table 5. Compilation of a selection of articles implicit or explicit giving an understanding of driving forces for outsourcing

Author:	**Study:**	**Example of driving forces for outsourcing:**
(Abrahamsson et al., 2003)	Article	Focus on core, lower costs and convert fixed to variable (ease the balance sheet)
(Augustson, 1998)	Licentiate thesis	In an IT context access to external competencies, cost and focus.
(Benson and Ieronimo, 1996)	Article, case and survey	Improve service, costs and flexibility.
(Bragg, 1998)	Book, empirical examples	Acquire new skills, focus on strategy and core functions, avoid major investments, handle overflow, improve flexibility, reduce costs and improve performance.
(Brandes et al, 1997)	Article, case	Combination of: need to focus on core competencies, cost efficiency reasons and financial problems.
(Bettis et al, 1992)	Article, empirical based	Cost reductions.
(Cachon and Harker, 2002)	Article	Economies of scale.
(Carlsson and Lind, 2005)	Book section	Companies value investments that yield cost reduction and short pay-back time. Balance sheet management to improve financial performance.
(Cánez et al, 2000)	Article, case	Firms' make-or-buy decisions are often made purely on the basis of costs. Driving forces comprehend cost reduction, lack of capability, reduce time to market, increase quality, new product introduction, focus investments, balance capabilities, skills shortage and increase responsiveness.
(Deavers, 1997)	Article	Presents two surveys: (1) Improve company focus, access to world-class capabilities (learn from business partner), share risks and free resources for other purposes; (2) Capacity constraints limiting expansion, access to specialised skills and tools not available at the plant, cost cutting.
(Ellram and Billington, 2001)	Article, case	Potential advantages of obligational contracts (e.g. by outsourcing): cost reduction and risk reduction.
(Ellram and Maltz, 1995)	Article, case	Cost reduction.
(Fill and Visser, 2000)	Article, case study	Costs but the authors also review other articles and say that 5 main driving forces are: costs, core-business, quality, cooperation and finance.
(Fine and Whitney, 1995)	Article, theoretical with empirical examples	Capability, manufacturing competitiveness and technology condensed to (1) dependency for capacity and (2) dependency for knowledge.
(Greaver, 1999)	Book, empirical examples	Organisationally driven (improve effectiveness and flexibility), improvement-driven (access and risk-management), financial-driven, revenue-driven (access), cost-driven.
(Gilley and Rasheed, 2000)	Article, survey	Improved financial performance or non-financial performance (e.g. heightened focus on core competencies, quality improvements) and spread risks.
(Harland et al., 2005)	Literature review and quantitative approach	Focus on core activities to reduce costs, providing short-term financial benefits and balance sheet improvements as well as improve flexibility (handle market development).

(Harrison and Kelley, 1993)	Article, survey	(1) Capacity, (2) access to special machining or engineering skills, (3) lower labour costs. But also to create a greater scope (product diversity).
(Higgins, 1955)	Article	Cost reductions, capacity or capital need, risk-sharing, techniques, focus more at speciality.
(Hendry, 1995)	Article, theoretical	Companies sought to reduce costs by contracting out services and activities. Expected benefits from outsourcing: cost savings, operational flexibility, financial flexibility, short-term responsiveness.
(Heywood, 2001)	Book	Put forwards three basic reasons for outsourcing: the desire to concentrate on core activities, the need to improve the service and need to reduce costs.
(Jennings, 1997)	Theoretical with empirical examples	Cost reduction has been the traditional motive for outsourcing.
(Linder, 2004)	Article, empirical example	Facilitate organisational change and rapidly launch new strategies
(Lonsdale and Cox, 1997)	Article, empirical based	Despite the amount of literature written on the danger using headcount and cost-cutting as a driver for outsourcing firms still to often base their decisions on costs and financial factors.
(McIvor et al, 1997)	Article, theoretical	Firms are motivated primarily search for short-term cost reductions.
(McIvor, 2000a)	Article, theoretical	Many firms adopt a short-term perspective and being motivated primarily by the search for short-term cost reductions.
(Probert, 1996)	Article, case	Firms' make-or-buy decisions are too often addressed from a cost comparison perspective.
(Quinn and Hilmer, 1994)	Article, theoretical with empirical examples	By strategically outsourcing and emphasising on the company's core competence the firm's can leverage their own competencies and increase competitiveness. Also to let the supplier take some investment risk.
(Quinn, 2000)	Article, theoretical with empirical examples	Access innovation by strategic outsourcing (tap the capabilities of external knowledge leaders).
(Saunders et al., 1997)	Article, survey based	Technological considerations/lacking skills in-house, costs, rapidly build new strategies, human resources and mandated/consolidation
(Rothery and Robertson, 1995)	Book, empirical examples	Business process re-engineering (search for world-class manufacturing and flexibility), re-engineering tool, organisational restructuring, changing technology, costs. Mechanism for acquiring new dialogue, ideas (access).
(Wasner, 1999)	Licentiate thesis, case	Cost reduction, volume flexibility, increased capacity, improved quality, innovative capability of supplier.
(Welch and Nayak, 1992)	Article, theoretical with empirical examples	Historical, many firms have made sourcing decisions based on unit costs. Outsourcing has advantages that drive: convert fixed costs to variable costs, balance work force requirements, reduce capital investments needs, reduce costs by utilising supplier's economies of scale and lower wage structures, gain access, focus resources on high value activities. Consider also technology access/development.
(Winkleman et al. 1993)	Article, empirical based	Two main drivers: costs and strategic shift. Outsourcing has helped companies to ameliorate competitive pressure, squeeze profits margins, eliminate investments, higher quality, access and increase efficiency.

Appendix 3. Literature review: the outsourcing decision

Table 6. Compilation of a selection of articles' implicit or explicit discussion of important factors to consider in outsourcing decisions.

Author:	**Study:**	**Considering outsourcing decisions/strategies:**
(Brandes et al, 1997)	Case	Decision, unit and process effect on the outcome of outsourcing. Decision based on core competencies and cost efficiency, compared to decision caused by financial problems => outsourcing more successful
(Bettis et al, 1992)	Empirical based	View sourcing in strategic and offensive terms not to as a technique to fix problems. The industrial spiral of decline = main the risk of outsourcing.
(Bragg, 1998)	Book	When outsourcing a function: find and evaluate potential supplier, costs of the outsourcing, legal issues, changing organisational structure, personal issues, transition issues, supplier contractual relationship.
(Brück, 1995)	Survey	Consider: (1) technological differentiation and cost optimization (consider 4 different types of costs), (2) supplier cooperation.
(Cánez et al, 2000)	Case	Strategic make-or-buy framework for specific parts: (1) impact technology, (2) cost benefits, (3) supply chain, (4) support systems
(Insinga and Werle, 2000)	Empirical examples	Potential for competitive advantage (activity value) vs. internal capability. Risk for operational dependencies.
(Ellram and Maltz, 1995)	Case	Need to properly consider the total cost of ownership to understand the implications of an outsourcing decision.
(Fill and Visser, 2001)	Case	Contextual factors, strategy, structure and transaction costs.
(Fine and Whitney, 1995)	Theoretical with empirical examples	Make-buy decision as a core competence where the specific activity need to be broken down in to sub-systems. Two main dimensions to consider when considering the outsourcing decision: (1) if the company will either be dependent of the external source knowledge or capacity and (2) the component/ subsystems possibility to be decomposed from the system of components that forms the final products.
(Galetto et al, 2003)	Theoretical with empirical examples	Core competence => what should be outsourced => external benchmarking/selection of vendor and contract agreement => managing the outsourced products/services.
(Hendry, 1995)	Theoretical	Potential risks and rewards (expected benefits) of outsourcing.
(Jennings, 1997)	Theoretical with empirical examples	Cost, business environment, capability, technology, supplier relationships.
(Lonsdale and Cox, 1997; Lonsdale,1999)	Empirical based/case	Several intrinsic risks with outsourcing => must think strategic about outsourcing => understand core-concept, consider the risk of shift in power/ loss-leader-tactics and the effect of supplier failure.
(McIvor et al, 1997; McIvor, 2000; 2000b)	Theoretical	Core/non-core activities, capability benchmarking (cost analysis) and evaluation of supplier risks related. Risk of not adequate separating between core and non-core (considering problematic as non-core)
(Quinn and Hilmer, 1994; Quinn, 2000)	Theoretical with empirical examples	Potential for competitive edge (keep core competencies and outsourcing non-core), degree of strategic vulnerability (can create strategic block).
(Venkatesan, 1992)	Empirical examples	Break down sub-systems to families of components to identify what should be considered as strategic core and commodities that should be outsourced. Strategic subsystems have a high impact on what customers perceive as important product attributes.
(Welch and Nayak, 1992)	Theoretical with empirical examples	Unit cost not sufficient decision criteria => consider also: (1) process technology (and relationship to competitive advantage, (2) maturity if process technology, (3) competitors' process technology positions.

Appendix 4. Summary of WPM firms' driving forces for outsourcing

Case company	Reduce cost	Financial motives	Focus on Core competence	Operation/ Capacity Constraints	Utilisation of External Capabilities
Kährs	Cost efficiency in focus - tough price competition leads to the need to become leaner in operations. Measure competitiveness (benchmark internal processes against suppliers' process costs). Restructuring programmes for improved profitability.	Too high capital intensity (need for financial flexibility). Does not want to make new investments or get too high fixed costs.	Focus more resources on core activities and outsource non-core. Moving resources from sawmill related production to marketing and sales.	Not wanting to invest in new capacity (linked to reducing cost and financial motives). Handling business flexibility.	Not present to any large degree.
Tarkett Wood	Outsourcing offers new possibilities to lower total costs - prices are important to sustain competitive and cost in strong focus. Divesting for improved profitability.	Lower investment needs for wood related activities.	Focus resources on what creates differentiation and enable a basis for competitiveness (e.g. supply chain and manage customers).	Avoiding costly investments to increase capacity.	Not present to any large degree.
Vest-Wood	Extremely focused on total process cost and if production processes are profitable. Outsourcing enables benchmarking. Customer focus requires reallocation of costs.	If an internal process demands too much capital investments to be competitive Vest-Wood considers outsourcing.	Moving towards a new business area and customers comes in focus. Working with product augmentation and increasing their spending to enhance marketing and sales activities.	Handling flexibility in production sites.	Not present to any large degree.
Dooria Kungsäter	Costs are in overall strong focus.	Capital is a scarce factor.	Focus more resources on activities that create differentiation on the market and lasting value for customers.	Improve the flow in the production.	Not present to any large degree.
Svenska Fönster	Realise possible production cost reductions by outsourcing certain activities to external suppliers. Avoid costly capacity expansions.	Expanding capacity and simplify flows without costly investments.	Focus more resources on certain activities at the end of the value chain that can create differentiation on the market.	Capacity constraints (enable expansion without growing more in present production-lines). Access partners and by this ensuring continuously supply of wood raw material.	Not present to any large degree.
Elitfönster	Lowering total cost by outsourcing upstream component manufacturing.	Lowering and avoiding investment needs by utilising external source. Lower capital tied up in production facilities, warehouses and in wood raw material.	Expanding company by acquisition strategy and focus on what creates differentiation. Interesting in additional extension of product offer with services.	Operation constraints with machinery. Capacity constraints in production of windows. Improve business flexibility.	Not present to any large degree.

Appendix 5. Context glossary

This section will shortly define some main terms used in the context studied:

Bottom-layer: see M/B-component

Builders' merchants: Suppliers of wood based products to the local and regional construction industry and other professional customers. They can be defined as merchants sourcing, stocking, handling and distributing wood based products (Fransson and Rehme, 2005a; Nord, 2005, p. 42).

By-products: In the context it refers to the by-products from the transforming of sawlog to sawn timber and includes chips, sawdust and bark for the pulp, wood panel and bio-energy industries (cf. Staland et al., 2002; Nord, 2005).

Component manufacturing: Transforming sawn timber or other wood based raw material in to a component based on wood (e.g. combination with glue or other material). Component manufacturing at WPM firms start from a wood raw material basis delivered from sawmills.

Consequence products: "*Sawn timber products emerging from a specific sawing pattern not meeting technical and appearance properties based on that particular sawing pattern thus requiring further processing and/or sales activities finding other end-users*" (Nord, 2005, p. 236). These non-standard products are often difficult to sell and can cause lower overall profitability of a sawmill (Ibid.).

Divergent production flow: "*The production in a saw mill can be described as a divergent flow, i.e., one product entering the saw mill resulting in a large number of different products*" (Nord, 2005, p., 236). The starting point is the difficulties for sawmills to link customer demands on wood properties with the actual properties of the sawmills' raw material input. Sawmills' production process is characterised by a high level of upstream uncertainty due to the heterogeneity of the wood material. Here, a divergent production flow means that every single piece of production input of sawlogs to the sawmills can result in a number of various outputs to different customers. (Nord, 2005) Three main product types emerge from the sawmill production output: a) demanded products - sawn timber products emerging from a specific sawing pattern, b) consequence products and c) by-products (Nord, 2005). For a sawmill all product output including by-products needs to be off-set to assure profitability (Ibid.).

DIY-retailers: Do-It-Yourself retailers or home centre markets can be defined as more consumer focused builders' merchants with broad product assortments in the home improvement area (Fransson and Rehme, 2005a; Henningsson, 2005).

Door case: The case that supports the door construction and can be of sawn timber or further processed wood (e.g. glue-laminated wood).

Door frame: The external casing frame to install the door. In Swedish termed "*dörrkarm*".

Dry sorting and grading: Final production activities at the sawmill. Here, a batch from the drying activity is first unstacked and then each piece of the sawn timber is processed in terms of sorted and graded after quality class and length. Some adjustments are also done as trimming the timber to the right lengths. This station is the final quality inspection of the sawn timber and any timber of insufficient quality are sorted out. In Swedish the station is called: "*justerverket*".

End-pieces: see M/B-component.

Exotic wood species: A collective term used in the flooring industry, which can be defined as hardwood from the Southern hemisphere (i.e. tropical hardwood species).

Finger-joint: A series of several interlocked fingers cut on the ends of two pieces of wood that are held together by glue.

Glue-laminated wood: Individual pieces of sawn timber that is glued together into layered pieces, e.g. by using finger jointing technique. A type of engineered wood product (Nord, 2005).

Green sorting: The first dimension sorting of the undried sawn timber in the sawmill.

Hardwood: Non-conifer wood, e.g. oak, ash, birch, cherry, maple, walnut etc.

Heterogeneity: see divergent production flow.

HDF: High density fibreboard, which is a wood panel based on refined wood fibres bonded together by resin and under heat and pressure.

Industrial end-users: see WPM firms.

Joinery factory: Manufacturers of wood products and are often small with only local or regional presence. Most firms in the WPM sector have started as joinery factories or sawmills (see Brege et al., 2003; 2004). In Swedish termed snickeri.

Joint-glued-lamella: see glue-laminated wood.

m3sub: Cubic metres solid under bark (In Swedish m3fub: fast kubikmeter av stocken under bark).

M/B-component: The mid-layer and bottom-layer constitute a component that the floor manufacturer Kährs (and also Tarkett Wood) calls "*stomme*". In English, Kährs terms this component the core. However, to avoid any confusion with core and non-core components, this component is called the M/B-component (i.e. M = mid-layer and B=bottom-layer). The middle-layer consists of quarter sawn fingers of sawn timber and at each side an end-piece of plywood (or birch) that is glued together. The bottom-layer consists of a veneer board or a thin edge-glued panel, which is glued together with M/B-component.

MDF: Medium density fibreboard, which is a wood panel based on refined wood fibres bonded together by resin and under heat and pressure.

Mid-layer: see M/B-component.

Moisture content/quota: Weight of water contained in the wood.

NWP: Norrskog Wood Products, the supplier case study.

Particleboard: A panel manufactured from wood particles that is bonded together with resins and other binders by heat and pressure.

Parquet flooring (3-layer): Most common wooden flooring (in comparison with solid wood flooring). Consists of a bottom-layer, mid-layer and a surface wear-layer of high grade wood (see separate definitions).

Planing mill: Further processing of sawn timber by planing to make the surface less rough and improve the appearance.

Plywood: A structural cross laminated panel made of layers of wood that is tightly glued together.

Primary wood industry: In this thesis defined as the first tier sawmills that transform the sawlogs to sawn timber, consequence products and by-products (chips, sawdust and bark) (cf. Declos, 2000).

Processing of wood raw material: WPM firms' further transformation of sawn timber to products and systems such as doors, windows, floorings, kitchen and bath, stairways and different kinds of other joineries (Desclos, 2000; Brege et al., 2003; 2004).

Pulp industry: Industry transforming pulpwood and chips to pulp (cf. Rundh, 1992). A pulp mill can either be directly integrated with paper and paper board manufacturing or non-integrated and producing market pulp. An integrated mill means that all pulp and papermaking activities are conducted at the same site.

Puttying: Fill and repair defects with putty (In this thesis done for window blanks of insufficient quality).

Raw material commodities: Sawn timber with standardised specifications that is easily substituted by timber from other suppliers and is sold to several customers.

Sawlog: Logs in the natural state and of suitable quality and dimension to be used for sawn timber production. Thus, sawmills' raw material input. The other main type of output from the forest is pulpwood, which has a lower quality and is of smaller dimension (Skogsstatistisk årsbok, 2006).

Sawn timber: These are the demanded products and are rough unplaned timber that is wood sawn from sawlogs to meet technical and appearance properties (Nord, 2005). In the view of the WPM firm, sawmills that supply sawn timber are regarded as the suppliers of wood raw material. Sometimes termed sawn wood in literature.

Sawmill: Supplier of wood raw material that can be defined as the "*primary actor transforming the conical sawlog to a squared board [i.e. sawn timber]*" (Nord, 2005, p.1). The role of a sawmill is to optimise sawing of the sawlog in accordance with physical dimension properties (e.g. length, width and thickness) and technical (wood species, strength, moisture content, annual ring width, appearance, heartwood share, fibre and knot structure) (Nord, 2005, p. 50).

Sawmill companies in the primary wood industry: Suppliers to WPM firms. See also definition of sawmill.

Secondary processed wood product industries: see the WPM sector.

Softwood: coniferous wood usually evergreen with needles. In this thesis the softwood types considered are pine and spruce.

Stacking: Preparing the sawn timber for the drying activity by stacking it with help of wood-sticks. In Swedish the term used is "*ströa virke*t"

Strips: see wear-layer.

Taking over outsourcing: In this thesis taking over outsourcing refers to take over some of WPM firms' initial component manufacturing. Thus, sawmills going from mainly supplying raw material commodities to also more adapted components.

Value-adding strategies: A term very often used in the primary wood industry when discussion forward integration and can in this context be mainly considered as further processing of the sawn timber (Roos et al. 2000; 2002; Hansen et al. 2003; Nord, 2005). Value-adding strategies for sawmills are not homogenous (Roos et al., 2002). Instead they can include several different products and customer groups and by this search for competitive advantages on more niche markets. In Swedish the term used is "*vidareförädlingsstrategier*".

Veneer: Thin layer of wood.

Window blanks: The wood components for manufacturing the window frame. The blanks can, for example, be based on finger jointed glue-laminated wood or more traditional on sawn timber of high share of heartwood with know-free outer side. The term blanks is also used in similar ways in the stair-case and door industry (cf. Staland et al., 2002; Nord, 2005).

Wood floors: In this thesis defined as parquet floors, see parquet flooring.

Wear-layer: The surface of the three layer parquet flooring comprising of a veneer in choice of wood species, design and finish. The wear-layer is often made of a high grade quality of hardwood (e.g. oak, beach and ash). The sawlogs for the wear-layer is sawn to strips and then planed and further sawn to lamellas that form the wear-layer. Number of strips also refers to the type of parquet flooring that relates to the width of the wood-strip used in the wear-layer (i.e. 1-, 2- and 3-layer strip floors).

Wood panels: A collective term comprising of structural (plywood and oriented strandboard) and non-structural panels (e.g. MDF and particleboards).

Wood raw material: Defined as sawn timber supplied by the sawmills.

Wood raw material based component: A component based on wood to be used to form a complete wood product such as doors, windows or floors. See also component manufacturing.

WPM firms: Wood product manufacturing (WPM) firms are manufacturers of products incorporating sawn timber and are considered to be the secondary processed wood product industries (cf. Declos, 2000) or, from a sawmilling industry perspective, industrial end-users (Nord, 2005). The products of the WPM firms are the results of further transformation of wood raw material like sawn timber and other wood-based material for the professional and private consumers (Desclos, 2000; Brege et al., 2003; 2004). WPM firms are closely related by having the same types of suppliers for their purchase of wood raw material: sawmill companies in the primary wood industry (Nord, 2005). WPM firms are often operating on the domestic or even regional markets (cf. Nord, 2005).

WPM products: The products of WPM firms that are the result of further transformation of wood raw material to products and systems such as houses, doors, windows, floorings, kitchen and bath, stairways and different kinds of other joineries (Desclos, 2000; Brege et al., 2003; 2004).

Appendix 6: Outsourcing terminology

This section will shortly define some main outsourcing related terminologies used in the thesis. See also the thesis' chapters, especially the theoretical framework chapter, for a more discussion related to the different concepts.

Activity: An activity in this thesis refers to an event in the value chain and can be primary or supporting (cf. Porter, 1998; McIvor, 2000a). McIvor (2005, p. 97) considers activities as the "*routines and processed that have to be co-ordinated and integrated that enable an organisation to create and deliver products and services to their customers*" For example, to manufacture a window component or sawn timber several activities are present in the operation stage (see also Nord, 2005; Brege et al., 2006d).

The outsourcing decision analysis: Considers the analysis of whether or not to outsource and what key factors that are considered in the outsourcing analysis (also cf. McIvor, 2005).

Benchmarking: In a simplified way benchmarking is defined as comparing the firm's internal capability to perform activity in comparison with potential suppliers' (cf. McIvor et al., 1997; McIvor, 2000a) and/or competitors' (cf. Insinga and Werle, 2000; Gottfredson et al., 2005). Here, McIvor et al (1997) state that benchmarking includes searching out the "best of the breed". By this a company can establish possible performance gaps and either enhance internal performance or increase the outsourcing.

Buyer: see customer.

Capability: The use of capability in this thesis is in line with Brehmer (1999), who defines capabilities as the result of competencies, technologies, supplier/customer relationships, human resources and other resources that are combined to create basis for serving customers in an competitive way (also cf. Insinga and Werle, 2000). In line with this, in an outsourcing context, McIvor (2005, p. 97) refers to capability as the ability of a company to deploy resources to perform activities: "*an organisation may posses a superior cost position relative to its competitors (a capability) in manufacturing (an activity) which involves deploying equipment, people, technology etc. (resources)*". When considering outsourcing, capability benchmarking not only refers to analysing cost position but also looking at quality, flexibility, and service etc. (e.g. McIvor, 2005, p. 161).

Component: In this thesis the components considered in the outsourcing analysis are based on wood raw material. A component can be defined as several parts of input that together form the component and several components form a sub-systems that together form a product (Venkatesan, 1992; Fine and Whitney, 1999). The easiness of outsourcing a component will depend on how decomposable it is from the system of components that form the final product (Fine and Whitney, 1999). See also products.

Core: To decide what is core and non-core is main step in the outsourcing analysis. Core activities can be defined as central to meet the needs of customers and that are perceived by the customers as adding value and therefore being a major determinant of competitive advantage (Quinn and Hilmer, 1994; Lonsdale and Cox, 1997; McIvor, 2000a, p. 29; Fill and Visser, 2000). A company should not just consider problematic activities as non-core because they can still be important in the eyes of the customer and critical for competitive advantage (Lonsdale and Cox, 1997; Lonsdale, 1999; McIvor, 2000b). In line with this neither should something be considered as non-core just because external suppliers has higher capability (Venkatesan, 1992; McIvor, 2005). Research indicates that companies unfortunately too often define core in a static way and on a short-term basis (Lonsdale and Cox, 1997; Lonsdale, 1999; McIvor, 2005).

Core competence: On the basis of Quinn and Hilmer's (1994) and Hamel and Heene's (1994) definitions, core competencies will from an outsourcing starting point be considered more or less the same as certain strategically important activities for long-term competitive advantage.

Customer: In this thesis, in an outsourcing perspective, the customer or buyer is referred to the company conducting outsourcing (i.e. WPM firms).

Dependency: Outsourcing will increase the dependency to an external source (Lonsdale and Cox, 1997; Lonsdale, 1999; 2001; Abrahamsson et al., 2003; McIvor, 2005). In an outsourcing perspective, dependency can be considered from need of capacity or knowledge (Fine and Whitney, 1999). In a simplified way, dependency can be seen as the customer increases its need to the supplier by the increased external value-adding (Lilliecreutz, 1996; Abrahamsson et al., 2003).

Economies of integration: Offering cost advantages by forward integration can be defined as economies of integration (Porter, 1998). For example, this can include economies of scale, operations, information and internal control (e.g. Ibid.).

External source: see supplier.

Factor costs: Input needed to perform activities of the company, for example, labour, capital, raw material (Kanter et al., 1990; Porter, 1998; 1996; McIvor, 2005, pp. 153-154).

Forward integration: see vertical integration.

In-house: Refers to the governance within the firm's border.

In-sourcing: Transferring an outsourced activity back to in-house governance (cf. Harland et al., 2005; Swartling 2005).

Make-or-buy: The traditional make-or-buy decision is the explicit base of the outsourcing decision (see e.g. Welch and Nayak, 1992; Venkatesan, 1992; Brück, 1995; Rothery and Robertson, 1995; Probert, 1996; Jennings, 1997; McIvor et al., 1997; Cánez et al., 2000). While make is referring to in-house governance, buy mean using an outsourcing agreement.

Mixed strategy: see parallel production.

Non-core: see the core discussion.

Operational level: In my thesis this mostly refers to the manufacturing and the accompanied supply side with issues often of a more day-to-day and on a detailed nature (cf. Rothery and Robertson, 1995; Brehmer, 1999; Insinga and Werle, 2000).

Operations: Activities linked to transforming raw material input to complete products (Insinga and Werle, 2000; McIvor, 2005).

Outsourcing: In this thesis defined as transferring an activity from internal governance to external control. Outsourcing differs from purchasing where defining outsourcing simply in terms of a purchasing decision will limit the strategic scope (e.g. Wasner 1999, Greaver, 1999; Gilley and Rasheed, 2000; Ellram and Billington, 2001). Here, purchasing or procurement is more related to getting the input material that is used in the value chain (McIvor, 2005).

Outsourcing from a supplier side: In this thesis, the supplier side of outsourcing or outsourcing from a supplier side/perspective refers to the supplier's decision analysis of whether taking over outsourcing from the customer to increase the value adding. Auguste et al (2002) refer to this as the other side of outsourcing.

Parallel production: In this thesis parallel production or a mixed strategy refers to the concept of combing outsourcing with parallel in-house production (cf. Harland et al., 2005). Thus, a company retains a part of the activities in-house and not just conducting complete outsourcing and full closure of capacity.

Product: A manufactured product is made up of number of subsystems which themselves comprise of subassemblies of components (Venkatesan, 1992; Fine and Whitney, 1999). In this thesis, products manufactured by WPM firms are doors, floors and windows. The products of the sawmill case study are mainly sawn and planed timber.

Resource: A resource can be defined as the firm's tangible and intangible assets that are tied semipermanently to the firm (Wernerfelt, 1984). Examples of resources are equipment, buildings, economical and knowledge that can be combined in unlimited number of ways (Brehemer, 1999). From an outsourcing viewpoint, McIvor (2005, p. 97) defines resources as those companies deploy to perform an activity.

Resource-based theory (RBT): An often used theoretical perspective to understand the basic theoretical basis for outsourcing. From resource-based theory it is argued that firms will develop their competitiveness by resource uniqueness (focus on core competencies), which can distinguish them from competitors (e.g. Barney, 1991; Peteraf, 1993).

Supplier: The provider/partner taking over outsourced activities, i.e. the seller.

Strategic level: In the outsourcing literature there is often a heavy focus on the strategic level of outsourcing which means that the consideration is given to a core competence approach to decide what should be outsourced (see e.g. Welch and Nayak, 1992; Venkatesan, 1992; Quinn and Hilmer, 1994; McIvor et al., 1997; 2000a). Here, activities that create a basis for competitiveness should be kept in-house, while other non-core activities are potential for outsourcing (e.g. Quinn and Hilmer, 1994). Based on such reasoning, strategic level in an outsourcing analysis in this thesis can be defined as a more long-term and important for sustained competitiveness of the firm (cf. McIvor, 1997; 2005).

System/sub-systems of components: see product.

Technology: This thesis uses the definition of Brusoni et al's (2001, p. 597) view that has linkage to outsourcing. They define technologies as something that "*can be understood as the bodies of knowledge, understanding and practice, that underpin product design and manufacturing*".

Transaction cost theory (TCT): An often used theoretical perspective to understand the basic theoretical basis for outsourcing (cf. e.g. McIvor, 2005). From a transaction cost theory viewpoint there are economic reasons for organising some transactions in one way (i.e. in-house or market), and other in another way (Williamson, 1979; 1985).

Vertical integration: Porter (1998) considers downstream or upstream vertical integration a special but common case of a general strategic option to enter a new business. For an upstream supplier taking over outsourced activities this implies forward vertical integration in the supply chain. In this thesis this can be defined as integrating downstream or forward towards further finishing of semifabricated products (Scherer and Ross, 1990).