

**BUSINESS-LEVEL COMPETITIVE STRATEGY
IN THE
UNITED STATES HARDWOOD LUMBER INDUSTRY**

by

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(ABSTRACT)

Three related aspects of competition in the U.S. hardwood lumber industry were investigated. First, product and supplier attributes that are determinant in hardwood lumber purchase decisions were investigated within four segments of the market for hardwood lumber: Millwork producers, hardwood dimension and flooring producers, wood household furniture producers, and wood kitchen cabinet producers. Attributes with the highest determinant scores were: grading accuracy, supplier's reputation, freedom from surface checks, competitive pricing, and within-load thickness consistency. The least determinant attribute was the presence of the supplier's logo or trademark. The importance of various attributes was generally consistent across the market segments and producers were relatively well attuned to the needs of lumber users. Lumber users were least satisfied with lumber quality. Lumber producers perceived users to be least satisfied with the availability of certain species.

Business-level intended competitive strategy in the industry was investigated through quantitative identification of strategic groups in a sample consisting of the 100 largest U.S. hardwood lumber producers. Factor and cluster analyses were used to define strategic groups along the dimensions of cost leadership, focus, and differentiation. Five strategic groups were identified and examined as to strategic orientation and intra-group homogeneity. The differentiation dimension accounted for the greatest portion of strategic variation. Empirical evidence of the use of hybrid *Overall Cost Leadership/Differentiation* strategies was found – suggesting that strategic typologies that do not account for this strategy may not be applicable to a mature industry. Predicted strategic change in the industry concentrated on increasing differentiation orientation.

Qualitative data concerning competition in the industry was obtained via in-person interviews with executives at twenty of the largest companies in the sample. In general, the largest and smallest companies in the industry were found to be the most production oriented. Companies self-typed their competitive strategies using Porter's (1980) strategic typology. *Overall Cost Leadership* strategies were the most common followed by *Differentiation* and *Focus* strategies. The majority of companies interviewed competed for customers based on quality, customer service, and price – in that order of importance. Proprietary grading was an important competitive tool for larger companies.

PREFACE

This dissertation consists of five major sections. The first section describes the problems that the research addressed, defines the objectives of the research, and reviews literature relevant to the topic of competitive strategy and the hardwood lumber industry. The remainder of the dissertation consists of four sections, each comprising an independent manuscript. Since the manuscripts are designed for different journals and audiences, style and format may differ slightly. In addition, some duplication of information between manuscripts, to allow them to stand alone, was unavoidable. The author apologizes for any consternation this causes the reader.

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PROBLEM STATEMENT AND JUSTIFICATION

The hardwood lumber industry (Standard Industrial Classification 24211) is presently in a stage of maturity. Based on Department of Commerce data, production and demand for hardwood lumber are growing slowly at an average annual rate of approximately 2 percent (Ulrich 1988). The number of producers has decreased in recent times (USDC-BOC 1980, USDC-BOC 1985a) and substitute products have created strong competition for hardwood lumber in traditional and important markets such as the furniture and pallet industries (Luppold and McKeever 1987, Singh 1986, McLintock 1987). In addition, foreign producers of hardwood products and non-domestic markets for hardwood lumber have become important factors in the industry (Losser 1986, Nolley 1988).

Many of the changes the hardwood lumber industry has experienced can be considered indications of industrial maturity (Day 1986). These changes are not unique to the hardwood lumber industry. Many industries are experiencing maturity and the changes associated with this stage in the life cycle. In fact, the majority of North American businesses operate in mature or declining industrial environments (Hearne 1982).

Additional changes in the structure and nature of competition can be expected as the hardwood lumber industry evolves through maturity and, perhaps, decline (Harrigan 1988). In order to remain profitable in the face of these changes, firms in the industry must adopt strategies that allow them to maintain a competitive advantage. Strategies that were profitable during the previous stages of the life cycle, or the early stages of maturity, may not be successful during late maturity and

decline (Heame 1982). The firm must also look beyond the present stage of evolution since strategic decisions made during industry maturity can affect strategic alternatives and, possibly, profitability during decline (Harrigan and Porter 1983). The only logical alternative to maintaining a competitive advantage is to exit the industry.

The position of an industry in the life cycle is a fundamental variable in determining appropriate competitive strategy. Major changes in strategy are usually required as the industry moves through the life cycle (Hofer 1975). Unfortunately, traditional strategic planning is best suited for the first half of the industrial life cycle and has performed least effectively in the mature/declining environment (Day 1981). In addition, the applicability of generalized models of competitive strategy to the mature/declining environment is limited due to the fact that mature/declining industries are often treated as homogeneous - ignoring critical differences such as the causes of decreased demand, the strength and number of competitors, and potential for enduring pockets of demand (Harrigan 1980).

In spite of these problems, there is a lack of research available that is specific to competitive strategy in mature/declining industries (Day 1981, 1986; Harrigan 1980, 1988). This lack of research is especially evident in the context of wood-based industries, many of which could be considered mature or declining. This study seeks to reduce this information gap by investigating the business-level strategic postures, both present and expected future, of major firms in the hardwood lumber industry.

The majority of firms in the hardwood lumber industry are small, independently owned operations (White, Lamb, and Wengert 1981) that may not have the resources or expertise to enable them to diversify into alternative industries as the

hardwood lumber industry evolves. Consequently, a niche or focus strategy – create or defend a strong position in a particular segment (Porter 1980) – may be most appropriate for many hardwood lumber producers. The appropriateness of such a strategy is supported by Gundy (1986 p.46) who states:

"We have a definite lack of product specialization in our hardwood industry ... too many of us are attempting to be everything to every hardwood consumer and we pay the price. Why not specialize?"

This study addresses the question of how to best serve specific market segments by providing basic information concerning the product and supplier attributes considered determinant by lumber buyers in four industries that constitute segments of the market for hardwood lumber: wood household furniture, millwork, kitchen cabinets, and hardwood dimension and flooring.

The knowledge this study provides will aid in forecasting the raw material and work force requirements of the industry by better understanding how the industry is likely to evolve and react to changes. In addition, it can help to better tailor hardwood processing research to the present and future needs of the industry.

McLintock (1987 p.82) provides a succinct description of the need for marketing research in hardwood-based industries. He states:

"Hardwood industries just do not maintain forward-looking, effective marketing programs based on an understanding of consumer needs and expectations. The dilemma facing any company that wants to do a better job in this

regard is that the information it requires is not available, and the mechanisms for obtaining it are not in place. The research has not and is not being done."

This study sought to help provide this needed information.

OBJECTIVES

1. Develop and test a methodology for categorizing business-level competitive strategy and determining strategic change in a mature industrial environment. Determine the applicability of existing strategic typologies to the U.S. hardwood lumber industry.
2. Characterize the product and supplier attributes required by selected industrial consumers of hardwood lumber. Identify the attributes that are determinant in purchase decisions.
3. Determine the perceptions of primary hardwood processors concerning product and supplier attributes required by selected industrial consumers of hardwood lumber. Compare these perceptions to the results of objective number two.

REVIEW OF LITERATURE

✓ The Hardwood Lumber Industry

Definition:

An industry can be defined as a group of firms producing goods or services that are considered close substitutes (Porter 1980, Day 1984). Exactly how closely substitutable products or goods need to be in defining an industry is subject to debate, but Porter (1980) suggests using Standard Industrial Classification (SIC) codes as the basis for delineation.

This is the approach that will be used in this study in defining the hardwood lumber industry as those firms classified under SIC 24211 (Hardwood lumber, rough and dressed). It should be noted that this level of classification (five digits) is considered by Porter (1980) to be too narrow for some analyses. However, for the purposes of this study, SIC 2421 (sawmills and planing mills, general) - which includes firms producing softwood lumber, wood chips, softwood siding, and softwood cut stock - is too broad. Clearly, these varied products are not practical substitutes for one another. By using the more restrictive five digit definition of the hardwood lumber industry, the study more closely conforms to Porter's (1980) definition.

✓ Size and Expenditures:

In 1982, the hardwood lumber industry (SIC 24211) consisted of 840 establishments primarily involved in the production of hardwood lumber and had employment of approximately 21,200. The total value of shipments reported by the Department of Commerce was 1.95 billion dollars in 1987 (USDC-BOC 1989).

However, this figure appears unrealistically low in light of estimated industry production.

During 1982, new capital expenditures in the industry totaled 56.5 million dollars; approximately 67.3 thousand dollars per establishment or 3.2 thousand per production employee (USDC-BOC 1985a). When compared to new capital expenditures in the softwood lumber industry (SIC 24212) of approximately 4.4 thousand dollars per production employee, this figure suggests that the hardwood industry has been less aggressively modernizing. This idea is supported by a 1985 study of the eastern sawmilling industry that characterized the typical eastern hardwood sawmill as a small operation utilizing a circular headrig and non-computer controlled/assisted processing equipment (Bush 1986). White, Lamb and Wengert (1981) similarly characterized the industry as consisting of small, independently owned firms lacking in automated processing equipment.

Specialization and Concentration:

While the Bureau of Census does not report a current specialization ratio¹ for SIC 24211, it is thought to be quite high since the specialization ratio for the more general SIC 2421 is 93 percent (USDA-BOC 1985a). In addition, researchers have stated that the hardwood lumber industry is highly specialized (White, Lamb and

¹ The specialization ratio represents the ratio of shipments of products primary to the industry to total product shipments (USDC-BOC 1986). It provides a rough measure of product diversity in the industry. A related measure, the coverage ratio, represents the ratio of primary products shipped by firms in the industry to total shipments of the products (USDC-BOC 1986).

Wengert 1981). This high specialization implies that the hardwood lumber industry is, in general, lacking in product diversification.

The industry is not highly concentrated and can be characterized as fragmented. Based on a comparison of data from the National Forest Products Association (Corlett 1988) and the USDA - Forest Service (Ulrich 1988), the top five firms in the industry (by production) produce between 6 and 8 percent of the total industry output.

↳ Production and Consumption Trends:

Hardwood lumber production figures reported by the USDA - Forest Service (Ulrich 1988), which are based on U.S. Department of Commerce - Bureau of Census data, are perhaps the most consistently reported. These data indicate that hardwood production between 1955 and 1986 varied between a low of 5.1 billion board feet in 1982 and a high of 8.0 billion board feet in 1956 (Table 1).

Until recently, hardwood lumber production data reported by the National Forest Products Association (NFPA 1984) were quite similar to Forest Service data. However, researchers have begun to question the U.S. Department of Commerce statistics (Cardellichio and Binkley 1984, Corlett 1988). As a result, the NFPA recently revised its estimates of U.S. hardwood lumber production upward an average of approximately 37 percent for 1978 through 1987 (Corlett 1988). In particular, the new NFPA figures indicate that 1986 hardwood production was 10.024 billion board feet and preliminary figures indicate that 1987 production represented a twenty year high of 11.026 billion board feet.

Luppold and Dempsey (1989) estimate 1986 hardwood lumber production at 10.024 billion board feet but the authors excluded hardwood lumber production in regions other than the central and eastern United States - suggesting that total U.S. production was slightly higher. The *Weekly Hardwood Review* (Anonymous 1987) proposed that 1987 production was actually in the 12 - 13 billion board feet range. However, the lack of methodological support for estimates proposed by the *Weekly Hardwood Review* detracts from their credibility.

Apparent hardwood lumber consumption follows hardwood lumber production quite closely since, in recent years, net exports have been a relatively small portion of the total market (Cardellichio and Binkley 1984, Nolley 1988). Between 1977 and 1987, for example, net exports peaked at 278 million board feet or approximately 4 percent of production (Tables 1 and 2). Using Department of Commerce data (Ulrich 1988) for the 1975 - 1985 period, net exports averaged 70 million board feet per year or approximately one percent of average production.

Despite the disagreement over the absolute magnitude of hardwood lumber production and short term fluctuations, it is evident that production and demand for hardwood lumber are growing slowly. Cardellichio and Binkley (1984) report an average annual production growth rate of 0.5 percent between 1950 and 1980. Based on Department of Commerce data, production increased at an average annual rate of 2.1 percent between 1976 and 1986 (Ulrich 1988).

Markets:

The major uses of hardwood lumber in recent years have been in pallets, furniture, and railroad ties (Cardellichio and Binkley 1984, Gundy 1986, Luppold

1988, Spelter and Phelps 1984). Table 3 provides the relative share of these and other markets for hardwood lumber in 1980. Table 4 provides more recent estimates of the consumption of eastern hardwood lumber. The wood household furniture industry (SIC 2511) is the single largest user of higher grade hardwood lumber and the only one of the three major uses that consumes significant quantities of higher grade material (Luppold 1986, Ackerman 1987). Pallets are the largest single use for hardwood lumber (Luppold 1988, Gundy 1986) but lumber purchases for pallets are concentrated in lower lumber grades (Wengert and Lamb 1981, Araman 1987, Luppold 1988).

Pallets - The demand for pallets has grown significantly in the last 50 years (McCurdy and Ewers 1987). Production of pallets reached 250 million units in 1980 and accounted for approximately 32 percent of total hardwood lumber use (Cardellichio and Binkley 1984, Spelter and Phelps 1984). By 1985, estimated production reached 450 million units - consuming an estimated 4.6 billion board feet of hardwood material². However, the National Wooden Pallet and Container Association (NWPCA 1988) reported a substantially lower figure of 304 million units for 1985 and approximately 418 million units for 1987.

Luppold (1988) reports that the proportion of hardwood lumber used for pallets grew to approximately 50 percent in 1986. Lumber use per pallet, however, has decreased (Spelter and Phelps 1984), possibly resulting from a trend toward the

² This estimate is based on: 13.89 board feet of lumber per pallet, a nationwide average of 73 percent hardwood lumber, and total production of 450 million units (McCurdy and Ewers 1987, McCurdy et al. 1988).

production of fewer non-expendable pallets (which typically contain more wood) in favor of expendable pallets (McCurdy et al. 1988).

While pallet demand has grown strongly in recent times, substitute products have begun to impact the demand for hardwood lumber in pallet production (McLintock 1987). For example, the U.S. automotive industry recently began to utilize plastic pallets and bins (Singh 1986) and United States military use of wood pallets has been affected by competition from plastics (Anonymous 1988). The development of wood-based substitutes, such as molded flakeboard pallets, may also pose a threat to solid wood pallets.

Spelter and Phelps (1984) estimate that 75 percent of total pallet production is from purchased lumber. Using this figure and NWPCA production figures for 1987, the market for hardwood lumber to pallet producers is an estimated 3.2 billion board feet. Obviously, this is a significant market segment. However, the importance of the segment is reduced somewhat since pallet producers purchase primarily low quality, low value-added material.

Hardwood Lumber Exports -- As is the case with pallets, hardwood lumber exports have grown significantly in recent years (Table 2). Lumber exports from the United States reached over 725 million board feet in 1987 and had a reported value of over 474 million dollars (Araman 1988a, Nolley 1988). However, this value appears unrealistically low in light of domestic prices for lumber. Net exports, while small in relation to production, have grown since 1985 (Table 2).

The volume of hardwood lumber exports increased significantly in 1988 to an estimated 1.3 billion board feet - a 79 percent increase over 1987 exports (Phelps

1988). Net exports for 1988 increased by 200 percent over 1987 to an estimated 900 million board feet (Table 2).

It should be noted, however, that estimates of export levels based on Department of Commerce data have been questioned. Luppold (1989) states that Department of Commerce data overestimates the volume of hardwood lumber exports and estimates that exports will reach 700 million board feet in 1989. While this figure indicates growth in exports, it is significantly below the previous estimate of 1.3 billion board feet in 1988 (Table 2).

The largest quantities of exported lumber are destined for Canada, Taiwan, Japan, and the Federal Republic of Germany (Araman 1987). Red and white oak are the principal species exported but maple and walnut are also exported in significant quantities (Araman 1984, Nolley 1988).

Although only a relatively small percentage of total hardwood lumber is exported, this market is significant since export lumber is generally a high quality, high value-added product (especially exports to Europe). This point is evident in the fact that in 1986 one of every five dollars received by hardwood sawmills was generated through export related sales (Araman 1988a).

The hardwood lumber export market in the future will be affected by a number of factors. Just as domestic hardwood markets have been affected by substitute products, so have foreign hardwood users. European furniture producers, in particular, have been under pressure to maintain lower costs through substitution of less expensive materials for imported wood (Araman 1987). Hardwood lumber exports will also be affected by changes in the value of the dollar relative to other currencies and by the domestic furniture market since furniture manufactured

overseas, of U.S. lumber, is often sold in the U.S. Finally, since the export market is heavily dependent on a few species, hardwood lumber exports are affected by the state of alternative domestic markets for the lumber.

High Value Markets -- In addition to the export market, high quality lumber is used by the millwork (SIC 2431), wood household furniture (SIC 2511), hardwood dimension and flooring (SIC 2426), and wood kitchen cabinet (SIC 2434) industries (Araman 1987). This study concentrated on these product/markets since they may offer the greatest potential for niche marketing which can form the basis of competitive strategy (Day 1984). In addition, other major markets for hardwood lumber such as pallets, and exports have been relatively well studied in recent times (see, for example: Araman 1984, 1987, 1988a, 1988b; Luppold 1988; McCurdy and Ewers 1987; McCurdy et al. 1988).

High Value Markets for Hardwood Lumber

The Wood Household Furniture Industry:

The wood household furniture industry (SIC 2511) consisted of 2,607 establishments (2,430 companies) in 1982. This was down from 2,982 establishments (2,796 companies) in 1977 (USDC-BOC 1985b). The industry is numerically dominated by small firms. Approximately 68 percent of the establishments have 20 or fewer employees (USDC-BOC 1985b). Industry employment during 1982 was 123,900 and employment increased to 140,600 by the second quarter of 1987 (Nolley 1988).

Bureau of Census statistics (USDC-BOC 1986) indicate a specialization ratio of 95 percent and a coverage ratio of 96 percent for the wood household furniture industry. This relative lack of product diversification, as well as the industry's low concentration (four-firm total of less than 15 percent of industry output), has also been reported by the U.S. Department of Commerce - International Trade Administration (USDC-ITA 1985).

✓ Hardwood lumber was the most important material used by the wood furniture industry in 1982, accounting for 18 percent of total material cost (Luppold 1986). However, lumber use by the furniture industry, in general, has decreased on a per unit basis. Spelter and Phelps (1984) report lumber consumption per unit of output by the furniture industry as steadily decreasing from 1949 to 1981. Luppold and McKeever (1987) adjusted hardwood lumber use in the industry by the level of production and found that usage per unit decreased between 1963 and 1982. This decrease reflects the substitution of alternative materials (usually wood based) for hardwood lumber (Cardellichio and Binkley 1984, Ackerman 1987). In particular, composite panels and softwoods have gained market share from hardwood lumber (Luppold and McKeever 1987). Since furniture production increased threefold over the 1949 to 1981 period (Spelter and Phelps 1984, Swanston, Morrissey, and Rosenthal 1985), the drop in lumber demand was not as great as the substitution effect would suggest.

The wood household furniture industry exhibits many of the attributes of the perfect competition model of industry structure (although not to the extent exhibited by some other wood-based industries). These include (USDC-ITA 1985):

- Many manufacturers with no firm controlling a large market share
- Little brand recognition
- Nearly homogeneous product
- Technology that is available to all firms such that none have a sustainable competitive advantage based on superior technology
- Strong price competition

The loss of market share to imported furniture is a major threat to the furniture industry (Swanston, Morrissey and Rosenthal 1985). The wood household furniture industry, in particular, is threatened by foreign competition since it does not enjoy the protection that high shipping costs afford the upholstered furniture industry. Foreign market share in this category (wood household furniture) grew from 6 percent in 1979 to 13 percent in 1983 (NDMA 1985). Araman (1988b) estimated the market share held by imported wood household furniture to be approximately 22 percent in 1987 (based on deflated dollar values of shipments). In constant 1982 dollars, the value of imported wood household furniture and parts has increased from 478 million dollars in 1977 to 1.787 billion dollars in 1987 (Nolley 1988).

The furniture industry has experienced below average profits in recent times and this has resulted in low capital investment and slow productivity growth (USDC-ITA 1985). New capital expenditures in the industry averaged 45.7 thousand dollars per establishment in 1982 (USDC-BOC 1985b). Labor productivity fell at an annual rate of .2 percent between 1972 and 1981 (USDC-ITA 1985). In more recent times, however, the industry has experienced slight gains in labor productivity (Herman 1987). Overall, the industry is considered to be in a poor position to compete with

foreign competition due to its labor intensity and relatively high U.S. labor costs (USDC-ITA 1985).

In general, the furniture industry is tending toward less fragmentation as large corporations acquire smaller concerns. For example, Interco Corp. owns Broyhill, Ethan Allen, and Highland House, Inc. furniture galleries (Interco 1988). Martens and Araman (1987) support this contention in stating that the furniture industry is highly competitive and increasingly dominated by large concerns.

The Hardwood Dimension and Flooring Industry:

Statistics for hardwood dimension manufacturers (SIC 24262) and hardwood flooring manufacturers (SIC 24261) are generally reported in combination under SIC 2426 by the Bureau of Census. Consequently, information specific to either of the industries is often lacking. Because of this and the fact that other sources of industry specific information are few, the approach taken here will be to first investigate the industries in combination (SIC 2426) and then review the available information specific to the individual industries.

The number of establishments in SIC 2426 has decreased in recent times from 933 in 1972 to 780 in 1982 (USDC-BOC 1984). This represents a decrease of approximately 16 percent. Over the same period, the proportion of larger firms (20 or more employees) remained constant at approximately 39 percent. The total number of employees dropped, however, from 29,100 to 22,900 (USDC-BOC 1985a). Employment during the second quarter of 1987 had increased significantly to 33,000 (Nolley 1988).

Hardwood dimension and flooring manufacturers are similar to wood household furniture manufacturers in that they are highly specialized and produce the majority of the products primary to their industries. Firms categorized in SIC 2426 had an overall specialization ratio of 90 percent and a coverage ratio of 92 percent in 1982 (USDC-BOC 1986). The industry, like many wood-based industries, is fragmented and many of the firms are small, family owned operations (NDMA 1985).

New capital expenditures by firms included in SIC 2426 totaled 24.3 million dollars in 1982 or approximately 30.8 thousand dollars per establishment (USDC-BOC 1985a). This compares to 66.7 thousand dollars per establishment in the hardwood lumber industry and 45.7 thousand dollars per establishment in the wood household furniture industry. The industry purchased 751.6 million board feet of hardwood lumber in 1982; 81 percent of which consisted of rough lumber (USDC-BOC 1985a). Production is concentrated in the eastern U.S. with North Carolina, Tennessee, Virginia, Kentucky and Pennsylvania being the leading states (NDMA 1985).

Three major product classes account for the majority of the value of shipments from SIC 2426: Hardwood dimension stock (SIC 24262) accounts for 52 percent, Hardwood flooring (SIC 24261) for 23 percent, and wood frames for household furniture (SIC 24266) accounts for 10 percent (NDMA 1985).

Standard Industrial Classification 24262 -- Hardwood dimension stock, furniture parts, and vehicle stock manufacturers make up SIC 24262 and form the largest segment of SIC 2426. This industry accounted for 30 percent of the establishments, 51 percent of the employees, and 52 percent of the value of shipments within SIC

2426 in 1982 (USDC-BOC 1985a, NDMA 1985). During the same year the industry included 238 establishments and 11.6 thousand employees (USDC-BOC 1985a).

Total value of shipments by firms in SIC 24262 was 444.2 million dollars in 1982, a three percent decrease when compared to 1977 (Losser 1986). In real terms, the value of industry shipments has been declining since 1972 (NDMA 1985). While exact figures are difficult to obtain, 1988 demand for hardwood dimension was strong enough to allow the industry to make capital investments to expand capacity and improve productivity (Losser 1988).

The industry supplies dimension stock to a variety of firms. The largest portion of shipments, however, are to furniture and cabinet manufacturers (Losser 1986). This dependence on sales to furniture manufacturers makes firms in SIC 24262 vulnerable to the market share gains made by foreign manufacturers of furniture and furniture parts. Foreign furniture part manufacturers compete, primarily, on price (NDMA 1985) and the U.S. industry is not in a good position to compete on this basis. Labor rates in the U.S. are considered to be higher than in the competing countries, the technology level of U.S. producers is generally equivalent to their competitors, technological improvements are generally available to all producers, and shipping costs or the lack of domestic raw material supplies have not proven to be significant deterrents to export to the U.S. (NDMA 1985). As a result, some furniture manufacturers have begun to use imported furniture parts in order to lower their costs (Losser 1986). This effect can be seen in the over 70 percent increase in the value (constant 1982 dollars) of imported household furniture and furniture parts between 1977 and 1987 (Nolley 1988).

Another threat to the industry is the trend on the part of furniture and cabinet manufacturers toward backward integration. The National Dimension Manufacturers Association (1985) estimates that 89 percent of U.S. dimension users produce at least some of their own dimension parts and approximately 72 percent of the total dimension material used is internally produced. The effects of such integration are to give dimension users bargaining power over dimension manufacturers and to place a ceiling on profits in the dimension industry (Porter 1980). Dimension manufacturers are also vertically integrated. Approximately 23 percent owned sawmill operations in 1985 (NDMA 1985) and this trend is increasing (Losser 1988).

Standard Industrial Classification 24261 – Manufacturers primarily engaged in the production of hardwood flooring materials are classified in SIC 24261. This classification included only 44 firms in 1982 and employed approximately 4200 people (USDC-BOC 1985a). The industry consumed an estimated 476 million board feet of lumber in 1987, the majority of which was oak (Martens 1988). Unlike the dimension and wood furniture industries, the hardwood flooring industry uses significant quantities of 2 common and 3A common grades of lumber (Martens 1988, Araman 1987). Most companies produce strip flooring as opposed to parquet, plank, or laminated (Martens 1988).

The demand for hardwood flooring has changed dramatically in the last 30 years. Cardellichio and Binkley (1984) report a drastic decrease in demand between 1960 and 1980. In the eighties, production has increased but remains well below the levels of the sixties and early seventies (Figure 1).

While the flooring industry does not appear to be suffering from competition from foreign producers, it remains vulnerable to changes in residential housing construction and to product substitution. Changes in the demand for hardwood flooring can result from a decrease in the number of housing starts or from a decrease in the amount of flooring used per housing unit (resulting from the substitution of alternative flooring materials). This latter effect has been documented by Spelter and Phelps (1984) who reported a 90 percent decrease in wood use for flooring per single family home between 1950 and 1976.

The Millwork Industry:

The millwork industry (SIC 2431) consists of firms primarily engaged in the production of windows and window parts, doors and door parts, and wood molding (USDC-BOC 1985c). The industry consumes higher grade lumber (Firsts & seconds, and selects) and as such competes with the export market for material (Araman 1987).

The millwork industry included approximately 2,321 establishments in 1982 and 72 percent of these firms had fewer than 20 employees (USDC-BOC 1985c). This number, however, includes softwood millwork manufacturers as well as hardwood manufacturers. In fact, the industry consumed almost three times as much rough softwood lumber as rough hardwood lumber in 1982 (USDC-BOC 1985c). Accordingly, most millwork and molding plants are located in the western U.S. (Gundy 1988). Consumption of hardwood (rough and dressed) totaled 786.6 million board feet in 1982 (USDC-BOC 1985c).

New capital expenditures totaled 34.4 thousand dollars per establishment in 1982 (USDC-BOC 1985c). This figure is less than the 66.7 thousand dollars per establishment during the same year in the hardwood lumber industry (SIC 24211) but slightly more than what was spent in the hardwood dimension and flooring industry (USDC-BOC 1985a).

Capital expenditure levels have been sufficient in recent years to avoid decreases in labor productivity. Herman (1987) reports that productivity (as measured by output per employee hour) in the millwork industry increased slightly between 1980 and 1984. The industry employed 77,200 workers in 1986 (USDC-BOC 1988). As is common in wood-based industries, the millwork industry exhibits high specialization and coverage ratios (USDC-BOC 1986).

The majority of millwork firms are small operations. In 1982, for example, 55 percent of the firms in the industry employed fewer than 10 people and only 5 percent employed 100 or more people (USDC-BOC 1985c). Consequently, it is likely that the majority of millwork firms do not purchase lumber in quantities large enough to gain significant power in bargaining with lumber suppliers.

Cardellichio and Binkley (1984) report a decrease in the use of hardwood lumber for millwork between 1960 and 1980. However, no information is given as to the reasons for the decrease. McKeever and Martens (1983) report total lumber use by the millwork industry as 2,429 million board feet in 1977. Approximately 16 percent (388 million board feet) of this use was hardwood lumber. While hardwood flooring use per single-family home decreased dramatically between 1950 and 1976, hardwood millwork use increased from 235 board feet per unit in 1950 to an estimated 340 board feet per unit in 1976 (Spelter and Phelps 1984). In 1988,

demand for molding and millwork was strong, primarily due to active Do-It-Yourself and professional remodeling markets (Tomasko 1988).

Major threats to hardwood lumber use in the millwork industry are the substitution of softwood species for hardwoods and the use of non-wood materials in products such as windows, molding, and doors. Softwoods held a 84 percent share of lumber used by millwork firms in 1977 (McKeever and Martens 1983) and increases in this share are likely to be at the expense of hardwood lumber. Metal doors have developed some market share and plastics have become established for window parts. A recent threat from a wood-based product has been developed in the form of molding products that consist of veneer or vinyl wrapped over a reconstituted or low grade solid wood core. Veneer overlays, in particular, are becoming common (Tomasko 1988).

The Wood Kitchen Cabinet Industry:

The wood kitchen cabinet industry (SIC 2434) includes firms primarily engaged in the manufacture of wood kitchen cabinets and wood bathroom vanities. The industry included 2,964 establishments in 1982 and, in contrast to many wood based industries, the number of establishments grew by 65 percent between 1972 and 1982 (USDC-BOC 1985c). Firm size is heavily skewed toward smaller establishments as is evidenced by the large percentage (68%) of firms with fewer than 10 employees (USDC-BOC 1985c). Total employment within the industry was 53,400 in 1986 (USDC-BOC 1988).

The largest single group of firms within the industry produce cabinets on a custom basis. Perhaps because of the predominance of smaller firms, the industry's

new capital expenditures per firm are low. In 1982 they amounted to approximately 14.8 thousand dollars per establishment (USDC-BOC 1985c). In spite of this, the industry managed a very slight productivity gain between 1980 and 1984 (Herman 1987).

The large number of small firms in the wood kitchen cabinet industry suggest that it can be characterized as fragmented. This characterization is supported by evidence of relatively low concentration. In 1982 the industry had a four company concentration of 12 percent (USDC-BOC 1986). The industry is also highly specialized and produces the vast majority of products primary to the industry. A specialization ratio of 96 percent and a coverage ratio of 97 percent were reported for 1982 (USDC-BOC 1986). These ratios indicate that the industry has not widely diversified into non-cabinet products and that firms in other industries have not diversified into cabinet manufacture to any great extent. Major competitors in the industry (based on 1986 sales figures) include: Merillat Industries, Inc. with sales of \$215.9 million; Triangle Pacific Corp. with sales of \$165.2 million; and the WCI Cabinet Group with sales of \$152.3 million (Gralla Publications 1987).

Total lumber use in the industry was approximately 186.2 million board feet in 1977 and approximately 73 percent (135.9 million board feet) of this was hardwood lumber (McKeever and Martens 1983). Luppold (1989) estimated eastern hardwood lumber consumption by the industry at 358 million board feet in 1977 and 612 million board feet in 1987. Regardless of which estimates are more accurate, it is apparent that the kitchen cabinet industry is among the larger users of hardwood lumber.

Threats to hardwood lumber use by the wood kitchen cabinet industry include the use of substitute materials and changes in housing starts. The kitchen cabinet

industry consumes significant quantities of plywood, particleboard, and medium density fiberboard - often substituting for hardwood lumber (McKeever and Martens 1983). Ackerman (1987) reports that laminate-faced panels have displaced solid wood in approximately 15 to 20 percent of kitchen cabinet production.

Demand for kitchen cabinets is closely tied to housing starts and the level of residential repair and remodeling activity (Ackerman 1987). The repair and remodeling market has grown in recent years while housing starts have fluctuated. Given a steady level of housing starts, demand for wood kitchen cabinets is expected to grow slightly in the near future (Ackerman 1987). Additionally, demand for hardwood lumber for use in kitchen cabinets will be influenced by the level of price competition within the industry. Increased competition will tend to stimulate the use of lower cost substitute materials and reduce the use of hardwood lumber.

Summary:

The hardwood lumber industry can be characterized as fragmented, highly specialized, and consisting of many small firms. Overall, demand for hardwood lumber is growing slowly. However, demand differs widely by market. For example, hardwood lumber use by the pallet industry and the export market has grown in recent years while lumber use in flooring has declined dramatically. The position of lumber in almost all of these markets is being threatened by substitute materials and imports.

Competitive Strategy

Competitive strategy consists of goals in conjunction with policies designed to enable the organization to reach these goals (Porter 1980). Competitive strategies can be dichotomized along corporate-level and business-level lines. Hofer (1975 p.784) defines business-level as:

"... that level in an organization at which responsibility for the formulation of a multifunctional strategy for a single industry or product/market is determined."

In contrast, corporate-level refers to the top level of an organization - regardless of its size. This dichotomy is useful even though differences between the corporate- and business-levels are often blurred. For example, in small, single-industry organizations corporate- and business-level strategy is coincident. In addition, guidelines for corporate-level strategy may be applicable to the business-level if one focuses on analysis of product/markets rather than business units.

Corporate-level strategy is concerned with the configuration, management, organization, and financial transactions of business units - typically representing various industries (Patel and Younger 1978). In simpler terms, corporate-level strategy considers which industries to compete in (Hambrick 1980) and how to manage the business units within the chosen industries. This area of competitive strategy has been the focus of the bulk of attention from researchers (Hofer 1975), perhaps because of the limited availability of business-level data as compared to corporate-level data. Competitive strategy research specific to wood products based organizations has also concentrated on the corporate level.

In contrast to corporate-level strategy, business-level strategy is concerned with operating within a single industry. Business-level strategies are comprised of an investment substrategy, a political substrategy, and a competitive substrategy (Hofer and Schendel 1978). Investment substrategies address the question of optimum allocation of limited (usually financial) resources. Political substrategies are concerned with the firm's interactions with external groups. Business-level competitive strategies address the problem of achieving and maintaining a competitive advantage within an industry or product market (Porter 1980,1985; Day 1984; Patel and Younger 1978). Competitive advantage is the result of a business's use of superior skills or resources to obtain positional advantages that result in performance outcomes (Figure 2).

Competitive Strategy Research:

The literature concerning competitive strategy can be segmented into three general groups. The first group seeks normative models that have implications for strategy formulation. Examples include, but are not limited to, the experience curve effect (Day 1986, Webster 1984), the product life cycle concept (Harrigan 1980, Day 1986), and various portfolio type models (Webster 1984, Day 1986, Harrigan and Porter 1983, Morris 1988).

The second group of studies (which can be theoretically or empirically based) seek to define a limited number of generic strategies representing generalized competitive positions or postures. In the framework of Figure 2, these generic strategies are analogous to positional advantages. As such, they do not provide the manager with information concerning how to use the firm's strengths to obtain

positional advantage, but rather they provide guidelines as to which positional advantage to seek.

Examples of studies within this second group include much of the work based on the Profit Impact of Market Strategy (PIMS) database (Hambrick and Schecter 1983, Galbraith and Schendel 1983, and others) as well as the works of Day (1984), Miller and Friesen (1977), Harrigan (1988), Harrigan and Porter (1983) and Porter (1980). Many of these studies concentrated on corporate-level competitive strategy. However, as previously noted, the business-level/corporate-level dichotomy is often blurred.

Porter's (1980) three strategies (*Overall Cost Leadership*, *Differentiation*, and *Focus*) constitute perhaps the most well known generic strategy typology. Achieving low product cost can produce a significant competitive advantage but can require large capital expenditures and favorable access to raw materials (Porter 1980). Hardwood lumber producers may find a low cost position based on superior technology difficult to defend since production technology is relatively stable and generally available to competitors. Following a differentiation strategy requires creating a product that is perceived industry-wide as unique (Porter 1980). Competitive strategies based on differentiation are defensible when customers are brand loyal and less price sensitive toward the differentiated product than to competing products. Finally, firms that pursue a focus strategy specialize in a particular market segment and defend it by creating switching costs for their customers.

Dess and Davis (1984) identified a series of strategic dimensions that serve to differentiate Porter's (1980) three generic strategies. These include brand

identification, channel selection, technological leadership, cost position, service, and leverage.

Day (1984) proposed a set of generic strategies similar to Porter's (1980) with the addition of a *hybrid* (low cost and differentiation) strategy. Figure 3 shows the appropriate positions of these strategies along the dimensions of customer price sensitivity and relative differences in products.

The definition of generic strategies has led to a third group of studies which seek to categorize competitive strategy employed in a particular business segment. These studies often make comparisons to proposed generic strategy typologies and, typically, firms are combined into strategic groups using statistical algorithms or the researcher's judgement³. Examples of these studies include; Dess and Davis (1984), Galbraith and Schendel (1983), Harrigan (1985b), Rich (1986), O'Laughlin and Ellefson (1981a,b,c), and Cleaves and O'Laughlin (1986a,b).

Dess and Davis (1984) examined intended business-level competitive strategy within the paints and allied products industry (SIC 2851) and compared strategic groupings to Porter's (1980) generic strategy typology. Their results provide empirical evidence of the validity of Porter's typology in an industry not unlike the hardwood lumber industry in its fragmentation. Dess and Davis' (1984) work also provided methodological guidelines for future research into business-level strategy.

³ Strategic groups are groups of firms within an industry or group of industries that follow similar, although not necessarily identical, competitive strategies (Hitt, Ireland, and Stadter 1982; Porter 1979). The existence and importance of strategic groups has been supported by several authors (Porter 1979, Harrigan 1985b, Newman 1978, O'Laughlin and Ellefson 1981c).

Galbraith and Schendel (1983) used PIMS data to investigate strategy types within a multi-industry sample of firms. Cluster analysis methods were used to group firms on five dimensions resulting from 26 quantitative variables. For industrial products firms, four strategic groups and associated strategy types were identified: *Low commitment, Maintenance, Growth, and Niche*.

Harrigan (1985b) studied strategic group membership in a sample of 92 retailing firms. Within this sample, seven strategy groups were identified. However, the focus of this work was on demonstrating appropriate multivariate statistical techniques rather than the strategy types identified.

The remaining three studies, Rich (1986), O'Laughlin and Ellefson (1981a,b,c) and Cleaves and O'Laughlin (1986a,b), will be discussed in the next section of this review since they relate directly to wood-based industries.

Competitive Strategy in Wood-Based Industries:

Several studies have investigated business- or corporate-level strategy within the universe of wood-based industries. Rich (1986) studied 42 of the largest United States wood-based firms concerning corporate-level intended competitive strategy. The sample included corporations primarily involved in both fiber and solid wood based products and respondents were classified as using one or a combination of Porter's (1980) generic strategy types (*Overall Cost Leadership, Differentiation, or Focus*). Rather than infer strategy from responses concerning various strategic dimensions, Rich (1986) had the respondents indicate directly which strategy type was employed after reading short descriptions of the generic strategies.

In general, Rich (1986) found that the majority of firms reported utilizing a cost leadership strategy, but there was a trend toward the use of differentiation and focus strategies when compared to the results of a similar study covering the 1976-1979 period (Rich 1979). Firms utilizing differentiation and focus strategies were, in general, more profitable during 1984 than firms utilizing a cost leadership strategy.

Rich's (1986) study provides useful information concerning large wood-products based corporations. However, the study's cross-sectional, multi-industry approach precludes inferences concerning intra-industry business strategy. In addition, it is unclear whether the strategic groups in the sample are an intrinsic characteristic or a relic of the research process.

In their three article series, O'Laughlin and Ellefson (1981a,b,c) examine the economic structure of an aggregate industry composed of lumber and lumber products firms (SIC 24), paper and pulp products firms (SIC 26), and firms in the wood-based portion of the furniture industry (SIC 25). The sample consisted of the 40 largest (by 1978 sales revenue) firms in this aggregate category.

The third of O'Laughlin and Ellefson's articles (O'Laughlin and Ellefson 1981c) examined strategic groups within the sample. Firms were empirically classified into strategic groups based on 1978 sales rank and apparent diversification strategy. Four strategic groups were identified: *Traditional top 10 wood-based companies*, *Traditional wood-based companies similar in sales volume to new diversified entrants*, *New diversified entrants*, and *Other traditional wood-based companies*.

As is the case with Rich's (1986) study, the inter-industry nature, limited number of strategic dimensions, and focus on large multi-industry corporations of O'Laughlin and Ellefson's (1981a,b,c) study limits its applicability to intra-industry situations in

general and the hardwood lumber industry in particular. However, the authors do provide insight into competition within an industry. O'Laughlin and Ellefson (1981a,b,c) conclude that the presence in an industry of firms whose primary business is outside the industry tends to increase competition. Increased competition is likely to be the result of differences in goals between the firms whose primary business is outside the industry and those whose primary business is within the industry (Porter 1980). The authors also suggest that competition within an industry increases with increasing strategic group complexity (i.e. the number of strategic groups).

A more recent two-article series by Cleaves and O'Laughlin (1986a,b) investigated intra-industry business-level competitive strategy within the structural panel industry. The authors posit that important strategic dimensions include: manufacturing, size, integration, timberland ownership, procurement, distribution, and geographic specialization. These dimensions were used as the basis for defining strategic groups within a sample of 24 southern pine plywood firms.

Fourteen variables, representing the seven strategic dimensions, were measured for each of the 24 firms (Table 5). A hierarchical clustering algorithm was then used to define five strategic groups: *Integrated Wood Giants*, *Local Lumber Producers*, *Regional Solid Wood Products Specialists*, *Timber Baron Subsidiaries*, and *Diversified Paper Producers*. This methodology differed from that used by Rich (1986) in that it did not force the firms into *a priori* strategy types. No attempt was made to compare the strategic groupings, as determined by the clustering algorithm, to existing strategic typologies.

Cleaves and O'Laughlin (1986a,b) point out that the resulting multidimensional clustering helps to explain competition among the firms that cannot be explained adequately using the traditional economic models that are often applied to markets for wood products. In addition, the authors suggest that the identification of strategic groups within the industry aids in predicting industry-wide response to government regulations, technological advances, changes in raw materials, and competitor moves.

The major limitation of the work of Cleaves and O'Laughlin (1986a,b) involves the operationalization of the strategy construct. It is unclear how the strategic dimensions were chosen and how the findings might vary if different dimensions were used to define the strategic groups. Such questions probably fall beyond the original intent of the work but are relevant in the context of this study.

Rich (1979) defined seven factors that determine the position of a strategic business unit (SBU) in the investment portfolio corporate strategy model. These were: market share, timberland ownership, forward integration, diversification, timber utilization, market growth, and synergy (how the SBU adds to the total portfolio). The dimensions represented by these factors are very similar to those used in the Cleaves and O'Laughlin (1986a,b) study.

Industry Maturity and Decline

The concept of industry change as a evolutionary process - proceeding from introduction through maturity to a stage of decline - is conceptually linked to the product life cycle paradigm. Harrigan (1988) defines industry maturity/decline as the second half of the life cycle. In this context, an industry enters maturity when the

demand for its product or products passes from rapid growth to slow or no growth (Porter 1980). Similarly, declining industries are those where demand is decreasing. Some researchers have been more specific in defining a mature industry as having real annual growth (in demand) of less than 10 percent (Harrigan 1985a, Hambrick and Schecter 1983). Using this definition, the hardwood lumber industry, with annual growth of approximately 2 percent (Ulrich 1988), can be classified as mature.

Industry maturity is the norm rather than the exception (Hearne 1982). In the economies of Japan, western Europe, and the United States it is estimated that 75 percent of all industries can be classified as mature or declining (Harrigan 1988). The reasons for flat or decreasing demand are varied but can include (Harrigan 1988):

- Demographic changes
- Technological changes
- Import competition
- Lifestyle changes
- Pressure from substitute products
- Styling obsolescence
- Changes in laws and policies

Webster (1984) attributes changes in demand over the life cycle to changing consumer needs and preferences, advancing technology, and changing competition.

In addition to changes in demand, changes in the nature of competition and industry structure have been associated with various stages in the life cycle of an

industry. However, previous research is not conclusive as to the nature of these changes. Thorelli and Burnett (1981) found that the number of competitors in an industry increased as the industry moved from a growth period to a period of maturity. Patel and Younger (1978) contend that during maturity the number of competitors tends to decrease. Both Morris (1988) and Day (1986) divide the growth period of the life cycle into a period of rapid growth and a period of competitive turbulence. Morris (1988) found that the number of competitors increased during the rapid growth period but decreased as marginal firms exited the industry in the competitive turbulence or shake-out period. During maturity, competition was relatively stable and characterized by an oligopolistic market structure.

The maturity period of the industry life cycle has also been associated with increased emphasis on foreign markets (Wells 1968). Thorelli and Burnett (1981) confirmed this finding and added that competition from imported products tends to increase with each successive stage in the life cycle.

Patel and Younger (1978) define the general dimensions along which industry evolutionary change takes place. These dimensions are: growth rate, growth potential, distribution and stability of market share, breadth of product line, number of competitors, customer stability, ease of entry, and technological stability. Day (1986) summarizes changes specific to the maturity period by defining the following indicators of industry maturity:

- Evidence of market saturation
- Increasing rate of decline in real prices and profit margins
- Industry overcapacity levels that cannot be accounted for by short-run economic fluctuations

- Appearance of substitute technologies and related products
- Changes in the ratio of exports and imports, due to growing foreign sourcing of production
- Declining responsiveness of sales to advertising, promotion, and sales efforts, in conjunction with increasing price sensitivity
- Increasing reluctance of buyers to pay for technical services
- Decreasing profitability and reduced risks of backward integration by customers

The linking of the concept of industry maturity and decline to the product life cycle causes it to share many of the limitations inherent in life cycle theory. Controversy exists as to whether the product life cycle concept can correctly be extrapolated from individual consumer products (for which the concept was originally developed) to industries producing industrial products (Porter 1980). However, Thorelli and Burnett (1981), in a study of 1148 industrial businesses, concluded that the product life cycle does apply to industrial products. Hearne (1982) provides the basis for extrapolating from individual products to industries by defining a industry life cycle as the sum of the life cycles of the industry's products. Day (1986) points out that the demand for most industrial products is derived from the demand for a consumer product and, as such, do not follow their own life cycle but instead share the life cycle of the consumer product. One can conclude from this that the life cycle of an industry is the sum of the life cycles of the products from which its demand is derived. In the context of this study, the life cycle of the hardwood lumber industry is defined by the demand for solid wood furniture, millwork, cabinets, pallets, and the various other hardwood products.

Another problem in utilizing life cycle theory is the difficulty of defining an industry's position in the life cycle at any given time (Porter 1980, Day 1981). This problem is complicated by the fact that the length of the stages in the life cycle varies, some stages may be skipped entirely, and demand may revitalize - creating a new growth period (Morris 1988). In addition, the actions of a firm or group of firms can influence demand and so the length of life cycle stages (Porter 1980).

Strategy in the Mature/Declining Environment:

As previously mentioned, research specific to strategy in mature/declining industries is generally lacking and the work that is specific to the mature/declining environment tends to be corporate-level investment oriented. In addition, more general strategic models may not be appropriate to the mature/declining situation. For example, portfolio models based on the growth-market share matrix suggest a harvest strategy (limit investment - generate maximum cash flow) or divestiture in low growth industries (Day 1986, Webster 1984). Two problems are evident with these prescriptions. First, the cash generated from such activities ("milking" in the case of the harvest strategy or receipts from the sale of assets in the case of divestiture) is assumed to be invested in high growth industries (Webster 1984). This may not be desirable or even feasible. Heame (1982) states that such attempts are often unsuccessful due to the relative scarcity of growth industries and the competition to acquire firms within such industries. Secondly; corporate policy, contractual commitments, or exit barrier considerations (among others) may preclude exit from the industry (Porter 1980, Harrigan 1980, Harrigan and Porter 1983).

Research that specifically addresses strategy in the mature/declining environment includes Harrigan (1980, 1985a, 1988), Harrigan and Porter (1983), and (to a lesser degree) Patel and Younger (1978). The works of Harrigan as well as Harrigan and Porter sought to develop guidelines or generic strategies for competing in a mature or declining industry. For example, Harrigan (1988) identified generic strategies appropriate for the mature industry environment based on the industry's structure and the firm's competitive strengths. Figure 4 shows the relationship between these five generic strategies: *Divest*, *Milk the investment*, *Increase investment level*, *Hold investment level*, and *Shrink selectively*. Harrigan and Porter (1983) provided an analogous matrix appropriate to declining industries that consisted of four alternative generic strategies: *Leadership*, *Niche*, *Harvest*, and *Quick divestment*.

The determinants of appropriate strategic alternatives in both Harrigan's (1988) and Harrigan and Porter's (1983) matrices are the firm's relative competitive strength and the industry's structure and demand outlook. Industry structure, in the mature environment context, is affected by factors such as the number of strategic groups within the industry and the presence of pockets of demand that are likely to endure (and might form the basis of market niches). These, and other factors, determine how competition in an industry will evolve during maturity and decline. When combined with an assessment of a firm's relative strength, they allow the use of Harrigan's (1988) strategic matrix to help determine appropriate strategy.

Harrigan's (1988) model focuses on the investment segment of corporate strategy. The Harrigan and Porter (1983) model is a hybrid which incorporates elements of both investment and competitive strategies and could be interpreted at either the business or corporate levels.

Patel and Younger (1978) provide strategic guidelines which vary with competitive position and life cycle stage. In the maturity stage, seven potential strategies are identified (Figure 5). These generic strategies are similar to those of Harrigan (1988), however, Patel and Younger (1978) divide the spectrum of potential strategies more finely.

Summary:

Very little research is available that investigates competitive strategy in wood-based industries. Studies that have been conducted tend to concentrate on corporate-level strategy in inter-industry samples. The one exception that could be found (Cleaves and O'Laughlin 1986a,b) made no attempt to compare the strategy types identified to existing typologies.

Models are available that attempt to classify strategy in mature and declining industries. In addition, general models of business-level strategy are available. However, the nature of competitive strategy in the hardwood lumber industry and the applicability of available typologies to the industry remains unexamined.

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Table 1. United States Hardwood Lumber Production and Consumption:
1955 -1988.

Year	Production (Billion board feet)	Consumption (Billion board feet)
1955	7.6	7.6
1956	8.0	8.1
1957	5.8	5.8
1958	6.0	6.1
1959	6.7	6.8
1960	6.3	6.4
1961	6.0	6.0
1962	6.4	6.5
1963	7.2	7.3
1964	7.3	7.4
1965	7.5	7.7
1966	7.7	8.0
1967	7.4	7.6
1968	7.2	7.4
1969	7.5	7.8
1970	7.1	7.3
1971	6.9	7.1
1972	6.8	7.0
1973	7.0	7.3
1974	6.9	7.2
1975	5.9	5.9
1976	6.4	6.5
1977	6.7	6.8
1978	7.0	7.0
1979	7.3	7.3
1980	7.1	6.9
1981	6.3	6.1
1982	5.1	4.9
1983	5.6	5.4
1984	6.3	6.1
1985	6.0	5.9
1986	7.2	7.0
1987	7.5	7.2
1988 (est.)	7.8	6.9

Source: Ulrich 1988, Phelps 1988

**Table 2. United States Hardwood Lumber Imports and Exports:
1977 - 1988**

Year	Lumber Imports (MBF)	Lumber Exports (MBF)	Net Imports (MBF)
1977	300,000	200,000	100,000
1978	321,799	270,500	51,266
1979	322,100	294,245	27,855
1980	265,090	355,329	-90,239
1981	260,851	378,621	-117,770
1982	186,899	334,304	-147,405
1983	231,271	447,989	-216,718
1984	281,886	441,192	-159,306
1985	311,997	372,603	-60,606
1986	290,400	498,284	-207,884
1987	447,718	725,802	-278,084
1988 (est.)	400,000	1,300,000	-900,000

Sources: Nolley 1988, Ulrich 1988, Phelps 1988, USDA-FAS 1988

Table 3. United States Hardwood Lumber Market Shares: 1980

Market	Estimated Share %
Shipping and Materials Handling	37.8
Pallets	31.9
Containers	3.2
Dunnage	2.7
Furniture	26.9
Mines and Ties	15.2
Crossties	11.2
Switch Ties	1.0
Coal Mines	3.0
Construction	6.7
Flooring	1.2
Millwork	5.5
Miscellaneous	9.1
Exports	4.3

Source: Cardellichio and Binkley 1984

**Table 4. Eastern Hardwood Lumber Consumption by End-Use:
1972 - 1987**

End-Use	1972	1977	1982	1987
	MMBF			
Pallets and Containers	2412	2627	3184	4425
Dimension	795	1080	927	1359
Flooring	657	304	222	476
Wood Household Furniture	1147	1250	1014	1058
Millwork	545	372	441	713
Kitchen Cabinets	274	358	319	612
Railway Ties	850	1000	834	635
Exports	237	240	321	543
Commercial Furniture	213	221	275	427
Upholstered Furniture	427	254	285	309
Other	535	652	400	703
Total	8092	8358	8222	11260

Adapted from estimates provided by Luppold (1989)

Table 5. Strategic Dimensions and Associated Variables Studied by Cleaves and O'Laughlin (1986a,b)

Dimensions	Variable (units)
Manufacturing	Plant Capacity (Million sq. ft.)
Distribution	Plant Age (Years)
Size	Manufacturing Domain (# of States)
Integration	Distribution (# of States)
Procurement	Distribution Concentration (Outlets/State)
Land Ownership Position	Wood-Based Sales (Million of Dollars)
Geographic Specialization	Integration Ratio (Facilities/Sites)
	Wood-Based Sales Proportion (Total Sales/Wood-Based Sales)
	Plywood Diversification Ratio (Plywood Capacity/Solid Wood Capacity)
	Land Concentration (Acres/State)
	Supply Position (Available Timberland/Solid-Wood Capacity)
	Land-to Capacity Ratio (Acres/M sq.ft.)

Note: Variables may be used to quantify more than one dimension.

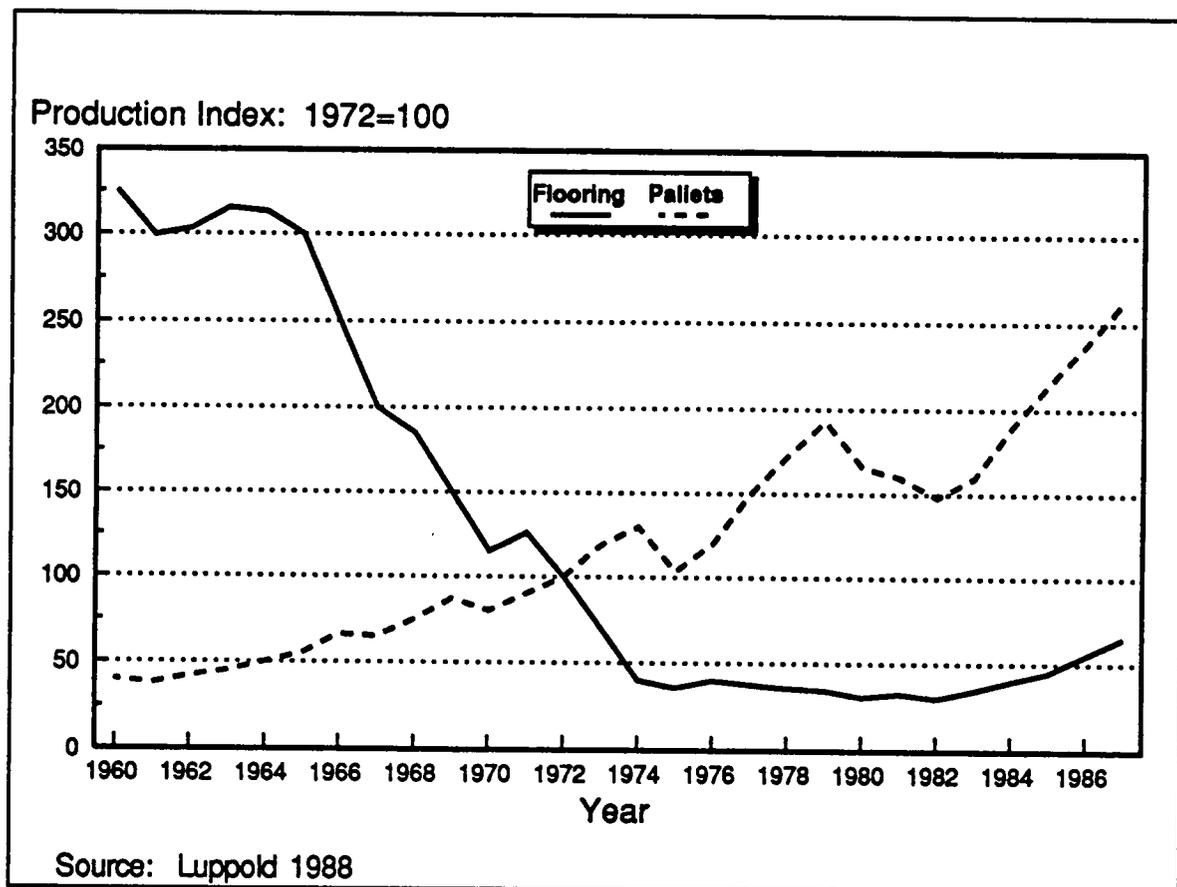


Figure 1. Indices of Pallet and Flooring Production: 1960-1987

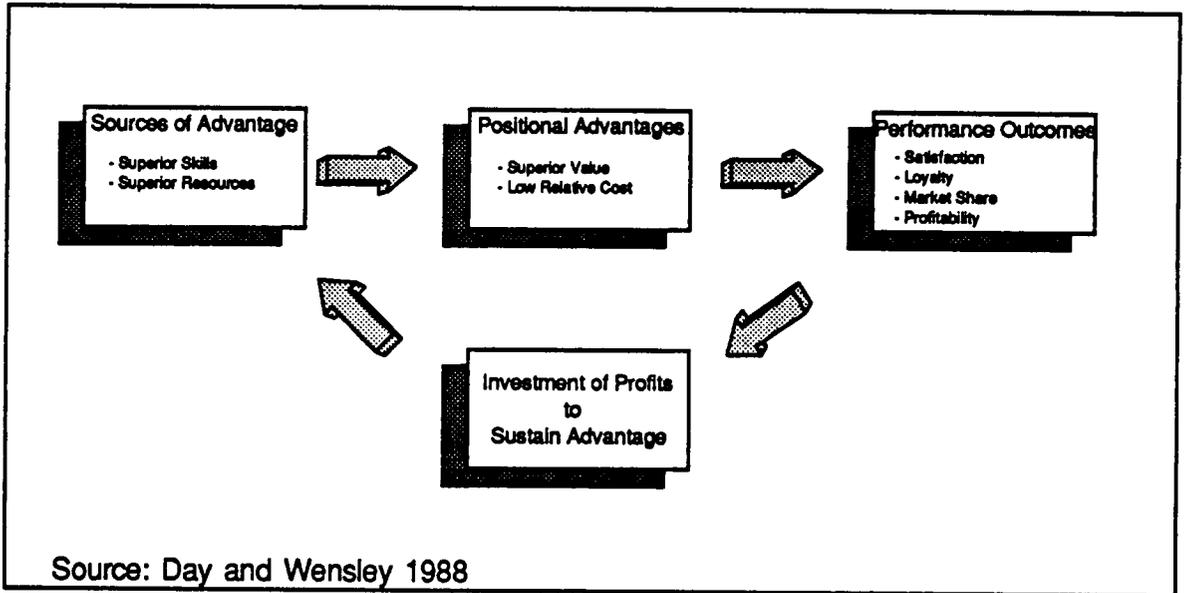


Figure 2. The Elements of Competitive Advantage

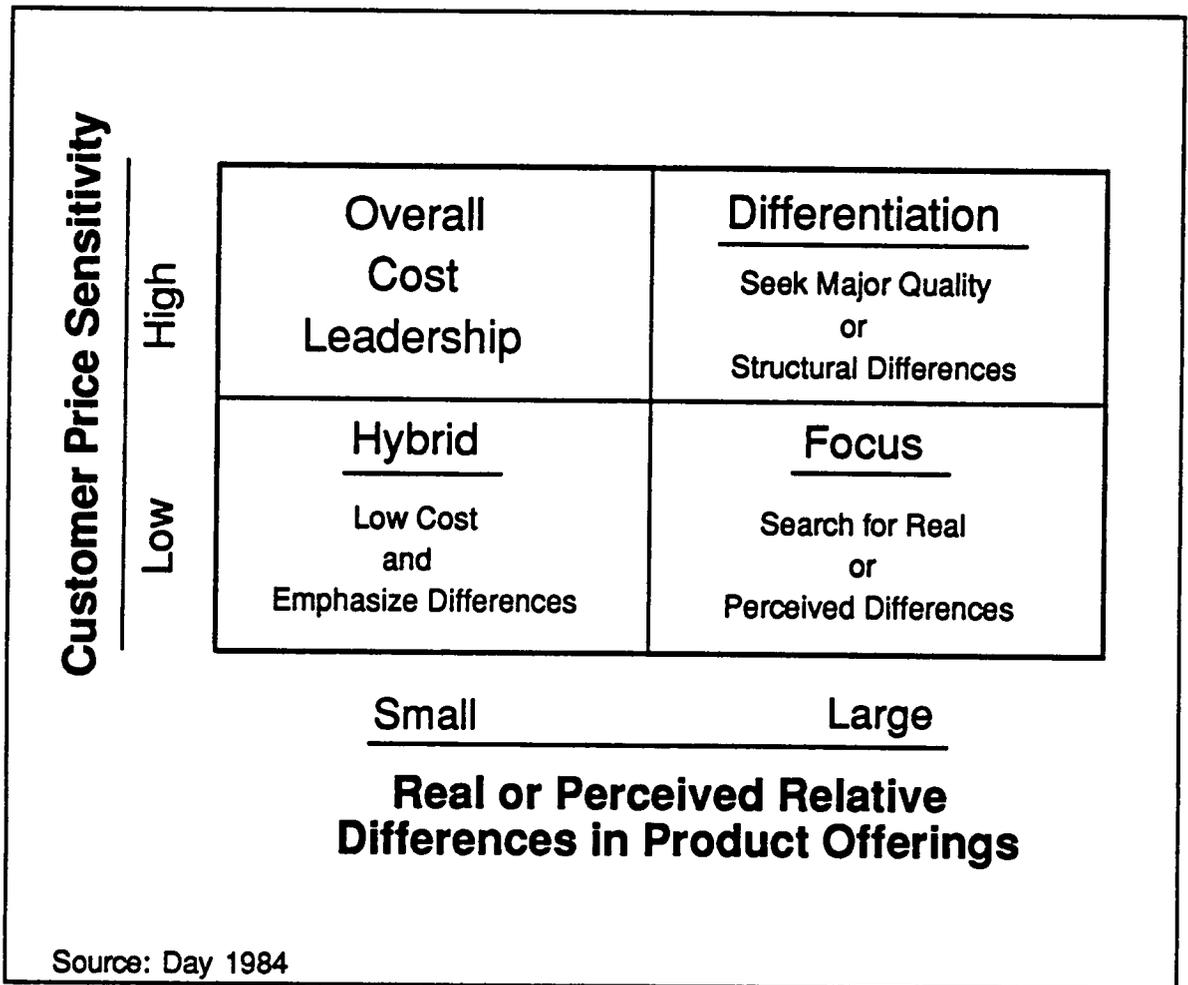


Figure 3. Generic Strategies as a Function of Price Sensitivity and Product Differences

		Strength Relative to Competitors for Attractive Niches		
		Great	Some	None
Industry Structure and Demand Outlook	Favorable	Increase investment or Hold investment level	Hold investment level or Shrink selectively	Shrink selectively or Milk the investment
	Medium	Hold investment level or Shrink selectively	Shrink selectively or Milk the investment	Milk the investment or Divest now
	Unfavorable	Shrink selectively or Milk the investment	Milk the investment or Divest now	Divest now

Source: Harrigan 1988

Figure 4. Mature Industry Strategy Matrix

		Life Cycle Stage			
		EMBRYONIC	GROWING	MATURE	AGEING
Competitive Position	DOMINANT	Push for Share Hold Position	Hold Position Hold Share	Hold Position Grow with Industry	Hold Position
	STRONG	Improve Position Push for Share	Improve Position Push for Share	Hold Position Grow with Industry	Hold Position or Harvest
	FAVORABLE	Push for Share Selectively Improve Position	Improve Position Selectively Push for Share	Custodial or Maintenance	Harvest
	TENABLE	Selectively Push for Share	Find Niche and Protect	Find Niche and Hang on or Phased Withdrawal	Phased Withdrawal or Abandon
	WEAK	Up or Out	Turnaround or Abandon	Turnaround or Phased Withdrawal	Abandon

Adapted from Patel and Younger 1978

Figure 5. Strategic Options During the Industry Life Cycle

Product and Supplier Attribute Determinance in Markets for Hardwood Lumber

ABSTRACT

Product and supplier attributes that are determinant in hardwood lumber purchase decisions were investigated within four segments of the market for hardwood lumber: Millwork producers (Standard Industrial Classification 2431), Hardwood dimension and flooring producers (SIC 2426), Wood household furniture producers (SIC 2511), and Wood kitchen cabinet producers (SIC 2434). Attributes with the highest determinant scores were: Grading accuracy, Supplier's reputation, Freedom from surface checks, Competitive pricing, and Within-load thickness consistency. The least determinant attribute was the presence of the supplier's logo or trademark. The importance of various attributes was generally consistent across market segments and producers were relatively well attuned to the needs of lumber users. Lumber users reported being least satisfied with the quality of the lumber they were offered. Lumber producers perceived that buyers were least satisfied with the availability of certain species.

INTRODUCTION

Porter (1980, 1985) defines three generic business-level strategies for successfully competing within an industry¹. The first of these, *Overall Cost Leadership*, is commonly associated with commodity producing industries and has been shown to be the most common corporate-level strategy among large forest products based companies (Rich 1986). However, Rich (1986) documented a shift, within the companies he studied, toward the implementation of Porter's (1980, 1985) remaining two generic strategies, *Differentiation* and *Focus*, or a combination of these strategies. Levitt (1986 p. 137) provides rationale for this shift away from cost leadership based strategies. He states:

"In short, meaningful differentiation is competitively more effective and enduring than low-cost production alone"

Evidence of the apparent adoption of business-level *Differentiation* and *Focus* strategies can be found within wood-based industries. Companies in the structural panel industry, for example, have attempted to differentiate their products by developing positive brand images through brand naming and promotional activities (Sinclair and

¹ Porter (1980) defines the strategies as follows: *Overall Cost Leadership* requires that the firm seeks to become the industry's low cost producer without ignoring quality and service. A firm pursuing a *Differentiation* strategy seeks to produce a product or service that is perceived industry-wide as being unique. Finally, a *Focus* strategy requires that the firm concentrate on a particular market segment and, in doing so, serve the segment more effectively or efficiently than can less specialized competitors. This last strategy is essentially cost leadership and/or differentiation applied to a specific market segment.

Seward 1988). Brand naming (generally in the form of a company logo painted on lumber bundles) is also widely used to develop brand images in export markets for hardwood lumber.

Focus strategies may underlie the decisions of companies in the paper products industry to concentrate on particular segments of the market for paper products. Westvaco Corporation, for example, has a stated intention of focusing on segments of the paper products market where technological and marketing skills provide a competitive advantage (Westvaco Corp. 1987).

All three generic strategies offer advantages and entail certain problems for producers of hardwood lumber. A successful *Overall Cost Leadership* strategy can provide significant competitive advantage but may require favorable access to raw materials, high relative market share, and/or the presence of scale economies (Porter 1980). While some hardwood lumber producers may have favorable access to timber by virtue of their location, land ownership, or relationships with landowners, the industry's low production concentration (percent of total production produced by the industry's largest producers (USDC-BOC 1986)) indicates that few companies have gained relatively high market share. In addition, scale economies in the industry are probably weak (Bush and Sinclair 1989).

A *Differentiation* strategy requires that the company's product be perceived, industry-wide, as unique (Porter 1980). This may be difficult for smaller hardwood producers with limited resources for promotion, advertising or extensive customer service, and other activities that may be needed to differentiate a product industry-wide.

Opportunities for implementing a *Focus* strategy in the hardwood lumber industry may be constrained by raw material and locational barriers. Hardwood lumber

companies may be located in areas where the species, quality or size of timber is inadequate to serve a particular market segment. Logs typically yield a variety of product types in spite of a manufacturer's wish to focus on a particular product/market and prohibitive hauling distances may also limit the markets a producer can serve. Doyle and Sanders (1985) state that skills in market segmentation and positioning are rarely present in old line industries such as forest products. These skills would need to be developed by most producers wishing to utilize a *Focus* strategy.

However, even companies that are able to overcome these barriers may find it difficult to operationalize a *Focus* strategy due to a lack of knowledge concerning product and supplier attributes that are most important to companies in the target market segment. In particular, knowledge of the attitudes and attributes that are determinant in purchase decisions is a key factor in the development of marketing strategy (Myers and Alpert 1968). Such knowledge of the needs of hardwood lumber markets is generally unavailable. McLintock (1987 p.82) states:

"Hardwood industries just do not maintain forward-looking, effective marketing programs based on an understanding of consumer needs and expectations. The dilemma facing any company that wants to do a better job in this regard is that the information it requires is not available, and the mechanisms for obtaining it are not in place."

This paper investigates product and supplier attribute importance and determinance in four industries that constitute segments of the market for hardwood lumber: Millwork producers (Standard Industrial Classification 2431), Hardwood dimension and flooring

manufacturers (SIC 2426), Wood kitchen cabinet manufacturers (SIC 2434), and Wood household furniture manufacturers (SIC 2511). These segments were chosen because they are relatively high value markets and, as such, potentially attractive targets for *Focus* strategies. Since understanding the needs of a market segment is requisite to a successful *Focus* strategy, this paper also compares the perceptions, among large hardwood lumber producers, of the needs of the market segments studied. In this way, the general state of the industry's knowledge of these markets, and the need for further research, can be evaluated.

METHODOLOGY

Sample

The nature of the study required that two distinct populations be sampled. First, the needs (in terms of determinant product and supplier attributes) of hardwood lumber users were assessed. Next, hardwood lumber producers were contacted concerning their perceptions of the needs of hardwood lumber users -- the consumers of their products.

Hardwood Lumber Users -- A purposive sample consisting of the largest 100 companies that could be identified in each of the four market segments was utilized in this portion of the study. Sample companies were identified via a review of published listings such as the *Furniture Design and Manufacturing Top 300* (Anonymous 1989), *Who's Who in Kitchen Cabinets* (Gralla Publications 1988), and trade association

membership listings. In addition, input from individuals familiar with the segments was used to help identify sample companies.

Because of the dynamic nature of the industries making up the market segments (for example, frequent mergers and acquisitions in the wood household furniture industry), the delay in publishing production information, and the fact that companies often participate in more than one industry, the sample was not considered a definitive list of the largest 100 companies in each market segment. However, it was felt that the sample included the major, and perhaps most influential, companies in each of the four industries.

A purposive, rather than probabilistic, sampling scheme was used since it was felt that a probabilistic sample would be heavily weighted toward smaller, less influential companies. Non-probability sampling is common in marketing research (Green and Tull 1978) and has been used in studying wood-based industries (Cohen and Sinclair, In press). At least one study (Karmel and Jain 1987) has shown that a non-random, purposive sample of large companies within an industry can outperform randomized sampling schemes.

Hardwood Lumber Producers – The sample for the second area of investigation was drawn from the population of U.S. hardwood lumber manufacturers. As with the hardwood users, a purposive sampling scheme consisting of the 100 largest (by production volume) hardwood lumber producers in the U.S. was used. Companies were chosen based on information from industry fact books (Miller Freeman 1988, 1987), trade association membership directories, *The Weekly Hardwood Review* (Anonymous 1987), and telephone conversations with company personnel.

Knowledgeable Forest Service and University personnel were also consulted to aid in identification of the sample companies. As with the sample of lumber users, the sample was not considered definitive, but rather as including many of the largest and most influential companies in the hardwood lumber industry.

Data Collection

Hardwood lumber Users – A questionnaire, administered by mail, was used to collect data from the companies included in the sample of hardwood lumber users. The questionnaire was directed to the individual within the company responsible for purchasing hardwood lumber. Identification of this individual was made during telephone conversations with personnel at each of the companies. In some cases, the companies employed someone whose title was lumber buyer. More commonly, however, lumber purchasing responsibility fell upon presidents or vice-presidents. In each case the questionnaire was addressed to the specific person who purchased hardwood lumber.

The questionnaire consisted of two sections. The first section used interval rating scales to gather data concerning the importance of 15 product attributes and 18 supplier attributes (Figure 1). Recipients were also asked to indicate how hardwood lumber suppliers differed and how the lumber from various suppliers differed on the same sets of product and supplier attributes. These data were also gathered with interval rating scales.

The second section of the questionnaire utilized closed-ended, multichotomous questions to gather data concerning the nature of the company. In particular, companies were asked to indicate their primary (by value of sales) area of business. This allowed the verification of *a priori* classifications as to market segment. Information

concerning the company's location, lumber purchases, number of employees and annual sales was also gathered.

The questionnaire was reviewed by knowledgeable Forest Service, trade association, and University personnel to test its face validity, clarity, and to ensure that no important attribute had been overlooked. A pretest was then conducted by administering the questionnaire to 92 companies that purchased hardwood lumber. The responses from this pretest were used to clarify question wording and refine the sets of product and supplier attributes. Examination of the correlation matrix of determinant scores and an exploratory factor analysis suggested that redundant attributes had been eliminated. That is, the attributes appeared to be independent and no group of attributes assessed a common underlying construct.

The refined questionnaire was mailed to 403 companies in May of 1989. Respondents remained anonymous. A total of 299 surveys were returned, 252 of which were found to be usable. This resulted in a usable response rate of 63 percent.

In order to test for possible trends in survey response (and, by extrapolation, non-response bias), respondents were split into early and late respondent categories. Each category accounted for approximately 50 percent of the total number of responses. Non-parametric statistical tests (Mann-Whitney *U* and Chi-square) were used to compare the groups on annual sales, geographic location, primary product and volume of lumber purchased. In no case could the hypothesis of no difference between early and late respondents be rejected ($\alpha = .10$). This result suggests that non-response bias (which could not be directly assessed due to respondent anonymity) was not a problem and the responses approximated random samples of their respective populations.

Hardwood Lumber Producers – A mail survey questionnaire was also used to assess lumber producers' perceptions of the needs of the hardwood lumber market segments. The questions were similar to those administered to the lumber users (using the same attribute sets and interval rating scales) but producers were asked to indicate only their perceived importance of each attribute to hardwood lumber users.

The questionnaire was mailed to 80 of the sample companies during June, 1989. An additional 19 surveys were delivered in person (one sample company declined to participate). A total of 72 surveys were returned by the time the data were analyzed. As was the case in the hardwood lumber users survey, early and late respondents could not be shown to differ in demographics or operation.

Determinant Attributes

Determinant attribute analysis can be described as (*Anderson, Cox and Fulcher 1976 p.45*):

"...a technique that is applicable in a wide variety of marketing research situations where the objective is to ascertain the critical factors in consumer decision making."

Determinant attribute analysis has been applied in numerous studies including Bearden (1977), Lumpkin, Greenberg and Goldstucker (1985), Moriarty and Reibstein (1986), and Sinclair and Stalling (In press).

Underlying the technique is the concept that a product offering consists of a bundle of attributes, some tangible and some, like supplier's reputation, intangible (Levitt 1986). Attributes are thought to be two dimensional. One dimension consists of the importance

of the attribute to the buyer and the other represents the perceived performance of a product supplier with respect to the attribute (Wilson and Ghingold 1987).

Myers and Alpert (1968) describe three general approaches to assessing these dimensions:

1. Direct questioning
2. Indirect questioning
3. Observation and experiment

Alpert (1971) demonstrated the effectiveness of the direct dual questioning technique and this is the approach that was used in this study. Recipients were asked to rate attributes as to their importance in lumber purchase decisions and as to how much the attribute varied among potential suppliers of lumber. Interval rating scales (with the end points itemized as, *1 = Not at all important* and *7 = Extremely important* for the importance data and *1 = No difference between suppliers*, *5 = Large difference between suppliers* for the difference data) were used. Scores on the two scales were then combined to produce a "determinant" score using the simple multiplicative model (Bearden 1977):

$$D_i = I_i Y_i$$

where:

- D_i = Determinant score for attribute *i* and respondent *j*
 I_i = Importance rating for attribute *i* and respondent *j*
 Y_i = Difference rating for attribute *i* and respondent *j*

Determinant scores (D_i) resulting from this calculation are potentially biased since respondents may differ in the intrinsic importance and difference scales they utilize (Moriarty and Reibstein 1986, Bass and Wilkie 1973). In order to eliminate this potential bias, determinant scores were standardized (across attributes and within respondents) to T -scores (mean of 50 and a standard deviation of 10) using the following formula:

$$TD_i = 10((D_i - X_j)/S_j) + 50$$

where:

- TD_i = Standardized determinant score for attribute i and respondent j
- X_j = Mean value of D_i for all i of respondent j
- S_j = Standard deviation of X_j

Moriarty and Reibstein (1986 p.469) point out that standardization in this manner results in no information loss in research where the goal is to:

"...understand the perceived relative determinancy of the product attributes as opposed to their absolute determinancy"

Since this research investigated the relative determinance of the attribute sets, normalization was deemed appropriate.

RESULTS

Respondents

Hardwood Lumber Users – Variations in response rates between segments, or errors in *a priori* classification of companies, resulted in an uneven distribution of respondents among the four industries (Table 1). The relatively large number of respondents in the Dimension and Flooring category allowed Dimension manufacturers and Flooring manufacturers to be analyzed separately. Geographically, respondents were concentrated in the southern and midwestern regions of the U.S. (Figure 2).

Respondents used a total of 1.39 billion board feet of hardwood lumber annually and purchased 92 percent (1.28 billion board feet) of this lumber from outside their companies. Flooring companies had the largest mean annual hardwood lumber purchases (Table 1) and purchases were concentrated in lower grades when compared to the other respondent segments (Figure 3). Purchases by millwork companies were concentrated in higher lumber grades, but the mean annual volume of purchases was lower than all but cabinet manufacturers.

Responding companies reported purchasing the largest percentage of their hardwood lumber directly from sawmills (67.7% of total board feet purchased). Brokers (16% of total purchases) and wholesalers (13%) were also important sources. However, the possibility that lumber was purchased from sawmills acting as wholesalers or brokers is not reflected in these figures.

The most important species was red oak which represented 37 percent of total purchases (by volume). White oak accounted for 17 percent of purchases and yellow

poplar accounted for 15 percent. The remaining domestic species each accounted for less than 10 percent of purchases. Imported species made up approximately 3 percent of purchases.

The low production concentration that is typical of many wood-based industries (USDC-BOC 1986) was reflected in the distribution of total sales among the respondents. Forty-six percent of the respondents reported sales of less than 10 million dollars annually. Approximately 26 percent of the companies reported sales of 10 to 24.9 million and 12.7 percent reported sales in the range of 25 to 49.9 million dollars. The remaining companies reported annual sales ranging from 50 to 250 million dollars.

Hardwood Lumber Producers -- The responding hardwood producers reported annual hardwood production figures that totaled to approximately 1.6 billion board feet. Mean annual production was approximately 22.2 million board feet per company. Respondents reported selling the largest portion of this production directly to end users (47% of production was marketed in this manner). Twenty-six percent of lumber production was sold in the rough, green state; 23 percent was sold rough, kiln-dried; and 19 percent of production consisted of cants or pallet lumber. Smaller amounts were sold air dried and/or planed.

Primary species produced by the responding companies were red and white oak (34% and 16% of total annual production, respectively). Approximately 54 percent of the respondents were located in the Bureau of Census (USDC-BOC 1988) southern region, 26 percent were located in the midwest region, and 17 percent were in the northeast region. Some respondents did not disclose their location.

Annual hardwood lumber sales ranged from less than 10 million dollars to over 100 million. However, the majority of the companies (52%) reported sales of less than 10 million dollars annually.

Reasons for Purchase Dissatisfaction

Both hardwood lumber users and producers were questioned concerning the general factor that caused the most dissatisfaction in hardwood lumber purchasing situations (Quality, Delivery time, Price, Credit terms, Species availability, Other). Some lumber users reported being satisfied with all aspects of their lumber purchasing. Lumber users that reported dissatisfaction were, most commonly, dissatisfied with the quality of the lumber they purchased. In contrast, hardwood producers perceived that their customers were least satisfied with the availability of certain species, price and lumber quality -- in that order.

This evidence suggests two conclusions. First, lumber producers have underestimated the importance of quality to their customers. Second, the desire for better quality lumber may provide the opportunity for tailoring a product to meet this need. Such a product could be the basis of a *Focus* strategy.

Attribute Importance

Figure 4 summarizes the five most important and five least important attributes, for both lumber producers and users, as determined by standardized mean importance ratings across all market segments. In general, producers seem well attuned to the relative importance of the attributes to their customers. The greatest difference in mean rating between users and producers occurred on the importance of square end trimming.

Lumber producers gave this attribute a standardized mean rating of 51.7 and lumber users gave the attribute a mean rating of 43.3 – suggesting square end trimming is less important to users than producers perceive.

The relative importance of the attributes was generally consistent across the market segments (Table 2). Grading accuracy, willingness to quote firm prices, and competitive pricing were among the five most important attributes for all of the market segments. Some differences in relative importance between segments were noted. Cabinet producers rated moisture content accuracy and consistency relatively higher than did the remaining four groups. Furniture and flooring manufacturers ranked the attribute of supplier's reputation higher than did the remaining companies and freedom from surface checks appeared to be less important to furniture and cabinet producers as compared to the other types of companies.

Attribute Determinance

Previous works using the determinant attribute concept (Alpert 1971; Lumpkin, Greenberg, and Goldstucker 1985) have endorsed the use of a one-tailed Z-test (where the grand mean and standard deviation are used as estimates of μ and σ) to identify attributes that are "determinant". This technique is of limited use, however, since the concept of absolute determinance has little utility in the formulation of marketing strategy.

Instead, the approach taken in this paper was similar to that of Moriarty and Reibstein (1986) and Heeler, Okechuku and Reid (1979) in that analysis focused on the relative rankings of attributes. Since the cost of creating "more" of an attribute in a company's marketing mix is likely to vary between attributes, all attributes that are

found to be determinant via Z-tests are not equal in their utility to marketing strategy. Rankings provide a guide that can be useful in cost/benefit estimations when formulating marketing strategy.

Figure 5 depicts the five highest and five lowest scoring attributes across all market segments. The concept of determinance is well illustrated by the service attribute of Willingness to quote firm prices. This attribute had a relatively high Importance score (Figure 4) but dropped to ninth in determinance. The conclusion that can be drawn from this is that, while firm price quotes are important, most suppliers provide this service. Firm price quotes are requisite for entry into the market but appear to have little impact on the buyer's choice of supplier. Similarly, Within-load thickness consistency dropped from second in importance to fifth in determinance – suggesting it varies less between suppliers than other important attributes.

Clearly, Grading accuracy is a critical factor to hardwood lumber users. Respondents indicated that this attribute was both important and it varied between suppliers, resulting in the highest determinant score. Supplier reputation had the second highest determinant score. The high scores exhibited by these attributes supports the contention that selecting a known vendor or brand is more an act of risk reduction on the part of the buyer than an expression of vendor or brand preference². Two ways in which buyers can reduce risk in purchasing hardwood lumber are to buy from established suppliers with strong reputations and buy from vendors that supply a product of known quality (e.g. accurately graded).

² This idea is attributed to Raymond A. Bauer by Levitt (1986)

It is interesting to note that pricing, which is traditionally thought of as the critical factor in commodity markets, was not the most important or determinant attribute. Neither was it the most common reason for purchase dissatisfaction among lumber users. In light of this finding, it may be useful to view hardwood lumber (specifically grade lumber) as a pseudo commodity (Unger 1983) rather than the hypothetical true commodity. Unlike true commodities, pseudo commodities have the potential for some level of differentiation.

Attributes that were lowest in determinant score tended to be those that would be provided by a supplier with a full product line and the ability to provide services such as arranging credit. The large lumber using companies included in this study do not, on average, value this type of supplier. Such a strategy (full service/product line) is probably more appropriate in a less mature industry or for smaller buyers.

Table 3 provides attribute determinant scores for each of the market segments. The least determinant attribute for all segments except dimension producers was a supplier's ability to provide dimension stock as well as lumber. The critical nature of grading accuracy is reemphasized by the fact that all of the market segments ranked this attribute most determinant.

Cabinet producers appeared to differ most from the remaining segments in terms of determinant scores. These companies tended to place less emphasis on Within-load thickness consistency and Supplier reputation and more emphasis on Chipped grain, Technical information, and the Ability to provide planned lumber than the other market segments. Of the segments studied, cabinet manufacturers appear most likely to value a full service supplier.

DISCUSSION

In interpreting the results of this study, it is important to recognize its limitations. First, both the producers and suppliers included in the study were (by design) the largest companies in their respective industries. Extrapolation of the results of the study to smaller companies may be inappropriate. For example, credit terms and the ability to provide lumber in various stages of processing may be more determinant to small companies that lack the resources of the companies studied.

While the study sought to describe differences between market segments based on industry (SIC code), this segmentation may not be the most appropriate for the formulation of marketing strategy. Moriarty and Reibstein (1986) have shown that segmentation by SIC code or company size may not result in market segments with homogeneous needs. An alternative to this segmentation scheme would be benefit segmentation, perhaps based on a cluster analytic approach to the data. The drawback to this approach is that the resulting segmentation scheme may be difficult to operationalize. While not an objective of this research, cluster analytic solutions were investigated as the basis for segmentation of the data. The initial results showed little improvement in discriminating or interpretive ability as compared to SIC based segmentation.

Finally, the industrial purchasing decision is a complex process, involving not only the product offering, but also inter-personal, organizational, and societal influences (Bonoma, Zaltman, and Johnston 1977). The focus of this study is on those attributes

over which the lumber supplier has some control. However, successful marketing strategies must also consider those external factors that can influence the purchase decision.

SUMMARY

This paper identified the product and supplier attributes that are most determinant in hardwood lumber purchase decisions and, consequently, are the logical attributes to stress in a company's marketing mix. These attributes are grading accuracy, freedom from surface checks, within-load thickness consistency, supplier reputation, and competitive pricing. The first three of these attributes suggest quality in the product aspect of the company's marketing mix – the importance of which lumber producers may have underestimated.

To optimize the marketing mix for a particular market segment, lumber producers may wish to look at determinant attribute differences between types of users. For example, cabinet producers placed increased emphasis on chipped grain, technical information and planned lumber as compared to the other segments studied. Such differences, while generally small, may provide the opportunity for a successful *Focus* strategy in a competitive market such as hardwood lumber.

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Table 1. Characteristics of Respondent Groups

Market Segment	Respondents ^a	% of Lumber Purchases	Mean (Median) ^b Hardwood Lumber Purchased (MBF)	Mean (Median) Production Employees	Mean (Median) Non-Production Employees
All Segments	252	100.0	5816.7 (1466.5)	336.3 (112.5)	53.2 (25.0)
Millwork	34	14.9	2610.1 (500.0)	76.5 (62.5)	22.5 (15.0)
Dimension	35	9.1	3526.1 (1620.7)	107.8 (66.0)	16.4 (10.0)
Flooring	28	26.3	12948.8 (4725.0)	168.3 (81.5)	27.4 (15.0)
Furniture	69	41.5	8426.5 (3000.0)	821.4 (300.0)	105.8 (50.0)
Cabinets	73	8.0	1649.3 (475.0)	210.0 (100.0)	49.0 (26.0)

^a Thirteen companies did not report their primary area of business

^b Twenty-four firms provided insufficient information to compute this statistic

Table 2. Mean Importance Scores by Market Segment and Attribute

Attribute ^a	Mean Standardized Importance Score					
	Millwork (N=34)	Dimension (N=35)	Flooring (N=28)	Furniture (N=69)	Cabinets (N=73)	Total ^b (N=252)
9. Accurate Grading	59.3	59.5	61.7	59.2	58.1	59.2
30. Price Quotes	57.8	57.4	57.6	58.3	57.3	57.8
12. Thick. Consist.	56.6	58.7	58.6	59.5	55.9	57.8
32. Comp. Pricing	56.1	57.8	58.9	58.7	56.7	57.6
2. Surface Checks	57.8	60.0	57.7	56.3	56.2	57.2
29. Reputation	55.8	56.4	57.1	57.9	55.8	56.7
14. Straightness	57.2	56.9	56.2	56.6	56.3	56.6
10. MC Accuracy	57.0	55.5	55.0	53.6	58.2	56.0
11. MC Consistency	56.0	55.9	55.4	54.9	57.8	56.0
15. Cleanliness	53.9	53.2	54.7	53.4	53.4	53.5
28. Relationship	52.9	53.0	55.4	53.7	50.5	52.8
3. End Splits	51.5	54.6	54.2	53.5	50.8	52.7
16. Rapid Delivery	52.7	54.2	52.7	53.8	50.9	52.7
4. Wane	51.8	52.5	54.5	52.3	52.2	52.7
31. Previous Bus.	53.1	53.9	52.8	52.8	49.8	52.3
1. Chipped Grain	46.4	52.5	50.7	49.8	54.4	51.8
18. KD Lumber	53.9	47.9	48.5	47.4	56.5	51.3
26. Arrange Ship.	50.6	51.4	48.4	52.6	51.0	51.1
24. Large Orders	51.5	50.9	52.1	49.9	50.7	50.9
13. Length Consist.	50.9	49.2	50.8	51.7	47.0	49.7
33. Location	44.8	51.1	52.7	49.1	45.1	48.0
20. Packaging	48.0	45.1	42.5	47.5	48.2	47.0
27. Small Orders	46.9	46.4	41.3	46.8	46.8	46.2
21. Species Variety	46.1	45.6	42.9	46.6	46.4	46.0
17. Tech. Info.	45.6	44.4	40.7	45.5	48.9	45.7
6. Square Edges	46.2	48.7	47.6	44.4	42.7	45.2
25. Arrange Credit	44.1	46.5	42.4	42.5	46.7	44.6
7. End Trimming	44.8	45.6	46.1	43.2	40.4	43.3
19. Planed Lumber	39.6	36.0	38.9	40.7	52.2	42.9
5. End Coating	42.6	43.5	40.2	44.2	40.5	42.1
23. Set Width Lumber	41.3	37.0	44.4	40.6	40.8	40.7
22. Dimension Stock	39.3	34.1	38.1	38.2	38.5	37.8
8. Trademark	32.8	34.2	36.5	33.6	32.3	33.4

^a Numbers reference Figure 1

^b Thirteen respondents could not be classified by market segment

Table 3. Mean Determinant Scores by Market Segment and Attribute

Attribute ^a	Mean Standardized Determinant Score					
	Millwork (N=34)	Dimension (N=35)	Flooring (N=28)	Furniture (N=69)	Cabinets (N=73)	Total ^b (N=252)
9. Accurate Grading	61.3	62.4	64.8	59.2	60.9	60.9
29. Reputation	57.3	59.2	57.8	57.4	56.6	57.4
2. Surface Checks	57.8	60.2	56.0	54.2	57.8	56.8
32. Comp. Pricing	57.0	55.8	54.5	56.6	54.5	55.8
12. Thick. Consist.	54.3	57.4	56.9	57.3	52.8	55.4
16. Rapid Delivery	55.8	56.1	53.3	57.8	53.0	55.2
14. Straightness	56.4	54.4	53.8	53.0	56.2	54.7
10. MC Accuracy	53.5	53.7	53.1	51.6	55.7	53.4
30. Price Quotes	53.6	51.6	55.6	54.2	51.6	53.4
28. Relationship	54.8	52.2	55.4	53.3	50.8	53.2
11. MC Consistency	52.9	53.3	53.0	53.1	54.3	52.9
24. Large Orders	51.4	53.8	53.9	52.9	51.4	52.8
3. End Splits	51.5	53.5	53.0	52.9	52.5	52.6
15. Cleanliness	53.8	51.8	52.1	51.7	52.9	52.3
4. Wane	51.9	51.7	53.1	51.2	53.6	52.2
31. Previous Bus.	51.2	52.5	52.4	51.2	47.6	50.6
1. Chipped Grain	46.4	49.1	47.0	48.4	55.5	50.1
13. Length Consist.	50.8	48.7	49.2	51.5	46.7	49.3
33. Location	46.7	51.2	51.7	51.5	46.7	49.3
18. KD Lumber	49.4	47.5	49.0	47.2	48.8	48.4
26. Arrange Ship.	47.3	47.4	46.4	49.2	46.5	47.6
21. Species Variety	47.3	46.7	44.4	48.1	47.9	47.4
17. Tech. Info.	46.2	46.2	42.3	46.8	50.9	47.2
27. Small Orders	47.9	44.0	42.5	46.5	47.8	46.4
6. Square Edges	47.3	48.6	47.0	44.9	44.1	46.0
20. Packaging	45.5	45.1	43.2	45.9	46.5	45.8
5. End Coating	44.7	47.6	41.8	47.1	45.2	45.4
7. End Trimming	46.9	47.2	48.0	44.6	43.0	45.4
25. Arrange Credit	42.0	45.6	43.1	43.2	45.3	44.0
23. Set Width Lumber	45.0	39.8	47.4	43.8	43.1	43.8
19. Planed Lumber	42.6	37.7	41.6	40.6	47.3	42.6
22. Dimension Stock	42.7	37.3	41.3	42.4	42.0	41.4
8. Trademark	36.6	38.0	39.2	37.8	37.2	37.4

^a Numbers reference Figure 1

^b Thirteen respondents could not be classified by market segment

Product Attributes	Service Attributes ¹
<p>Absence of...</p> <ol style="list-style-type: none"> 1. Chipped Grain 2. Surface Checks 3. End Splits 4. Wane <p>Presence of...</p> <ol style="list-style-type: none"> 5. End Coating 6. Square Edges 7. Square End Trimming 8. Supplier's Trademark <p>Accuracy of ...</p> <ol style="list-style-type: none"> 9. Grading 10. Moisture Content <p>Within-Load Consistency of...</p> <ol style="list-style-type: none"> 11. Moisture Content 12. Thickness 13. Length 14. Lumber Straightness 15. General Cleanliness 	<p>Supplier's Ability to Provide...</p> <ol style="list-style-type: none"> 16. Rapid Delivery 17. Technical Information 18. Kiln Dried Lumber 19. Planed Lumber 20. Protective Packaging 21. A variety of species 22. Both Dimension Stock and Lumber 23. Set Width Lumber <p>Supplier's Ability to...</p> <ol style="list-style-type: none"> 24. Fill Large Order 25. Arrange Credit 26. Arrange Shipping 27. Fill Small Orders 28. Personal Relationship With Supplier 29. Supplier's Reputation 30. Willingness to Quote Firm Prices 31. Previous Business With Suppliers 32. Competitive Pricing 33. Nearby Location

¹ Categorizations are for convenience. Some attributes might, arguably, be placed in either category

Figure 1. Attributes Assessed in the Study

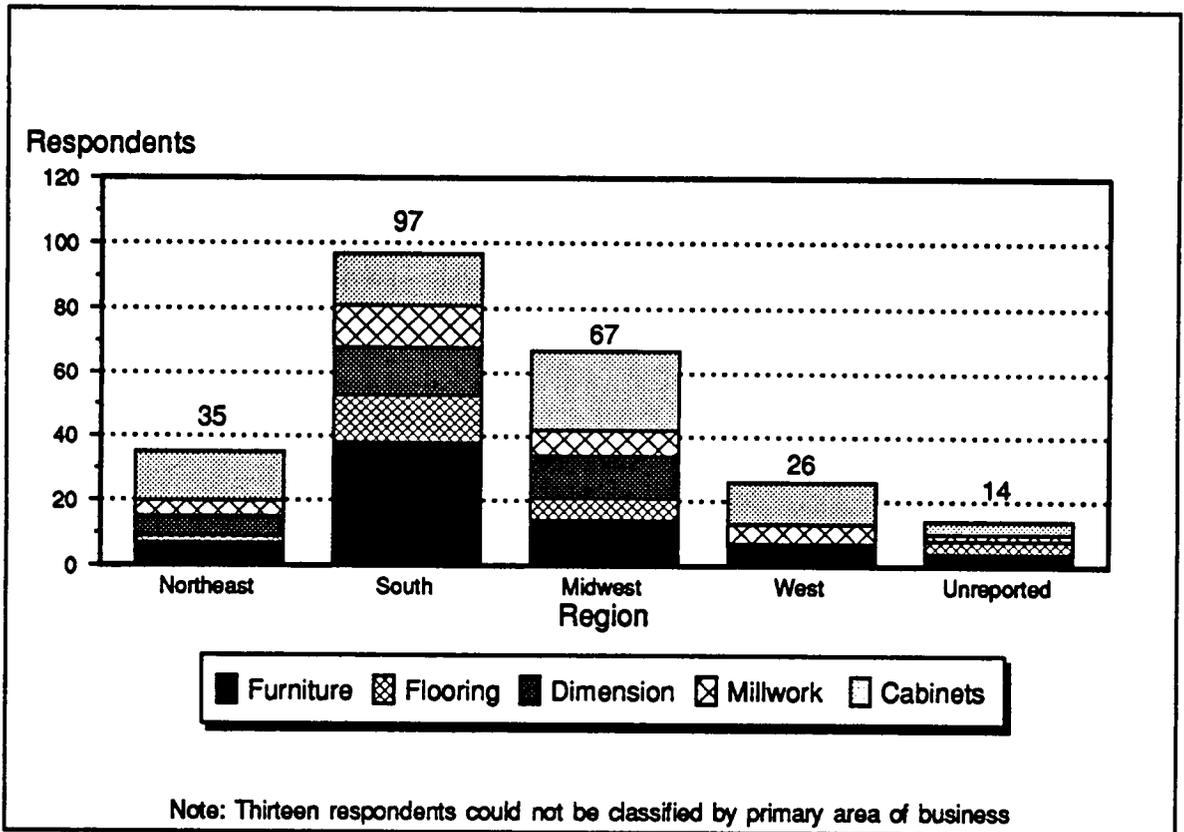


Figure 2. Responding Lumber Users by Primary Area of Business and Geographic Region

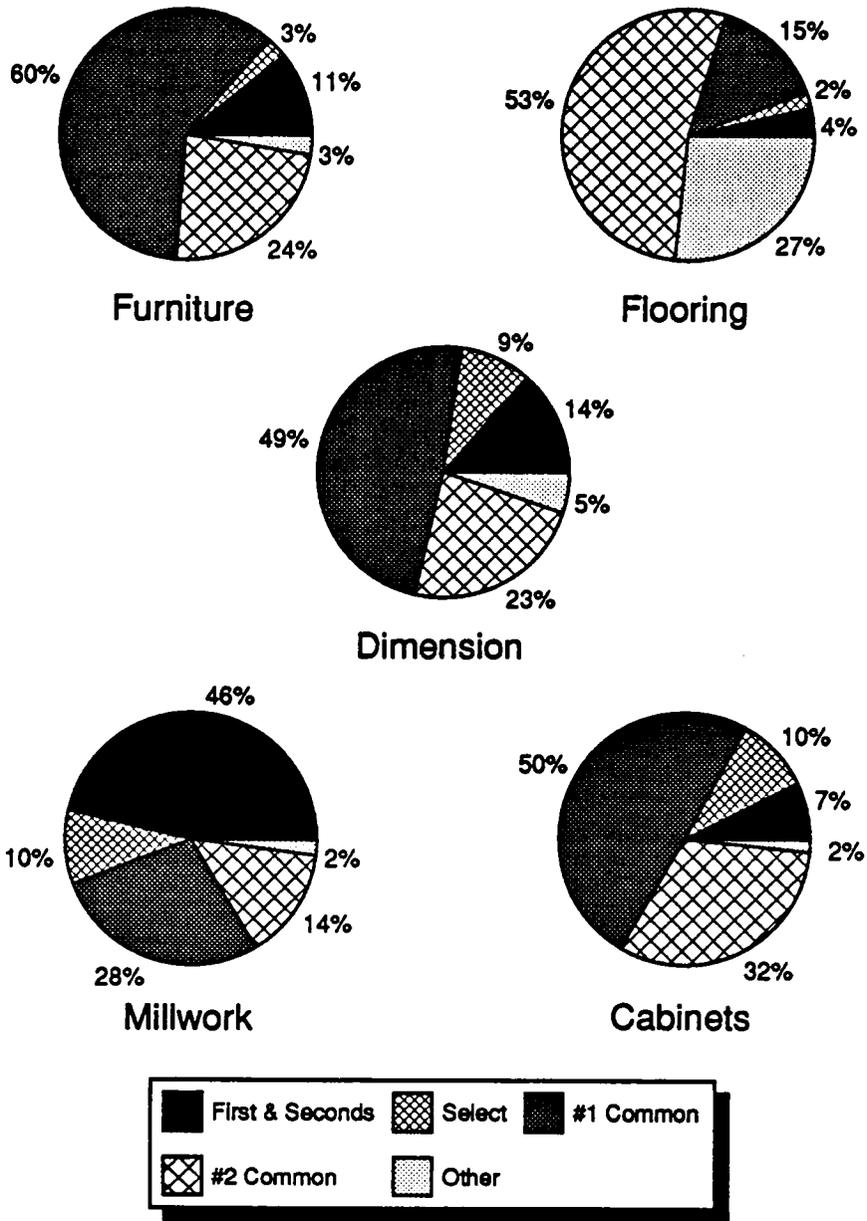


Figure 3. Lumber Purchases by Market Segment and Grade

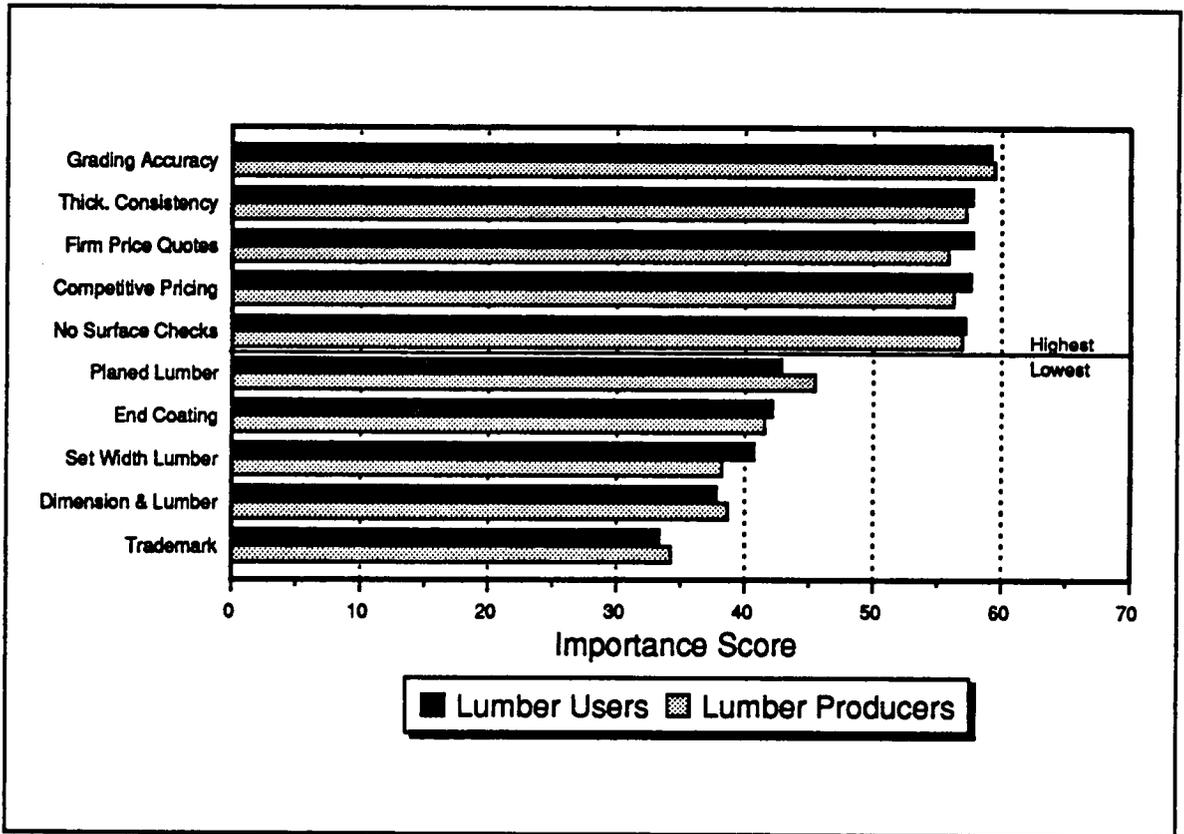


Figure 4. Highest and Lowest Importance Scores for Lumber Users and Corresponding Lumber Producer Scores (Mean=50; Standard Deviation=10)

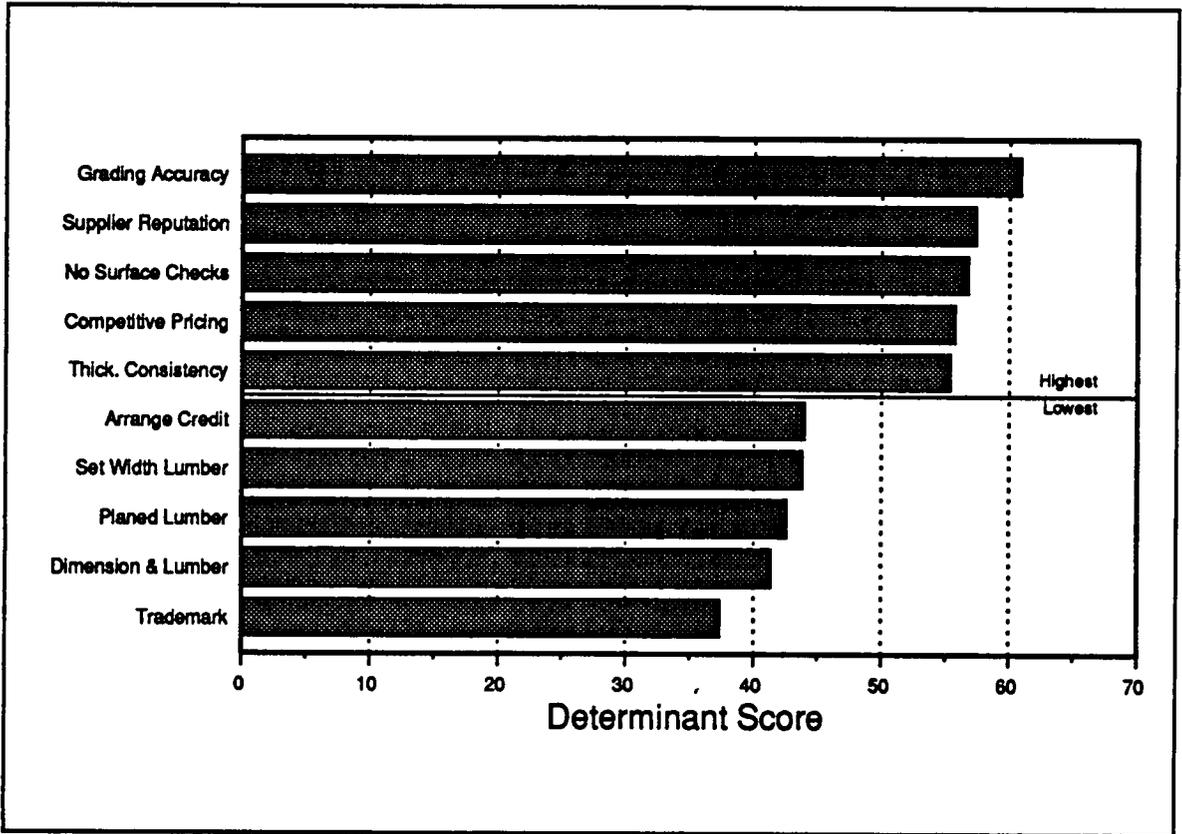


Figure 5. Highest and Lowest Determinant Scores for Lumber Users (Mean=50; Standard Deviation=10)

Business-Level Competitive Strategy in the Hardwood Lumber Industry

ABSTRACT

Business-level intended competitive strategy in the hardwood lumber industry was investigated through the identification of strategic groups in a sample consisting of the 100 largest U.S. hardwood lumber producers. Strategy was operationalized using a measure based on the variables developed by Dess and Davis (1984). Factor and cluster analysis were used to define strategic groups along the dimensions of cost leadership, focus, and differentiation. Five strategic groups were identified and examined as to strategic orientation and intra-group homogeneity. Two groups had no strategic orientation; one group exhibited a cost leadership strategy; one exhibited a differentiation strategy; and one group exhibited a dual cost leadership/differentiation strategy. The differentiation dimension accounted for the greatest portion of strategic variation. Predicted strategic change in the industry concentrated on increasing differentiation orientation. Three strategic groups indicated significant change in this direction and one group indicated an increase along both the focus and differentiation dimensions.

INTRODUCTION

The concept of strategic groups has become well established in the fields of industrial economics, strategic management and marketing as a tool for simplifying the variety of competitive strategies utilized by companies within an industry. Underlying the concept is the simple idea that industries are not necessarily homogeneous. But neither are all companies in an industry unique in terms of the competitive strategies they utilize. Instead, companies can be grouped by their competitive strategies such that groups are, in general, homogeneous within and heterogeneous between. The strategic group concept provides an important intermediate level for industry analyses (Porter 1980). Studies of the industry as a whole may miss important intra-industry strategic differences and the complexity of company level analysis makes it difficult to conduct.

In the marketing and strategic management fields it is assumed that differences between groups of firms are the result of deliberate strategic decisions and thus reflect the company's overall strategic orientation. Strategic groups in this context can be defined as groups of companies that follow similar competitive strategies (Harrigan 1985).

The importance of strategic groups lies in their effect on competition within an industry. McGee and Thomas (1986 p.142) state that strategic groups, if they exist within an industry, *"... clearly have implications for the patterns of competition..."*.

Newman (1978) contends that the complexity of the strategic group structure within an industry has a significant influence on its performance. Specifically, strategic group complexity is positively correlated with the level of competition within an industry

(Harrigan 1980, O'Laughlin and Ellefson 1981c). Strategic groups may also differ in their response to market opportunities or threats (Thomas and Venkatraman 1988) and their profit potential (Porter 1980).

This paper reports the findings of a study that investigated strategic group membership within the hardwood lumber industry. Strategic change in the industry was also investigated. The research focused on the hardwood lumber industry for several reasons. First, hardwood lumber producers are an important segment of the forest products industries and they have received limited study when compared to softwood producers. Luppold and Dempsey (1989) estimate that hardwood lumber accounts for approximately one third of the total value of domestically produced lumber – both hardwood and softwood. The industry's importance is also suggested by its employment of approximately 21,200 workers in 1982 (USDC-BOC 1985) and its position as supplier to high value-added industries such as household furniture and cabinets.

An additional reason for studying the hardwood lumber industry is that it faces numerous challenges and pressures from both the resource side (in the form of changing timber quality, availability and prices) and the market side (in the form of the changing importance of certain markets for hardwood lumber). For example, the average stumpage price for oak sold from eastern National Forests increased 65 percent (unadjusted dollars) between 1980 and 1986 (Ulrich 1988). During the same period, the average price received for red oak (4/4, air-dried, 1C) increased approximately 38 percent (Nolley 1989). Because raw material cost represents a significant portion of the cost of hardwood lumber production, this difference may have represented a change in cost structure for some mills.

On the market side, export markets are increasing in importance while the portion of the lumber market accounted for by flooring and upholstered furniture has decreased and consumption in the pallet and cabinet markets has increased (Luppold 1989).

Knowledge of strategic groupings in the industry can facilitate predictions of reactions to the pressures and changes faced by the industry. Knowledge of strategic change in the industry will aid in identifying the research needs of the industry. In addition, empirical analysis of strategic groups aids in determining the applicability of theoretical strategic typologies to the industry and provides a basis for assessing long-term trends in the industry.

A marketing perspective was taken in this study. That is, the focus of the study was on competitive strategy as embodied by the use of marketing variables rather than as indicated by the companies' structure (the latter being indicative of an industrial economic approach).

THEORY AND PREVIOUS RESEARCH

Defining Strategy

Strategies have been theoretically classified along two dimensions. The first of these involves the corporate-level, business-level dichotomy. Business-level refers to the level in an organization at which strategy for a single industry or product market is determined (Hofer 1975). Corporate-level refers to the top level of an organization, regardless of its size, and is concerned with the configuration, management, organization, and financial transactions of business units which, typically, operate in several industries (Patel and Younger 1978).

Business-level strategy can be further classified along the second dimension -- strategic focus. Business-level strategies are comprised of investment, political, and competitive substrategies (Hofer and Schendel 1978). Investment substrategies address the question of optimum allocation of limited (primarily financial) resources while political substrategies are concerned with the firm's interactions with external groups. Business-level competitive substrategies address the problem of achieving and maintaining a competitive advantage within an industry or product market (Porter 1980, Day 1984, Patel and Younger 1978).

Strategy Research in Wood-Based Industries

Several studies have investigated business- or corporate-level strategy within wood-based industries. Rich (1986) studied 42 of the largest U.S. wood-based companies concerning corporate-level intended competitive strategy. The sample included corporations primarily involved in both fiber and solid wood-based products and respondents were classified as using one or a combination of Porter's (1980) generic strategy types (*Overall Cost Leadership, Differentiation, or Focus*)¹. Rather than measuring strategic dimensions and using these measurements to determine overall

¹ Porter (1980) defines the strategies as follows: *Overall Cost Leadership* requires that the firm seeks to become the industry's low cost producer without ignoring quality and service. A firm pursuing a *Differentiation* strategy seeks to produce a product or service that is perceived industry-wide as being unique. Finally, a *Focus* strategy requires that the firm concentrate on a particular market segment and, in doing so, serve the segment more effectively or efficiently than can less specialized competitors. This last strategy is essentially cost leadership and/or differentiation applied to a specific market segment.

corporate strategy, Rich had respondents indicate directly which generic strategy type was employed.

In general, Rich (1986) found that the majority of firms reported utilizing a *Cost Leadership* strategy, but there was a trend toward the use of *Differentiation* and *Focus* strategies when compared to the results of a similar study covering the 1976-1979 period (Rich 1979). Firms utilizing *Differentiation* and *Focus* strategies were, in general, more profitable during 1984 than firms utilizing a *Cost Leadership* strategy.

In their three article series, O'Laughlin and Ellefson (1981a,b,c) examined the economic structure of a multi-industry group of firms consisting of lumber and lumber products manufacturers (SIC 24), paper and pulp products manufacturers (SIC 26), and wood household furniture manufacturers (SIC 2511). The sample consisted of the 40 largest (by 1978 sales revenue) firms in this group.

The third of O'Laughlin and Ellefson's articles (1981c) examined strategic groups within the sample from an industrial economics perspective. Firms were empirically classified into strategic groups based on 1978 sales rank and apparent diversification strategy. Four strategic groups were identified: *Traditional top 10 wood-based companies*, *Traditional wood-based companies similar in sales volume to new diversified entrants*, *New diversified entrants*, and *Other traditional wood-based companies*.

O'Laughlin and Ellefson (1981a,b,c) concluded that the presence in an industry of firms whose primary business is outside the industry tends to increase competition. This increase is likely to be the result of differences in goals between firms whose primary business is outside the industry and those whose primary business is within the industry (Porter 1980). O'Laughlin and Ellefson also suggest that competition within an

industry increases with increasing strategic group complexity (i.e. the number of strategic groups).

A more recent two-article series by Cleaves and O'Laughlin (1986a,b) investigated realized business-level strategy within the structural panel industry. The sample consisted of 24 southern pine plywood producers. The authors took an industrial economics approach in operationalizing business-level strategy through structural characteristics of the company. These included: manufacturing, size, integration, timberland ownership, procurement, distribution, and geographic specialization.

Fourteen variables, representing the seven strategic dimensions, were measured for each of the 24 companies. A hierarchical clustering algorithm was used to define five strategic groups: *Integrated Wood Giants*, *Local Lumber Producers*, *Regional Solid Wood Products Specialists*, *Timber Baron Subsidiaries*, and *Diversified Paper Producers*. This methodology differed from that used by Rich (1986) in that it did not force the firms into *a priori* strategy types.

Cleaves and O'Laughlin (1986a,b) point out that the resulting multidimensional clustering helps to explain competition among the firms that cannot be explained adequately using the traditional economic models that are often applied to markets for wood products. In addition, the authors suggest that the identification of strategic groups within the industry aids in predicting industry-wide response to government regulations, technological advances, changes in raw materials, and competitor moves.

Operationalizing the Strategy Construct

Operationalization concerns the assignment of numbers to represent quantities of attributes (Churchill 1979). Operationalization of the strategy construct requires that a

complex phenomenon be simplified to a relatively small set of strategic dimensions. Researchers have found this process extremely difficult to accomplish in a manner that is consistent and widely applicable (Hambrick 1980, Harrigan 1983). Numerous approaches have been investigated but none has been universally accepted. Yet, the choice of strategic dimensions is the single most influential factor on the outcome of a study of strategy and the greatest source of variation between studies (McGee and Thomas 1986).

The strategic dimensions included in various operationalizations tend to reflect the researcher's field of study (marketing, industrial economics, or strategic management) and the objectives of the study (testing of *a priori* theory or empirical description of an industry). The choice of strategic dimensions also varies depending on the researcher's decision to focus on intended strategy (strategy as the intentions of the company's executives) or realized strategy (strategy as expressed by the company's structure and actions).

Thomas and Venkatraman (1988) classify operationalization schemes as *Narrow* (uni-dimensional) or *Broad* (multi-dimensional). *Narrow* operationalizations use a single variable such as firm size, degree of vertical integration, or technology to assess strategy. *Broad* operationalizations are based on observable characteristics of the firm or scores on measures of strategic dimensions. In a similar manner, Harrigan (1983) divides operationalization schemes into coarse-textured and fine-textured approaches.

METHODOLOGY

This study focuses on business-level intended competitive strategy within the hardwood lumber industry. Business- rather than corporate-level strategy was investigated by controlling for the product market variable (diversification) to a non-significant level, as suggested by McGee and Thomas (1986). Since the strategy professed by company executives may differ from the strategy that a company actually implements, intended strategies may differ from actualized strategies (Snow and Hambrick 1980). However, focusing on intended strategies allowed strategic change in the industry to be addressed.

Quantitative strategic data were gathered via a twenty-item measure based on the strategic variables developed by Dess and Davis (1982, 1984). The measure developed by Dess and Davis was judged to have met the three concerns in operationalization presented by Thomas and Venkatraman (1988): (1) It captured (with minor changes) the basis for competition in the industry; (2) It had a strong relationship to extant strategic group theory, specifically, Porter's (1980) generic strategy typology; and (3) the work of Dess and Davis (1982, 1984) provides evidence of the validity and reliability of the measure.

Minor changes were made to ensure applicability to the hardwood lumber industry and the content validity of the resulting measure was checked via a review of the research instrument by knowledgeable Forest Service, University, and Trade Association personnel. Figure 1 lists the variables used in this portion of the study.

Sample

A purposive (judgement) sample consisting of the largest 100 U.S. hardwood lumber manufacturers that could be identified was utilized. Where companies participated in more than one industry, only the business unit involved in hardwood lumber production was included in the study.

Obviously, this non-probabilistic sampling scheme precludes extrapolation of the results to the entire industry. However, it was felt that, given limited research resources, strategic issues in the industry could best be investigated by examining larger, influential firms rather than by using a probabilistic sample that was likely to include small firms with little influence on the industry. Purposive sampling also allowed the sample to be controlled for the potentially confounding effects of extreme variations on company scope and resources (Dess and Davis 1984). In addition, non-probability samples are commonly used in marketing research (Green and Tull 1978) and at least one study (Karmel and Jain 1987) has shown that a non-random, purposive sample of large firms within an industry can outperform randomized sampling schemes.

Data Collection

Survey techniques were used to gather data from the sample firms. In multi-industry companies, the questionnaire was directed to the head of the business unit producing hardwood lumber. In single industry companies, the questionnaire was directed to the top executive. In some cases it was not possible to contact the top executive and senior marketing/sales people were substituted. Surveying more than one individual per company may have provided a more accurate picture of the company's intended

strategy. However, research resources and limits on the amount of time the companies could reasonable be expected to give to the study, precluded this refinement.

The questionnaire included questions concerning the nature of the firm (sales, production levels, location, etc.) as well as the 20 items that formed the strategy measure. These 20 items were rated as to their importance to the company's competitive strategy. Seven point Likert scales that ranged from, 1 = *Not Important* to 7 = *Extremely Important* were used. Recipients were also asked to indicate how important they expected each item to be in their company's future (next five years) competitive strategy.

The multi-item measurement approach used in this study is supported by Hambrick (1980). The use of a multi-item measure also allowed reliability to be assessed and may be necessary for valid measurement of a complex construct such as business-level strategy (Peter 1979).

The questionnaire was mailed during June, 1989 to 80 sample companies. Nineteen surveys (one sample firm refused to be interviewed) were administered between June and September, 1989 as part of in-person interviews. A total of 72 questionnaires (72%) were returned by the time analysis began.

Identifying Strategic Groups

Factor Analysis -- The investigation of possible strategic groupings within the sample began with data tabulations to identify any mistakes in coding or in data entry. Responses to the twenty-item measure were then factor analyzed. Factor analysis is a multivariate method for establishing dimensions within a data set and for data reduction (Stewart 1981, Hair et al. 1987). Factor analysis also serves to remove

autocorrelation between the variables that may bias cluster solutions (Saunders 1980). In this study, factor analysis was used to confirm the operationalization of the strategy construct and to generate factor scores for use in cluster analyses.

Principal component factor analysis was deemed an appropriate technique since a correlation matrix of the data showed relationships between variables (Table 1) and a Bartlett test of sphericity rejected the hypothesis that the matrix was an identity (Stewart 1981). In addition, the Kaiser-Meyer-Olkin measure of sampling adequacy was acceptable (Norusis 1988). Stevens (1986) recommends 4 to 5 subjects per variable (item) for a stable factorial solution. In this study the ratio was 3.6 to 1. Consequently, particular attention was paid to evaluating the reliability of the factor and cluster analyses results.

A three factor solution was chosen *a priori* since the measure was designed to evaluate Porter's (1980) three generic strategies as dimensions of business-level competitive strategy. Table 2 provides the resulting factor loadings (correlations between the original variables and the factors) after Varimax (orthogonal) rotation. The choice of a three factor solution was supported by a scree test and examination of factor eigenvalues (Stevens 1986). Variable 15 (ownership of timberlands and/or logging operations), which was designed to assess the importance of backward integration, was excluded from further analyses because of its low loading on all three factors. The remaining variables were assigned to the factor on which they had the greatest loading and formed sub-measures that assessed the three strategic dimensions.

Analysis of the variables that were assigned to each of the three factors indicated that Factor 1 clearly represented the Differentiation dimension. Factor 3 was interpreted as representing the Cost Leadership dimension. Interpretation of Factor 2 was less

clear since it incorporated variables that were originally thought to assess either Differentiation or Focus dimensions. This result is not surprising since a *Focus* strategy, as defined by Porter (1980), is a *Differentiation* and/or *Cost Leadership* strategy aimed at a specific market segment. Consequently, Factor 2 was ultimately interpreted as representing the Focus dimension.

Scores for each sub-measure were calculated using the linear model;

$$F_i = a_{i1}x_{i1} + a_{i2}x_{i2} + a_{i3}x_{i3} \dots a_{ik}x_{ik}$$

where:

F_i = Score on sub-measure i ($i = 1$ to 3)

a_{in} = Rating of the importance of the first variable included in sub-measure i

x_{in} = Rotated factor loading of variable a_{in} on factor i

k = Number of variables included in the sub-measure

The reliability of the sub-measures was evaluated by computing coefficient alpha; a commonly accepted formula for assessing the reliability of a multi-item measure (Peter 1979). Table 2 provides the alpha values for each sub-measure evaluated across the data set. These values are considered acceptable by Churchill (1979) for exploratory work. In addition, they were deemed reasonable given the relatively low number of variables making up sub-measures 1 and 2 (alpha generally increases with the number of items that form a measure).

Cluster Analysis – Cluster analysis is a term applied to a group of empirical techniques for classification of objects without prior assumptions about the population (Punj and Stewart 1983). While developed in the biological sciences, cluster analytic techniques are commonly used in marketing research (Saunders 1980).

In this study, hierarchical agglomerative cluster algorithms (using squared Euclidean distance measures) were used to determine strategic groupings within the sample companies. Prior to clustering, the data were examined for the presence of potential outliers that could skew the cluster solution. Based on plots of the three sub-measure scores and Mahalanobis' distance statistic (Norusis 1988) for each company, two potential outliers were identified. Because of their potential affect on the stability of the cluster solution, these companies were removed from further analyses. The computer program utilized (SPSS-X™) removed an additional two companies due to missing data. This resulted in a cluster sample size of 68 companies.

The companies were first clustered using Ward's method which seeks to minimize the sum of squared within-cluster distance (Hair et al. 1987). This algorithm was chosen because it has been shown to outperform others in many situations (Punj and Stewart 1983). Ward's method was also the most conceptually appealing for identifying strategic groups.

Unlike theoretical statistics, cluster analysis does not provide precise rules for choosing a solution (Dess and Davis 1984, Harrigan 1985). Instead, the choice of an appropriate solution must be based on less rigid guidelines and the interpretability of the results. A five cluster solution was chosen in this study based on analysis of a plot of the number of clusters versus the standardized distance coefficient between merged

clusters and because this number of clusters was the smallest that adequately differentiated the companies.

The reliability of the five cluster solution was tested using the three part approach suggested by Choffray and Lilien (1980) and used by Doyle and Saunders (1985). This approach consists of:

1. Testing for outliers in the data
2. Testing the randomness of the data structure
3. Testing the uniqueness of the solution

The first of these tests has been previously described. In order to test for randomness, 15 sets of random data with distribution characteristics (mean and standard deviation) similar to the actual data were generated. Each of these data sets were clustered using Ward's method. The mean standardized distance coefficients at critical cluster levels were then compared to the coefficients from the actual data (Table 3). If the distance coefficient did not significantly differ from the random data, the cluster solution would be trivial. As illustrated in Table 3, significant differences were noted; suggesting an underlying structure does exist in the data.

The final reliability test required that the cluster solution based on Ward's method of cluster formation be compared to the solutions based on alternative methods. This test is necessary since each method of cluster formation has certain biases. For example, single linkage cluster methods tend to form long, weakly connected clusters and Ward's method is biased in favor of spherical clusters with equal numbers (Saunders 1980). If the cluster solution based on Ward's method is non-trivial, it should exhibit relative stability when compared to the solutions generated by other clustering methods. Table 4 provides the results of a multi-method comparison. The relatively

good agreement between the clustering methods provide additional evidence of the reliability of the solution.

RESULTS

Strategic Groups

Figure 2 illustrates the five strategic groups that were identified by the cluster analysis. Locations correspond to cluster centroids and symbol size is proportional to the mean squared Euclidian distance between pairs of companies within the group – a measure of intra-group homogeneity. Since the variables used to generate factor scores were measured on interval scales, the axes scales should be interpreted as interval rather than ratio. Conclusions should be based on the relative rather than absolute positions of the strategic groups.

It is clear from Figure 2 that the greatest portion of strategic variation between groups is attributable to the Differentiation dimension. The groups differ less on the Focus and Cost Leadership dimensions. Similarly, Dess and Davis (1984) found that Cost Leadership did not differentiate strategic groups in the paints and allied products industry (an industry similar to hardwood lumber in its maturity and fragmentation).

Figure 2 also suggests that larger strategic groups within the industry are not necessarily less homogeneous. For example, Group 2 has the largest number of members (22) but intra-group homogeneity (as measured by the mean squared Euclidian distance) is greater than Group 4 with only nine members. Group homogeneity has implications to intra-group rivalry and stability (Harrigan 1985). Harrigan theorized that less homogeneous groups are more likely to face intra-group

discord and are more likely to revert to price as a basis for competition. This theory is supported by the position of Group 4 (the least homogeneous group) whose intended strategy displays no distinctive orientation. Without a distinctive orientation on one of the strategic dimensions, the only alternative for these companies may be to depend on price competition. The result is likely to be depressed profitability for all companies in the group. Porter (1980) termed this situation "Stuck in the middle" and concluded that such a strategic position assures low profitability.

A possible explanation for this lack of strategic orientation lies in the size of the companies that compose Group 4. Table 5 compares the five strategic groups on several size related variables. Group 4 appeared to consist of smaller firms since it was the lowest on all four characteristics (However, this conclusion is used with caution since the groups differed, at normal levels of significance, only when compared on the number of production employees). Such smaller firms may fail to develop a strong strategic thrust because of the risk associated with the attempt or because they do not have the resources to implement the necessary changes (Dess and Davis 1984).

Group 1 also appears to be "Stuck in the middle". This group has an intended strategy that is lowest on both the Focus and Cost leadership dimensions and exhibits a medium level of Differentiation orientation. The intended strategy of this group gives its members little strategic advantage.

Group 2 is large (22 members) but relatively homogeneous. It is strategically similar to Group 1 in terms of Differentiation but has developed a stronger Cost Leadership orientation and, therefore, may be more profitable.

Ideally, companies would avoid becoming "Stuck in the middle" (Porter 1980) by developing and implementing a strong strategic orientation along one of the dimensions

while maintaining only a nominal level on the remaining dimensions. However, in a pseudo-commodity (Unger 1983) industry such as hardwood lumber this nominal level of Cost Leadership orientation could be expected to be higher than in true specialty industries. Group 5 exhibits a strong emphasis on Differentiation and a level of Cost Leadership that probably approximates the industry norm. This Cost Leadership position is consistent with Porter's (1980) definitions since he states that differentiators seek cost parity or proximity relative to competitors.

Group 3 also has a strong Differentiation orientation but is higher on the Cost Leadership dimension. This dual strategy clearly has competitive advantages if the two goals can be achieved simultaneously. Porter (1980 p.38) states:

"...achieving differentiation will imply a trade-off with cost position if the activities required in creating it are inherently costly, such as extensive research, product design, high quality materials, or intensive customer support."

This does not seem to be the case in the hardwood lumber industry. In addition, Murray (1988) concludes that the external preconditions for *Cost Leadership* and *Differentiation* strategies do not preclude such dual strategies. Consequently, the strategy of Group 3, if implemented, is likely to provide significant competitive advantage.

When groups were compared (using analysis of variance techniques) based on the products they produced (species, grade, level of processing) they were also found to differ based on the amount of their lumber production that was sold rough and green ($p=.09$). Group 3 sold the smallest portion (18%) of its production rough and green

while Group 4 sold the greatest portion (46%) of its production in this form. This seems consistent with the differentiation orientations of these groups – as indicated by their positions in Figure 2. Additional processing of hardwood lumber (such as kiln drying and/or planing) offers more opportunity to differentiate the product or tailor it to a specific customer group. In fact, successfully implementing a *Focus* or *Differentiation* strategy may be difficult without some form of additional processing. This reasoning may explain why the groups that contained smaller companies that sell large portions of their lumber rough and green (i.e. groups 1 and 4) scored low on these dimensions.

Strategic Change

In addition to providing information concerning their present intended competitive strategies, respondents indicated how they expected their strategies to change in the next five years. Figure 3 indicates the directions of changes that were found to be significant (i.e. present and predicted future group centroids were significantly different at the $\alpha=.10$ level). With the exception of Group 3 (which is presently well positioned strategically), all groups planned significant changes. Groups 1, 4, and 5 planned increases in their emphasis on Differentiation. In general, companies in Group 2 planned to increase both their Focus and Differentiation emphasis. As mentioned previously, such dual strategies can cause problems if they involve internal inconsistencies in the allocation of resources.

The movement of several of the groups in the same strategic direction (i.e. increased Differentiation orientation) has at least two implications. First, an increase in the number of firms following a similar strategy may inhibit company performance (Dess and Davis 1984). A second and related implication involves decreasing inter-group

distances. Since these distances approximate the height of mobility barriers between groups (Harrigan 1985), increased inter-company competition can be expected as distances decrease and companies compete for the same customer groups. With Groups 1, 2, 4, and 5 making strategic moves toward group 3 along the Differentiation dimension, increased inter-group competition may result.

DISCUSSION

The five strategic groups identified in this study can be classified, using Porter's (1980) strategic typology and terminology, as follows: Groups 1 and 4 are "Stuck in the Middle"; Group 2 has a *Overall Cost Leadership* strategy; and group 5 follows a *Differentiation* strategy. Group 3 has a dual *Overall Cost Leadership* and *Differentiation* strategy and, as such, does not fit well into Porter's (1980) typology. The typology proposed by Day (1984), which adds a *Hybrid* (Low cost and emphasis differences) strategy to Porter's (1980) typology, accounts for the strategic position of Group 3. Consequently, Day's (1984) model may be the most appropriate for modeling the hardwood lumber industry.

As previously mentioned, groups that have no strong strategic orientation (i.e. Stuck in the middle) are likely to be low in profitability (Porter 1980). However, Dess and Davis (1984) posit that these companies may be better able to adapt to changes in the industry environment. As the hardwood lumber industry changes, groups 1 and 4 may gain in competitive advantage.

None of the strategic groups exhibit a strong *Focus* strategy. Doyle and Sanders (1985) provide a possible explanation for this lack of Focus orientation in stating that

skills in market segmentation and positioning are rarely present in old line industries such as forest products. Such skills would be required to successfully implement a Focus strategy. However, many of the companies included in the study have the financial resources necessary to obtain these skills. A more likely explanation of the lack of a strong focus orientation among these companies is the market risk and possible limitation of demand implied in focusing on one segment of the hardwood lumber market. Companies may be uncomfortable with "putting all their eggs in one basket" and may feel that the segment is too small to support their sales growth goals. However, this does not imply that a *Focus* strategy would be inappropriate for smaller companies. In fact, the finding that the large companies included in this study do not generally focus on particular market segments suggests a strategic opportunity for smaller companies.

In studying large U.S. wood-based corporations, Rich (1986) identified a trend toward the adoption of a *Differentiation* strategy. This study found that the largest hardwood lumber producers have similarly emphasized this strategic dimension in their intended strategies. In addition, most companies report that they intend to move their strategic emphasis in this direction in the near future. This implies that hardwood lumber producers will, increasingly, be attempting to produce specialty-like products and differentiate their existing products through techniques such as brand identification development and improved customer service.

Significantly, no group planned significant movement (either increases or decreases) along the cost leadership strategic dimension. It appears that companies are satisfied with their strategies in terms of cost leadership. New production equipment acquisitions are likely to be made in order to maintain the company's cost position rather than

as part of strategies designed to gain a competitive advantage through production cost advantage. Obviously, this finding has implications to sawmill equipment manufacturers and importers.

A limitation of this study that provides the opportunity for further research is the lack of quantitative performance data on the individual companies. With such data predictions of company performance based on strategic position could be tested. Rich (1986) was able to accomplish this when he used corporate-level data to compare the performance of companies that followed various generic strategies. Unfortunately, business-level performance data is extremely difficult to obtain (Porter 1979). Privately held companies do not commonly publish this information and it is often difficult to disaggregate corporate data to evaluate the performance of the business unit involved in hardwood lumber production. Obtaining such data and using it to test the predictions of previous researchers would add considerably to the understanding of business-level competitive strategy in wood-based industries and should be the goal of future research.

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Table 2. Factor and Sub-Measure Structure

Variable Number	Variable	Factor 1 Differentiation	Factor 2 Focus	Factor 3 Cost Leadership
----- Factor Loadings* -----				
17.	Market research	.75	.16	.13
8.	Using new marketing techniques/methods	.73	.52	-.14
7.	Developing brand identification	.71	.28	-.22
11.	Serving special geographic markets	.67	-.15	.16
13.	Promotion and advertising	.65	.37	.10
19.	Serving particular customer groups	.64	.10	.25
12.	Ability to manufacture specialty products	.50	.06	.11
1.	Developing new products	.46	.40	.16
14.	Maintaining a company sales force	.45	.15	.38
9.	Controlling channels of distribution	.45	.26	.16
15.	Owning timberlands and/or logging operations	.32	-.19	.22
2.	Providing customer service	.04	.77	.07
4.	Product quality control	.16	.73	.19
3.	Efficient operation of production facilities	-.05	.62	.35
20.	Reputation within the industry	.15	.52	.08
6.	Competitive pricing	.06	-.06	.69
5.	Employing trained/experienced personnel	.09	.39	.68
16.	Providing rapid delivery	.04	.10	.63
10.	Procurement of raw materials	.07	.16	.56
18.	Investment in new processing equipment	.30	.32	.50
	Eigenvalue	5.73	2.13	1.57
	Percent of Total Variance	28.6	10.6	7.9
	Coefficient Alpha (For items forming sub-measure)	.84	.69	.69

* Bold type denotes the variables used to form the factor sub-measure

Table 3. Comparison of Cluster Structure to Random Data

Number of Clusters	Standardized Distance Coefficient		t Statistic	Probability p
	Actual (Ward's)	Mean Random ^a		
1	3307.8	3985.3	6.07	< .001
2	1464.2	1800.6	5.83	< .001
3	934.9	1168.5	5.93	< .001
4	670.8	897.4	8.62	< .001
5	536.9	736.6	10.09	< .001
6	458.4	624.4	10.55	< .001
7	387.6	537.7	12.38	< .001
8	333.6	471.3	12.57	< .001
9	301.9	415.4	11.30	< .001
10	220.9	367.0	16.50	< .001
20	122.3	159.8	8.19	< .001
30	64.7	73.9	4.53	< .001
40	35.4	35.4	0.00	> .5
50	15.1	14.6	0.67	> .5
60	3.1	3.0	0.31	> .5
61	2.4	2.4	0.00	> .5
62	1.7	1.9	1.02	.3 > p > .2
63	1.2	1.4	1.43	.2 > p > .1
64	0.9	1.0	0.71	.5 > p > .4
65	0.6	0.6	0.55	> .5
66	0.3	0.3	1.37	.2 > p > .1
67	0.1	0.1	1.45	.2 > p > .1

^a Mean distance for each cluster level from 15 sets of random data

Table 4. Comparison of Clustering Methods

	Ward's Method	Complete Linkage	Average Linkage
Ward's Method	--		
Complete Linkage	79% ^a	--	
Average Linkage	76%	68%	--

- ^a Percent of cases consistently grouped based on five cluster solutions. Naive assignment of cases to the largest Ward's cluster results in correct classification of 32% of the cases.

Table 5. Strategic Groups Compared on Size Characteristics

Characteristic	Group Number					F Statistic	Probability <i>p</i>
	1	2	3	4	5		
	Mean						
Hardwood Production (MMBF)	19.20	20.27	24.21	9.74	26.93	1.21	.32
Softwood Production (MMBF)	1.56	14.83	.59	.06	26.02	.85	.50
Production Employees (Number)	109.13	81.43	156.5	34.78	138.86	2.93	.03
Non-Production Emp. (Number)	17.00	26.45	37.54	7.89	28.23	.96	.44

1. Developing new products	11. Serving special geographic markets
2. Providing customer service	12. Ability to manufacture specialty products
3. Efficient operation of production facilities	13. Promotion and advertising
4. Product quality control	14. Maintaining a company sales force
5. Employing trained/experienced personnel	15. Owning timberlands and/or logging operations
6. Competitive pricing	16. Providing rapid delivery
7. Developing brand identification	17. Market research
8. Using new marketing techniques/methods	18. Investment in new processing equipment
9. Controlling channels of distribution	19. Serving particular customer groups
10. Procurement of raw materials	20. Reputation within the industry

Figure 1. Variables Used to Operationalize Business-Level Strategy (Adapted from Dess and Davis 1984)

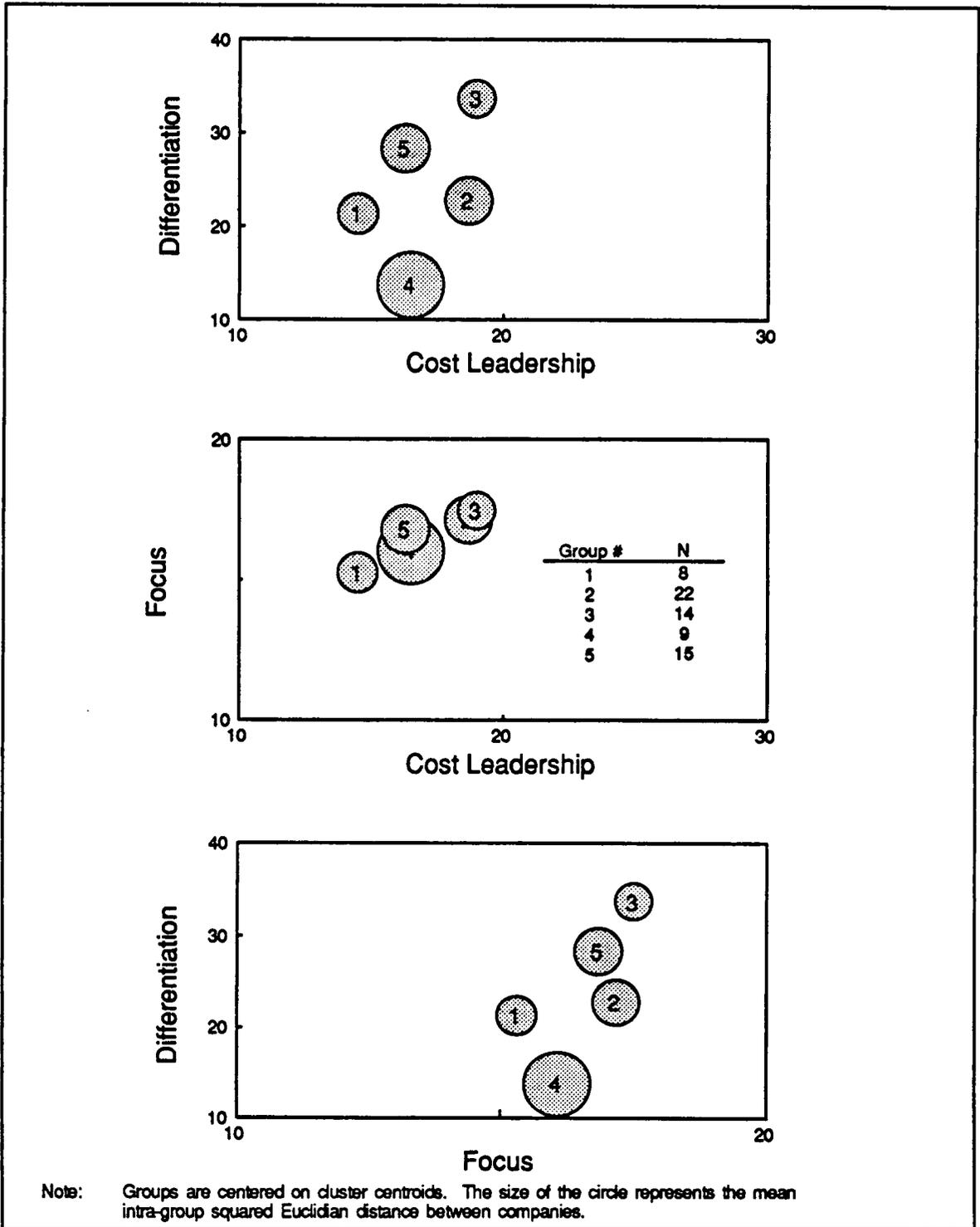
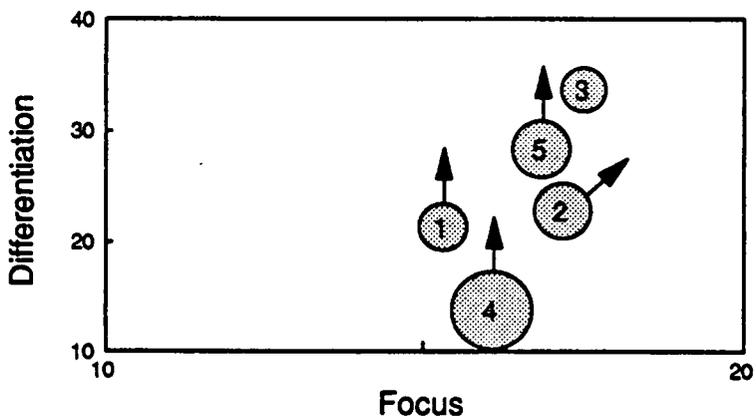
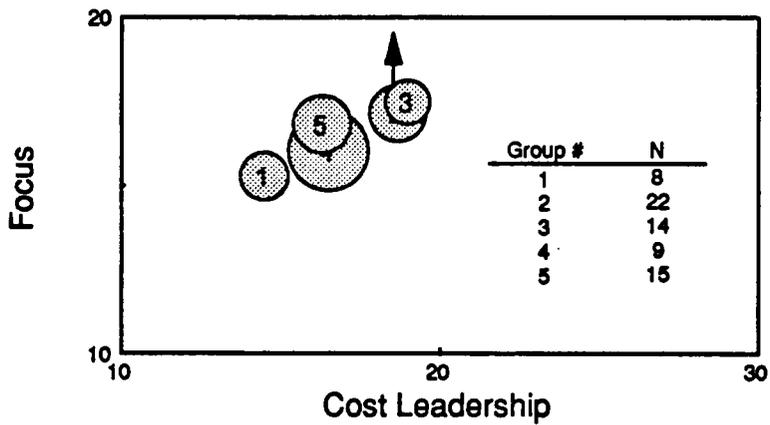
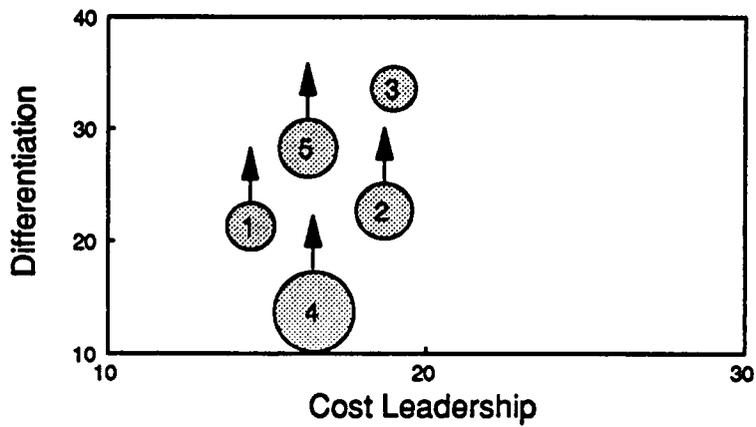


Figure 2. Strategic Groups on Three Strategic Dimensions



Note: Arrows indicate the directions of significant changes in group centroid location.

Figure 3. Predicted Strategic Group Movement: Next Five Years

A Qualitative Examination of Competition in the U.S. Hardwood Lumber Industry

ABSTRACT

Executives at twenty of the largest (by production) U.S. hardwood lumber companies were interviewed concerning competition in the hardwood lumber industry. In general, the largest and smallest companies in the industry were found to be the most production oriented. When the competitive strategies of the companies were categorized using Porter's (1980) strategic typology, *Overall Cost Leadership* strategies were the most common followed by *Differentiation* and *Focus* strategies. The majority of companies studied competed for customers based on quality, customer service, and price – in that order of importance. Proprietary grading was an important competitive tool for larger companies. Commonly reported trends in the industry included: shortened distribution channels, increased specialization in the products sought by lumber buyers, and movement of the inventory carrying function back to the producer.

INTRODUCTION

Studies of wood-based industries commonly focus on descriptions of structural characteristics such as the number of companies, employment, production processes, raw material use, and markets served. Examples of studies that provide this type of information concerning the hardwood lumber industry include, but are not limited to, Wengert and Lamb (1981a,b), Cardellicchio and Binkley (1984), Spelter and Phelps (1984), Araman (1988), Luppold and Dempsey (1989), Luppold (1989), as well as publications of the U.S. Department of Commerce - Bureau of Census and other government agencies (USDC-ITA 1984, USC-OTA 1984). Other studies have taken an econometric approach in describing the hardwood lumber industry (For example, Luppold 1982).

This wide variety of studies provides a rich description of many aspects of the industry. However, one aspect of wood-based industries, the basis and nature of competition, has been largely ignored. Notable exceptions are the works of Rich (1979, 1986) for large wood-based corporations, Cleaves and O'Laughlin (1986) for a portion of the structural panel industry, and Luppold (1987) for the hardwood lumber industry.

Until recently the hardwood lumber industry in the United States could be characterized as a fragmented (Porter 1980) industry with well established markets and widely accepted product standards (specifically, the National Hardwood Lumber Association grading rules). While the industry remains fragmented, some consolidation has occurred (USDC-BOC 1986). In addition, markets for hardwood lumber have changed (Luppold 1989). In part, this change has been due to strong world demand for U.S. hardwoods and the resulting interest in export markets.

Luppold (1989) reports a 500 percent increase in eastern hardwood lumber exports between 1965 and 1989. Consumption of eastern hardwood lumber in the pallet and cabinet markets has grown steadily between 1972 and 1987 (Table 1). Over the same period, consumption of eastern hardwoods for flooring and upholstered furniture saw decreases. In addition, demand for west coast hardwoods in pacific rim and west coast markets has grown significantly since 1976 (Buhler and Briggs 1989).

Traditional methods of competing in the hardwood lumber industry may also be changing as the industry and its markets change. However, considerations of competition often describe the hardwood lumber industry as competitive or very competitive but do not elaborate on the ways in which companies compete and the competitive methods used. One reason for this lack of information may be the difficulty of obtaining and analyzing data relevant to the subject.

This study is an attempt to fill this gap in the current literature by providing information concerning the ways in which hardwood lumber companies compete, the competitive strategies they utilize and trends in the industry that could affect competition. Knowledge of these trends could help to predict and plan for the future research and resource requirements of the industry.

To assess changes, a naturalistic inquiry (Heischmidt and Kellerman 1989) approach was taken. Interviews were conducted with executives at the largest U.S. hardwood lumber producers. Unless otherwise noted, the qualitative data these executives provided is the basis of the information presented in this paper.

The hardwood lumber industry was chosen for study because of its significance as well as the changes it has undergone. Hardwood lumber is an important segment of the group of industries that use wood as a raw material. Luppold and Dempsey (1989)

report that eastern hardwoods may account for approximately one third of the total value of domestically produced lumber (both hardwood and softwood). Nationwide, hardwoods account for a slightly larger portion of total domestic production since, smaller but increasing amounts are produced in regions such as the Pacific Northwest (Buhler and Briggs 1989). The industry's importance is also suggested by its employment of approximately 21,200 workers in 1982 (USDC-BOC 1985) and its position as supplier to high value-added industries such as household furniture and cabinets.

METHODOLOGY

During June, July, and August of 1989 in-person, semi-structured interviews were conducted with executives at twenty of the largest (by production) hardwood lumber manufacturers in the United States. The companies were identified via a review of production data provided by industry fact books (Miller Freeman 1987, 1988), trade association membership directories, *The Weekly Hardwood Review* (Barrett 1987), and telephone conversations with company personnel. In addition, knowledgeable Forest Service, University, and trade association personnel were consulted to aid in identifying the largest companies.

While every effort was made to avoid overlooking possible top-twenty companies, the sample was not considered a definitive list of the largest hardwood lumber companies for two reasons. First, one company that was thought to be in the top-twenty, in terms of production volume, declined to be interviewed. In addition, production figures from various sources are inconsistently reported. Some production figures reflect only the volume of lumber actually produced at mills owned by the

company while other figures reflect both the volume of lumber produced internally and lumber that is produced by independent mills but distributed by the company. These problems made the compilation of a definitive list of the top-twenty hardwood lumber producers extremely difficult. However, the sample did include most of the largest and many influential companies in the industry and was deemed significant for this reason.

In multi-industry companies, interviews were conducted with executives in the business unit producing hardwood lumber. In single industry companies, and where possible, interviews were conducted with the top executive. In some cases it was not possible to interview the top executive and senior marketing/sales people were substituted. Interviews were generally limited to one executive at each company. However, at a few firms it was possible to interview several people to gain additional insight.

Interviews were semi-structured and exploratory. Specific areas of inquiry included: the current state of competition in the industry, the competitive strategy utilized by the company, the importance of various marketing variables, and trends in the industry that could affect competition. While the interviews were conducted with the industry's largest companies, inquires were not limited to this industry segment. Respondents were encouraged to discuss competition in all segments of the industry – including smaller companies. To protect the confidentiality of the interviews, company names and proprietary information are excluded from this paper.

RESULTS AND DISCUSSION

Industry Segments

Several of the respondents¹ suggested that the hardwood lumber industry was too diverse to examine as a whole in terms of competition. There are several ways in which the industry could be segmented for the purposes of a study of competition. However, one of the most useful categorizations, and the one suggested by several respondents, uses the production volume of the company as the basis for segmentation.

Three general groups of companies were suggested: the largest companies (hardwood lumber production greater than 100 MMBF/year), medium-sized companies (ranging from 35 to 100 MMBF/year), and small companies (less than 35 MMBF/year). Obviously, this is a rough categorization and may not coincide with previous definitions of large, medium, and small hardwood lumber producers. However, the categorization is useful in understanding competition in the industry and is presented for this purpose.

This categorization will be referred to, where appropriate, in the latter sections of this paper. The general competitive characteristics of companies in each category are identified below.

Large Companies -- The largest hardwood lumber companies (greater than 100 MMBF/year) are often business units of wood-based corporations. They tend to be production cost and volume oriented and, in eastern markets, typically sell large amounts of green lumber to high volume end-users such as furniture manufacturers and pallet producers as well as kiln-dried lumber to distributors (Figure 1).

Large companies benefit from economies of scale in distribution (freight charges, for example) and offer the customer a competitive price, a wide selection of species and the ability to ship large volumes on short notice. Product availability is a competitive advantage of companies in this category and, as a result, lumber users may purchase from these firms when their normal suppliers are unable to meet their species or volume needs.

In large companies, the number and turnover of employees may limit the development of long-term relationships with customers. Because of the volume of lumber the largest companies deal with and the size of their sales staffs, they tend to serve many markets for hardwood lumber rather than focusing on a particular market segment. In addition, companies in this category may be more willing to become involved in price-based competition than medium-sized companies.

Typically, west coast companies in this category sell kiln-dried and planed lumber. While large, they tend to be less volume oriented than their eastern counterparts and are more likely to work closely with customers. These companies often have the financial strength to develop markets for alternative species or grades and have done this through promotional programs and proprietary grading systems.

Medium-Sized Companies -- The industry's medium-sized companies (35-100 MMBF/year -- although the majority of companies in this category are concentrated in the lower half of the range) generally compete using different methods than the largest companies. Medium-sized companies, while production cost conscious, attempt to differentiate their products through consistent quality, packaging, customer service, and long-term relationships with customers. Medium-sized companies primarily produce

kiln-dried lumber and prefer to sell their own production rather than distribute lumber produced by independent mills. They are often involved in exporting (either through a domestic export company or directly to a foreign agent) and, in domestic markets, may concentrate on lumber distributors (Figure 1).

Because of their lower employee turnover, smaller sales staffs, and the involvement of the company owner(s) in selling, medium-sized companies tend to develop long-term relationships with customers. These relationships help to protect them from competition in their geographical area.

Small Companies – The category that includes the smallest companies in the industry is undoubtedly the largest in terms of number of companies and the most diverse. Small companies are often too small to have their own sales force and, consequently, are heavily dependent on lumber brokers and wholesalers to market their products (This finding is supported by Luppold (1987)). Dependence on channel intermediaries to perform many of the marketing functions often results in company personnel that are production oriented and limits relationships with customers.

Alternatively, they may develop a close relationship with a local lumber user such as a furniture manufacturer. These users often consume a large portion of the company's production and the arrangement results in the lumber producer becoming a pseudo-captive supplier. There are several advantages to this type of arrangement - sales force requirements are minimal, lumber is moved rapidly and consistently to allow for a constant cash flow, the lumber user may help protect the producer from excessive swings in the lumber market and the lumber user may help to finance improvements or additions to the producer's production facilities.

Generic Business Strategies

In order to gain an overall picture of the ways in which the sample companies competed with other companies in the industry, respondents were asked to choose the one of Porter's (1980) three generic strategies that best described the intended strategy of their company. Respondents were provided with brief descriptions of each generic strategy². To facilitate comparisons, the descriptions were essentially the same as those used by Rich (1986) in his study of large wood-based corporations.

Table 2 provides the results of this questioning. All three companies that could be placed in the large company category identified, at least in part, with the *Overall Cost Leadership* generic strategy. As indicated in Table 2, many respondents indicated that their company's intended strategy was most accurately represented by a combination of generic strategies. Among the companies in the large category, this reflected a movement from a cost leadership orientation toward a differentiation orientation. Companies of this size are likely to have the skills and resources necessary to implement a focus strategy if they desired. However, respondents felt that focusing on a single market segment would limit potential sales and make them vulnerable to demand fluctuations in that market.

Among the companies interviewed that could be categorized as medium-sized, all three generic strategies were represented either separately or in combinations. However, *Focus* strategies or strategy combinations were used by the fewest number of firms. Companies in this category may avoid *Focus* strategies for reasons similar to those of the largest companies. Doyle and Sanders (1985), noting the shift in basic industries from commodity to specialty products, state that skills in market segmentation

and positioning are rarely present in old line industries such as forest products. Such skills may be required to successfully implement a *Focus* strategy and this may explain why few medium-sized companies indicated they used this generic strategy.

Another possible explanation stems from the way in which producers acquire their raw material. Hardwood lumber producers often purchase tracts of timber that yield several species, not all of which can be accepted by a single market. In addition, the logs, when sawn, yield a variety of product (grade) types. In order to market these products, companies must serve several markets. Focusing on a single market would leave the company with no outlets for some of their products.

The competitive strategies used by the companies interviewed generally support the findings of Rich (1986). Rich found that the majority of wood-based corporations in his sample used an *Overall Cost Leadership* corporate strategy but that there was a trend toward the use of *Differentiation* or *Focus* strategies. This trend appears to be supported at the business-unit level by the reported strategies of two of the large companies in this study and several of the medium-sized companies.

Elements of Competition

Respondents indicated that, among many companies in the industry, competition for customers was based on product quality, customer service, and price – in that order of importance. These and other elements of competition are discussed below.

Quality – Respondents defined quality in terms of packaging as well as the physical characteristics of the lumber itself. Quality in terms of the lumber included characteristics such as accurate edging, double-end-trimming, thickness accuracy,

freedom from checks, and other manufacturing aspects. This aspect of quality was considered by respondents to be the minimum for competing in the industry.

Packaging aspects of quality included the grade mix within a load, banding, protective wrapping and trimming all the lumber in a pack to the same length. These latter factors were termed presentation by several respondents. The interest in presentation appeared to have begun with export markets and carried over to domestic markets as customers began to demand the same features in the lumber they purchased. Respondents indicated that presentation was particularly important for the distribution center market and others that purchased kiln dried lumber. Packaging considerations were less important for green lumber since the lumber packages are often broken down to be placed on stickers and green lumber buyers were generally less concerned with the appearance of the lumber.

The level of quality demanded by some markets is not ensured by National Hardwood Lumber Association (NHLA) grade rules, according to respondents. For example, even though surface checks and wane may be allowed by NHLA rules, manufacturers often grade these as defects to improve the quality of the lumber they supply to certain markets. The mix of grades in mixed grade orders was also a quality consideration. A manufacturer might improve the quality of its product by increasing the percentage of higher grade boards in a mixed grade load (or at least not decreasing the percentage by pulling some of the better boards). Variations in length, width, and types of defects within a grade also affected quality.

West coast hardwood companies tended to define quality in different terms than many of the eastern companies. These producers stressed product consistency and value (as defined by the yield/price ratio). This difference is likely the result of

differences in markets served by these companies and their use of proprietary grading systems.

Customer Service – Customer service was defined using a variety of factors. The most commonly mentioned were product availability and prompt delivery. Product availability included product line width and depth and consistency of supply. For example, the ability to supply lumber during wet periods when logging is difficult was a customer service consideration.

Delivery scheduling was considered to be particularly important to manufacturers of secondary products such as cabinets because of a trend toward just-in-time inventory management. Respondents also indicated that delivery scheduling was of less importance in serving channel intermediaries such as distribution centers.

Customer service also included custom grading, willingness to ship mixed loads, the ability to meet large volume orders and the way in which complaints were handled. The ability to provide custom grading and/or sorting was particularly important and was predicted to become more so in the future.

In contrast, credit terms and the ability to provide technical information were considered less important aspects of customer service. Credit terms are relatively standardized throughout the industry and companies depend on trade associations and government agencies to provide technical information. The exception to this latter statement is where firms producing proprietary grades worked with customers to aid them in using their products.

Price – A comparable price was considered by most respondents to be a requisite rather than a primary tool for competing in the industry. Prices reported in publications such as the *Hardwood Market Report* (Jones 1989) and *Weekly Hardwood Review* (Barrett 1989) were commonly used as the basis for negotiations. Pricing often took the form of "Hardwood Market Report" plus or minus a specified amount to account for a variety of factors such as local availability, weather, the relationship between buyer and seller, and specific length or width selection. In some markets, price consistence or stability was an important consideration.

In contrast to producers, respondents indicated that price was the primary competitive tool for distribution channel intermediaries such as brokers since they may have limited control over quality and service characteristics. In some cases, it was felt that the pricing actions of these intermediaries strongly impacted, even controlled, market prices. Price was also thought to be more important to new customers as compared to established accounts. This likely reflects compensation required by the lumber buyer to offset the risk involved in dealing with a new supplier.

Timberland Ownership – Respondents were unanimous in indicating that timberland ownership could afford a company a competitive advantage. However, they generally felt that this advantage accrued to companies that purchased the timberlands some time ago and that purchasing timberlands today was an unprofitable investment. Instead, some respondents suggested that purchasing timber rights and obtaining management contracts were better ways of securing a raw material supply. One respondent indicated that his company provided loans to loggers in the area to help ensure a supply of raw material to his company.

For companies that have held timberlands for some time, competitive advantage can take several forms. The company may be able to realize greater profit margins while selling at the prevailing market price or the company may be able to gain market share by selling at less than the market price while maintaining a profit margin. Companies with timberland holdings may also have more power in dealing with timber suppliers.

However, the most important benefit of timberland ownership, according to respondents, is the raw material supply security that timberland ownership can provide. Many respondents were concerned with the future supply of timber in their area and properly managed timberlands can help to alleviate problems of short supply and accompanying increased prices.

Proprietary Grading – The use of proprietary grading systems was by no means widespread among the companies studied. However, a few larger companies had adopted this competitive tool. Proprietary grading systems can provide numerous benefits to a company. They can help to move the company's lumber from a commodity with widely reported market prices to a specialty product where price is determined by product value.

A company is also afforded a competitive advantage if its proprietary grades fit the needs of a market segment well enough to create barriers to entry into the market and switching costs for the user. For example, companies that wish to enter the market served by producers of proprietary grades face the expense of developing their own grades, changing their production system to produce the grades and convincing

customers of the value of their grades. Proprietary grades can also help a company in developing brand loyalty among its customers.

A disadvantage of proprietary grading systems is the additional resources they require to develop, produce and market. For example, the additional staff time required for the customer support that may be required by customers.

Brand Identification – All companies were asked about the importance of brand identification as a competitive tool. The responses suggested that very few firms had used brand identification to gain a significant competitive advantage in domestic markets. Activities designed to generate brand awareness often included the use of a company logo in advertising, promotion and on packages of lumber.

Most companies agreed that a company logo was important, even required, in export markets. Personal relationships are often limited in these markets due to geographical distances and the number of channel intermediaries involved. As a result, company logos were an important way in which the quality of the lumber was associated with a particular supplier.

Respondents were generally unconvinced of the usefulness of company logos on lumber shipped to domestic markets. Because personal relationships are more common in domestic markets, the ability of producer logos to generate brand identification and loyalty was considered weak.

Some companies used a logo on all domestic shipments while others never used one for domestic shipments. Use of a logo also varied with the customer type. For

example, some channel intermediaries did not want lumber packages marked with a logo or the producer's identification since they sold the lumber under their own brand.

Advertising and Other Promotional Activities -- Opinions as to the importance of advertising as a competitive tool ranged from "very important" to "a total waste". Many respondents reported that they placed informational advertisements in trade publications but they were not convinced of their effectiveness.

For many companies, informational advertisements in trade publications were the extent of their promotional activities. The exceptions included companies that produced proprietary grades of lumber. These companies typically made greater use of promotional literature that explained their grading systems and elaborated on the benefits of the grades.

In contrast to informational advertisements, respondents were very positive concerning trade association efforts to promote hardwoods to domestic and foreign consumers. An example commonly cited was the Hardwood Manufacturers Association's solid wood hang tag program.

Other Factors -- There are several additional factors affecting competition in the hardwood lumber industry that should be noted. Due to regional differences in timber supply and the limited distance over which it is economically feasible to ship lumber, location has a large impact on competition between companies in the industry. As a result, companies that develop long-term relationships with lumber users in the geographic area may be able to dominate that segment of the market. Another important consideration is the difference between competition in low grade lumber

(generally defined as #2 common and under) markets and markets for higher grade material. Up to this point the discussion has centered on competition for customers that purchase higher grade lumber. Lumber producers in the large and medium-sized categories often concentrate their efforts on these markets and view low grade lumber as an unavoidable by-product of higher grade lumber production and a problem to be sold as soon as is possible. Since much of this lower grade material is used by flooring and pallet manufacturers (Luppold 1987), the problem of selling this material has been aggravated by the recent trend among pallet manufacturers toward purchasing more cants and less lumber.

Since pallets may be marketed under contract to pallet users, lumber manufacturers feel constrained in raising prices and price stability is important to their customers. Some lumber manufacturers have the ability to plane low grade lumber in order to increase the potential market by serving customers that require this service. Lumber producers may also provide services such as sorting low grade material by species, width, and thickness.

Finally, it should be noted that, due in part to the strong demand for hardwood lumber in recent years, competition with other companies for raw material may be more important to many companies than competition for customers.

Industry Trends

Respondents were asked to give their views concerning trends in the hardwood lumber industry that could affect the ways in which companies market their products and compete for customers. Several trends were commonly reported. These included

shortened distribution channels, increased specialization of orders, and movement of the inventory carrying function.

The first trend reported by respondents was a shortening of distribution channels. This would result from a decrease in channel intermediaries and increased direct transactions between lumber producers and lumber users. This trend probably would not be a great change for large firms which have their own sales forces. However, for small firms that typically market their products through channel intermediaries, this could represent a major change in the way they do business.

Increased specialization in the products that customers desire was another reported trend. Respondents see customers as increasingly desiring specific lengths or mixes of lengths, specific widths, and specific grade mixes (for example, a certain percentage of each grade in mixed grade orders). A few respondents saw this trend continuing to the point of some markets buying dimension parts rather than traditional grade lumber. However, few respondents thought that the NHLA grade system would be replaced. Rather they suggested that producers would match the lumber to the specific customer's needs within the NHLA guidelines. Several of the medium-sized companies have already positioned themselves to take advantage of this trend by developing flexible sorting and grading systems and by diversifying into dimension operations. For many of the remaining firms, this trend could require investment in new processing equipment and increased production costs.

The final trend that was commonly reported involved the movement of the inventory carrying function back to the producer. This movement has already been seen by many lumber producers and they expect it to continue. Respondents attribute this trend to the adoption of just-in-time inventory systems and the increased cost of carrying

inventory. This trend will increase the competitive advantage of larger companies that can provide the customer with prompt delivery of a wide variety of species and grades.

SUMMARY AND CONCLUSIONS

It is apparent that hardwood lumber is a diverse industry. Even the largest twenty companies in the industry show variation in terms of markets served, distribution channels utilized, competitive tools, and overall business strategies. Companies in the industry also vary considerably in terms of production volume, corporate affiliations, and numerous other factors. However, some patterns are evident and these patterns aid understanding of competition in the industry.

Competition in the industry is, primarily, based on quality, customer service, and price. All three of these elements of competition were found to be multi-faceted. The primary aspects of quality were found to be accurate lumber manufacturing and packaging. Customer service consisted, primarily, of product availability and delivery scheduling. Price consisted of level (the actual price) and consistence (how often prices change as compared to the market).

Medium-sized companies in the industry tend to avoid the use of price as a competitive tool and concentrate, instead, on quality and customer service. Large companies may be more willing to compete based on price but do not ignore quality and customer service. Small companies tend to rely on channel intermediaries such as brokers and, consequently, are production oriented and provide little customer service.

In spite of the differences between top-twenty companies, several industry trends or continuations of trends were consistently predicted for the near future. These included shortened distribution channels as producers bypass channel intermediaries, increased specialization of orders, and the movement of the inventory carrying function backward in the distribution channel.

Several of the companies studied indicated that they utilized a *Differentiation* strategy either alone or in combination with *Overall Cost Leadership*. Calori and Ardisson (1988) found that, in the mature industries they studied, the major opportunity for differentiation was in adopting a "Total Quality" concept (product quality regularity, punctuality of deliveries, quick response to unexpected orders, quick and correct answers to requests, short delivery times). The "Total Quality" concept embodies many of the factors that this study indicated are important to competition in the hardwood lumber industry.

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Notes

1. In the interest of brevity, the company personnel with whom interviews were conducted are referred to as respondents in this paper.
2. The following descriptions of Porter's (1980) generic strategies, adapted from Rich (1986), were used:

Overall Cost Leadership

The firm seeks to achieve overall low cost through aggressive construction of efficient scale facilities, adoption of new technologies, avoidance of marginal customer accounts or market segments, and cost minimization in areas such as marketing.

Differentiation

The firm seeks to differentiate the product and service offered, creating something that is perceived *industry-wide* as being unique. Differentiation may take many forms, such as consumer service, brand image, strong captive distribution system, and/or a reputation for being on the forefront in new product development.

Focus

The firm focuses on a particular type of buyer, market group, or segment of the product line. The firm seeks to serve a particular target very well – better than its competitors who are competing more broadly.

Table 1. Eastern Hardwood Lumber Consumption by End-Use:
1972 - 1987

End-Use	1972	1977	1982	1987
	----- MMBF -----			
Pallets and Containers	2412	2627	3184	4425
Dimension	795	1080	927	1359
Flooring	657	304	222	476
Wood Household Furniture	1147	1250	1014	1058
Millwork	545	372	441	713
Kitchen Cabinets	274	358	319	612
Railway Ties	850	1000	834	635
Exports	237	240	321	543
Commercial Furniture	213	221	275	427
Upholstered Furniture	427	254	285	309
Other	535	652	400	703
Total	8092	8358	8222	11260

Adapted from estimates provided by Luppold (1989)

Table 2. Reported Generic Strategies of Hardwood Lumber Producers Interviewed in the Study

Size Category ^a	Number of Companies ^b	Generic Strategy ^c		
		Overall Cost Leadership	Focus	Differentiation
Large	2	X		X
	1	X		
Medium	5	X		
	3			X
	3	X		X
	1		X	X
	1	X	X	

- Large = Greater than 100 MMBF/year; Medium = 35 to 100 MMBF/year
- Number of companies in the size category that utilized the indicated strategy or strategy combination. Some companies did not provide this information
- Porter(1980); See Appendix A for operationalizations

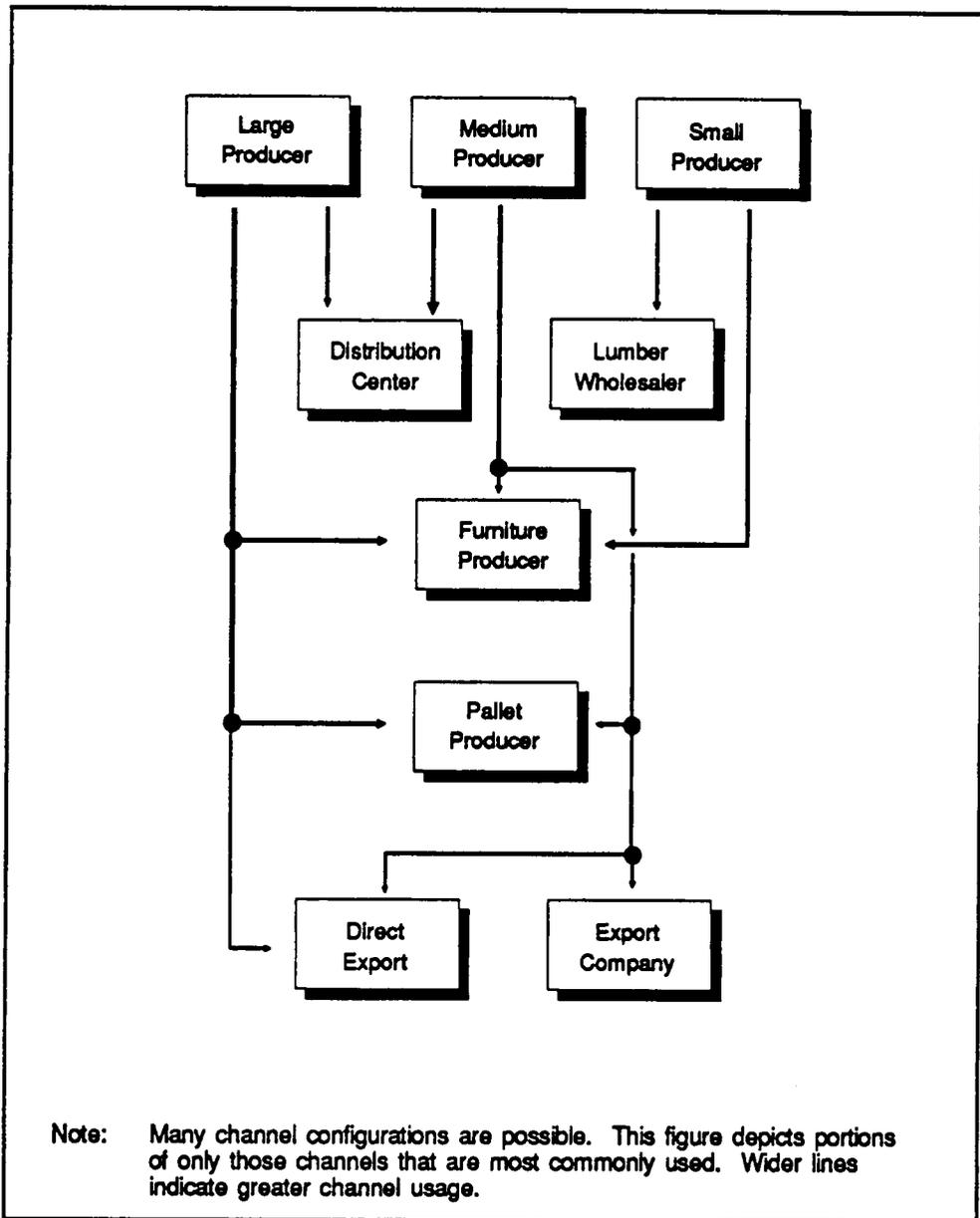


Figure 1. Major Distribution Channels Used by Three Categories of Hardwood Lumber Producers

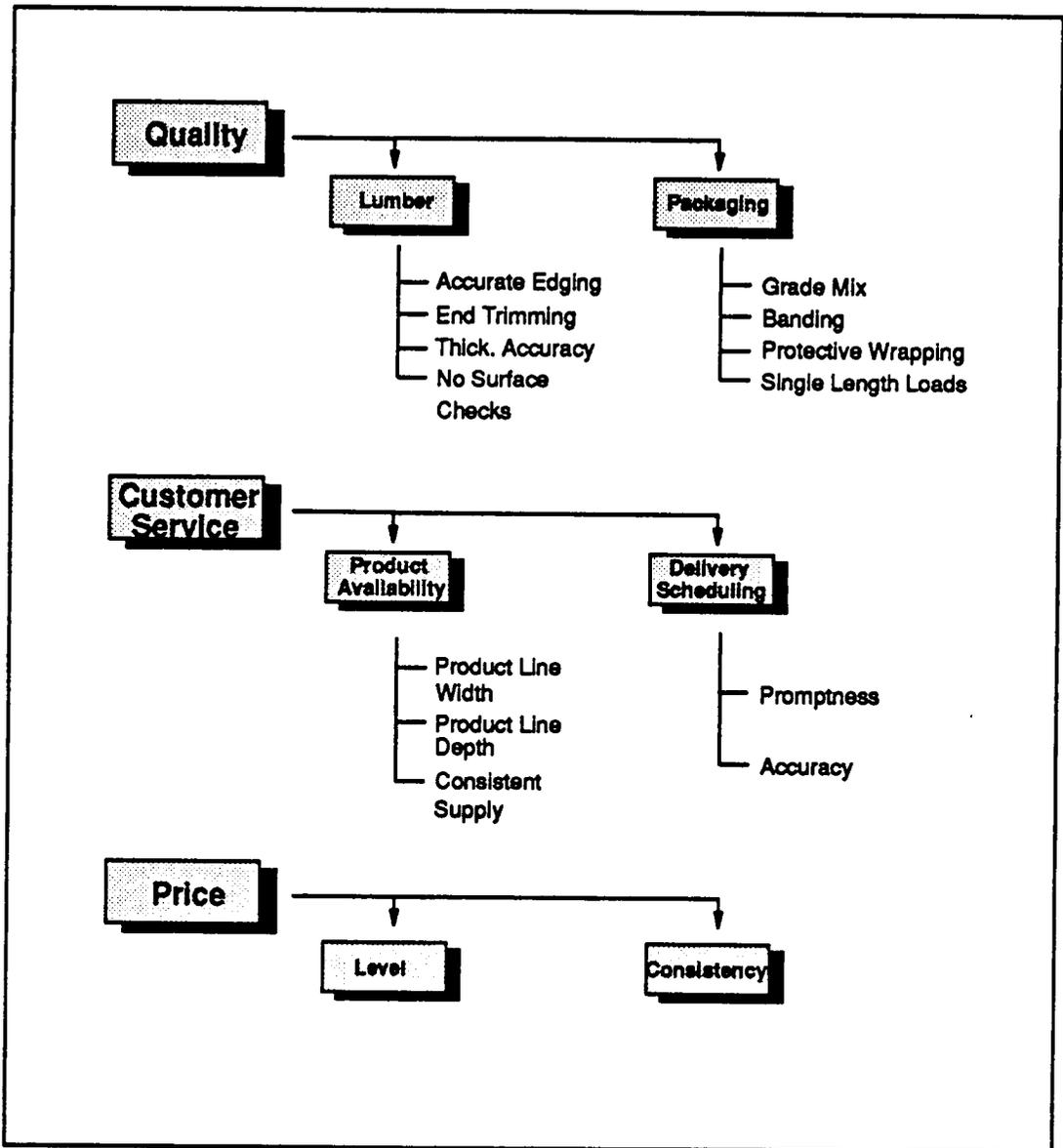


Figure 2. Primary Elements of Competition in the Hardwood Lumber Industry

A Methodology for Assessing Strategic Evolution in a Mature Industrial Environment

ABSTRACT

A methodology for determining business-level competitive strategy and strategic change in a mature industrial environment was developed and tested on the U.S. hardwood lumber industry. Quantitative data and multivariate statistical techniques were used to identify five strategic groups within the industry and predict future strategic movements. The results provide empirical support for the existence of dual Cost Leadership/Differentiation strategies in a mature industry setting. Strategic evolution was found to be primarily in the direction of increased differentiation orientation. Qualitative data obtained via interviews with company executives generally supported the findings of the quantitative analysis. However, self-typing of strategy by company executives was problematic.

INTRODUCTION

The number and characteristics of strategic groups in an industry have been related to industry performance (Porter 1979, Newman 1978, Hergert 1987), level of competition (Harrigan 1980; O'Laughlin and Ellefson 1981; Fiegenbaum, McGee and Thomas 1987), the effect of vertical integration into the industry (Newman 1978), and the height of mobility barriers (McGee and Thomas 1986, Harrigan 1985b). While the applicability of strategic group analysis to predicting change in an industry has been alluded to (Cleaves and O'Laughlin 1986, McGee and Thomas 1986), the focus of most studies has been on either establishing the presence of strategic groups in an industry or using strategic groupings to empirically generate or validate strategic theory. McGee and Thomas (1986 p.149), in reviewing studies that utilized the strategic group concept, state:

"None of the studies look at forecasting future strategic groups or even strategic directions which firms may pursue to anticipate the long-run evolution of industry structure"

In spite of the fact that the predictive use of strategic groups has been largely ignored, such use is intuitively appealing and could be pragmatically useful. Thomas and Venkatraman (1988 p.551), in discussing the direction of future strategic group research, state:

"It is essential that groups be used to either predict future strategic behavior and/or performance, failing which the results have minimal use."

The latter use of strategic group analysis, predicting performance, has been addressed in several studies (for example; Newman 1978, Porter 1979, Dess and Davis 1984, Cool and Schendel 1988). As a result, progress has been made toward a strategy-performance paradigm that is generally applicable. This study concentrated on the former use of strategic group analysis, prediction of strategic behavior or strategic change.

This study had two goals. The first was to develop a methodology for the prediction of strategic change in an industry and provide an example of its use. The strategic group concept was used in the course of pursuing this goal since, as Porter (1980) suggests, it provides a useful intermediate point between analysis of the industry as a single homogeneous unit and single company analysis which may not generalize to the industry. The second goal of this study was to test the applicability of existing generic strategy typologies in a mature industry environment.

The mature industry environment was chosen for several reasons. Since the majority of North American industries are mature or declining (Hearne 1982), a pragmatic reason for choosing a mature setting is wide applicability of the results. Mature industries are also (Hambrick 1983a p. 214):

"...of major significance both in terms of their relative numbers on the American economic scene and the resources they control."

It is important to study strategic groups in the mature industry setting separately from growth industries since successful strategic postures in growth industries may not correspond to successful strategies in mature settings (Patel and Younger 1978). Harrigan (1988) and Hambrick (1980) suggest that changes in the structure and nature of competition can be expected as an industry evolves through maturity toward decline. Doyle and Saunders (1985) note the need for basic industries (the majority of which are mature) to shift from commodity to specialty products. Obviously, this shift implies strategic change and prediction of this change could be useful to participants in the industry, industry suppliers, and government policy makers.

BACKGROUND

The Industry

Hardwood lumber, a basic old-line industry (Doyle and Saunders 1985), was chosen as an example in this study. The industry has been described as highly specialized, lacking in automated processing, and consisting, primarily, of small independently owned firms (White, Lamb and Wengert 1981). Hardwood lumber is also among the most competitive of wood-based industries (U.S. Congress 1983).

The industry can be considered mature as defined by Harrigan (1985a), Day (1981), and Hambrick and Schecter (1983). Annual growth is approximately 2 percent (Ulrich 1988); products are commodity-like and familiar to buyers (due to a high level of standardization); and customers are price sensitive (Sinclair, Bush and Araman 1989).

The hardwood lumber industry, with the eight largest companies producing only 15 percent of the value of shipments (USDA-BOC 1986), is highly fragmented (Porter

1980). It also has several of the traits defined by Calori and Ardisson (1988) as indicative of a stalemate industry: scale economies are generally weak (Bush and Sinclair 1989, USDC-ITA 1984), and process technology is widely known and available.

Unlike stalemate industries, the hardwood lumber industry exhibits low capital intensity when compared to other wood-based industries and low exit barriers (Ellefson and Stone 1984).

The industry's products are highly standardized -- as evidenced by the industry-wide acceptance of the National Hardwood Lumber Association (NHLA) grading standards. Representative market prices are widely reported using this grading system in trade publications such as *The Weekly Hardwood Review* (Barrett 1988).

Hardwood lumber manufacturers are heavily raw material (timber) dependent (U.S. Congress 1983). Raw material costs typically account for over 50 percent of total production costs (USDC-ITA 1984). Hardwood lumber production is labor intensive (McLintock 1987) and research is usually process rather than market oriented (U.S. Congress 1983).

Strategic Groups

It is not the purpose of this paper to provide a complete review of the state of strategic group research. However, an examination of some recent literature reviews and papers of particular relevance to this study is appropriate.

Two recent articles on the subject provide good overviews of the state of strategic group research. McGee and Thomas (1986) identified 21 studies in the area of strategic groups ranging from the initial coining of the term "strategic groups" in 1972 to studies published in 1985. The authors noted that the studies differed sharply on the

strategic dimensions used to define strategic groups. Some studies used single measures (such as firm size) while others utilized multiple measures. Similarly, Thomas and Venkatraman (1988) categorized 20 studies involving strategic groups based on their operationalization of strategy (uni-dimensional versus multi-dimensional) and approach to group development (*a priori* versus *a posteriori*).

As Thomas and Venkatraman (1988) state, the basic theory of strategic groups (that industries are not necessarily homogeneous, but rather consist of groups of companies that utilize similar but not necessarily identical strategies (Hitt, Ireland and Stadter 1982)) is at least implicitly accepted by most researchers. In contrast, there is no generally accepted operationalization of the strategy construct (Harrigan 1983, Hambrick 1980). Yet, the choice of strategic dimensions is the single most influential factor on the outcome of a study of strategy and the greatest source of variation between studies (McGee and Thomas 1986).

Consequently, there is a corresponding lack of a generally accepted method of determining strategic groups in an industry. The problem is compounded by the variety of methods used to delineate groups (from rules-of-thumb to multivariate statistics) and differences in sample frames (intra- versus inter-industry). The result has been that many studies are not comparable and, consequently, generalizable conclusions based on synthesis of the body of research have been difficult to reach.

Dess and Davis (1982, 1984) made use of a panel of experts (representing both the academic and industrial community) to determine the content of Porter's (1980) generic strategies (*Focus, Differentiation, Overall Cost Leadership*). The authors developed a measure that consisted of 21 strategic variables. Factor and cluster analyses were then

used to determine strategic group membership in the paints and allied products industry based on the three strategic dimensions.

Porter's typology, as used by Dess and Davis (1982, 1984) has been characterized as stable, parsimonious, and timeless (Chrisman, Hofer and Boulton 1988). It has also been shown to be reconcilable with other strategic typologies (White 1986, Segev 1989). Chrisman, Hofer and Boulton (1988) point out that Porter's typology subsumes the concepts of scope and type of competitive weapon but does not address the concept of segment differentiation.

It is important to note that Dess and Davis (1984) utilized Porter's (1980) generic strategies as dimensions of strategy. White (1986) took a similar approach in defining four strategic positions by using Porter's generic strategies as dimensions. This use implies that Porter's generic strategies are not mutually exclusive -- a position supported by White (1986) but contended by Chrisman, Hofer and Boulton (1988) -- and allows for the identification of strategic positions that do not fit neatly into Porter's (1980) typology. Day's (1984) *Hybrid* strategy (low cost and emphasize differences) is an example of such a strategic position that may be feasible in many industries (Murray 1988).

METHODOLOGY

This study focused on business-level intended competitive strategy within the hardwood lumber industry. Business-level rather than corporate-level strategy was investigated by controlling for the product market variable (diversification) to a non-significant level, as suggested by McGee and Thomas (1986). Since the strategy

professed by key informants may differ from the strategy that a company actually implements, intended strategies may differ from actualized strategies (Snow and Hambrick 1980). However, focusing on intended strategies is consistent with the goal of evaluating strategic change in the industry.

Operationalizing the Strategy Construct

Hambrick (1980) details four approaches to operationalizing the business-level strategy construct (Textual descriptions of strategy, measurement of parts of strategy, multivariate measurement of strategy, and typologies of strategies). Similarly, Snow and Hambrick (1980) describe four approaches to identifying and measuring strategy: Investigator inference, self-typing using written descriptions of strategy, external assessment, and objective indicators. In this study, the goal was to find an approach that simultaneously maintained relevance to both existing strategic typologies and the particular industrial environment. After a review of relevant strategic research concerning the content of the strategy construct (in particular; White 1986, Miller (1986), Miller and Friesen 1977, and Dess and Davis 1984)), and noting Venkatraman and Grant's (1986) and Peter's (1979) call for multivariate measures, the multivariate measure developed by Dess and Davis (1982, 1984) was chosen as the basis of the operationalization used in this research.

Since detailed knowledge and understanding of the industry context is required to identify competitive variables relevant to the industry (McGee and Thomas 1986, Hergert 1987), the applicability of the variables used by Dess and Davis (1984) to the hardwood lumber industry was evaluated by a panel of experts that included industry, trade association, government agency, and university personnel. Based on this evaluation,

minor changes were made to the measure to compensate for differences between the paints and allied products industry and the hardwood lumber industry.

Figure 1 lists the variables that comprised the measure used in this study. The measure formed by these variables was judged to have met the three concerns presented by Thomas and Venkatraman (1988): (1) It captured the basis for competition in the industry; (2) It had a strong relationship to extant strategic group theory, specifically, Porter's (1980) generic strategy typology; and (3) the work of Dess and Davis (1982, 1984) provides evidence of the validity and reliability of the measure.

Harrigan (1983) states the need for a multidimensional, hybrid approach to determining business-level competitive strategy. Snow and Hambrick (1980) suggest the need for multiple sources of information to enhance the validity of strategic measures. In keeping with these recommendations, business-level strategy was also investigated via in-person interviews. These interviews included a self-typing measure of strategy that consisted of short descriptions of Porter's generic strategies as developed by Rich (1986). This additional approach to assessing strategy was included to enrich the data and allowed for cross-checking of the multivariate operationalization.

Sample

A purposive sample consisting of the largest 100 U.S. hardwood lumber manufacturers was utilized. Where companies participated in more than one industry, only the business unit involved in hardwood lumber production was included in the study.

Obviously, this non-probabilistic sampling scheme precludes extrapolation of the results to the entire industry. However, it was felt that, given limited research

resources, strategic issues in the industry could best be investigated by examining larger, influential firms rather than by using a probabilistic sample that was likely to include small firms with little influence on the industry. Purposive sampling also allowed the sample to be controlled for the potentially confounding effects of extreme variations on company scope and resources (Dess and Davis 1984).

Data Collection

Data from 20 of the largest (by production volume) companies¹ were gathered using a combination of in-person, semi-structured interviews and written questionnaires. A portion of the interviews were exploratory and provided a rich variety of information concerning the company's strategy and competition in the industry.

In multi-industry companies, the questionnaires and interviews were directed to the head of the business unit producing hardwood lumber. In single industry companies, the questionnaire was directed to the top executive. In some cases it was not possible to contact the top executive and senior marketing/sales people were substituted. Previous contact with companies in the industry suggested that, other than top executives, marketing personnel had the best understanding of company strategy.

Using multiple informants per company may have provided a more accurate picture of the company's strategy (Venkatraman and Grant 1986). However, research resources and limits on the amount of time the companies could reasonably be

¹ The goal was to interview the twenty largest companies in the industry. However, one company that was among the largest declined to participate and the next largest company was interviewed as a substitute.

expected to give to the study limited this refinement to only a few of the companies studied.

Data concerning the importance of the competitive variables included in the multi-item measure were gathered via seven point rating scales that ranged from *1=Not Important* to *7=Extremely Important*. The use of questionnaires in studying intended strategy is supported by Hambrick (1980).

Informants were asked to indicate the present importance of the variables to their company's competitive strategy as well as their evaluation of the importance of the variable in the near future (next five years). In addition, those informants that were contacted in person were (after reading the descriptions of Porter's (1980) generic strategies) also asked to directly indicate the one or combination of strategies that best represented their company's competitive strategy. In this respect, the method used to measure strategy was similar to that used by Herbert and Deresky (1987).

A mail survey was used to gather data from the remaining 80 of the sample firms. The questionnaire was mailed during June, 1989. A total of 72 questionnaires (including questionnaires returned by companies that had also been interviewed) were received by the time analysis began.

Identifying Strategic Groups

Factor Analysis -- The investigation of possible strategic groupings within the sample began with data tabulations to identify any mistakes in coding or in data entry. Responses to the twenty-item measure were then factor analyzed to confirm the operationalization of the strategy construct and to generate factor scores for use in cluster analyses.

Principal component factor analysis was deemed an appropriate technique based on the correlation matrix of the data and a Bartlett test of sphericity which rejected the hypothesis that the matrix was an identity (Stewart 1981). In addition, the Kaiser-Meyer-Olkin measure of sampling adequacy was acceptable (Norusis 1988). Stevens (1986) recommends 4 to 5 subjects per variable (item) for a stable factorial solution. In this study the ratio was 3.6 to 1. Consequently, particular attention was paid to evaluating the reliability of the factor and cluster analyses results.

A three factor solution was chosen *a priori* since the measure was designed to evaluate Porter's (1980) three generic strategies as dimensions of business-level competitive strategy. Table 1 provides the resulting factor loadings after orthogonal (varimax) rotation. The choice of a three factor solution was supported by a scree test and examination of factor eigenvalues (Stevens 1986). Variable 15 (ownership of timberlands and/or logging operations), which was designed to assess the importance of backward integration, was excluded from further analyses because of its low loading on all three factors. The remaining variables were assigned to the factor on which they had the greatest loading and formed sub-measures that assessed the three strategic dimensions.

Analysis of the variables that were assigned to each of the three factors and Dess and Davis' (1984) work indicated that Factor 1 represented the Differentiation dimension. Factor 3 was interpreted as representing the Cost Leadership dimension. Interpretation of Factor 2 was less clear since it incorporated variables that were *a priori* thought to assess the Differentiation or Focus dimensions. This result is not surprising since a *Focus* strategy, as defined by Porter (1980), is a *Differentiation* or *Cost Leadership*

strategy aimed at a specific market segment. Consequently, Factor 2 was interpreted as representing the Focus dimension.

Scores for each sub-measure were calculated using a linear combination of variable ratings and factor loadings. The reliability of the sub-measures was evaluated by computing Cronback's alpha (Peter 1979). Table 1 provides the alpha values for each sub-measure evaluated across the data set. These values are considered acceptable by Churchill (1979) for exploratory work. In addition, they were deemed reasonable given the relatively low number of variables making up sub-measures 1 and 2 (alpha generally increases with the number of items that form a measure).

Cluster Analysis – Cluster analysis has been used to identify groups of strategically similar firms in several studies (Harrigan 1985b; Hambrick 1983a,b; Dess and Davis 1984; Galbraith and Schendel 1983). In this study, hierarchical agglomerative cluster algorithms (using squared Euclidean distance measures) were used to determine strategic groupings within the sample companies. Prior to clustering, the data were examined for the presence of potential outliers that could skew the cluster solution. Based on plots of the three sub-measure scores and Mahalanobis' distance statistic (Norusis 1988) for each company, two potential outliers were identified. Because of their potential affect on the stability of the cluster solution, these companies were removed from further analyses. Two additional companies were removed due to incomplete data, resulting in a cluster sample size of 68 companies.

The companies were first clustered using Ward's method which seeks to minimize the sum of squared within-cluster distance (Hair, Anderson and Tatham 1987). This algorithm was chosen because it has been shown to outperform others in many

situations (Punj and Stewart 1983). Ward's method is also the most conceptually appealing for identifying strategic groups.

A five cluster solution was chosen based on analysis of a plot of the number of clusters versus the standardized distance coefficient between merged clusters. This number of clusters was also the smallest that adequately differentiated the companies.

The reliability of the five cluster solution was tested using the three part approach suggested by Choffray and Lilien (1980) and used by Doyle and Saunders (1985). This approach consists of:

1. Testing for outliers in the data
2. Testing the randomness of the data structure
3. Testing the uniqueness of the solution

The first of these tests has been previously described. In order to test for randomness, 15 sets of random data with distribution characteristics (mean and standard deviation) similar to the actual data were generated. Each of these data sets were clustered using Ward's method. The mean standardized distance coefficients at critical cluster levels were then compared to the coefficients from the actual data (Table 2). If the distance coefficient did not significantly differ from the random data, the cluster solution would be trivial. As illustrated in Table 2, significant differences were noted; suggesting an underlying structure did exist in the data.

The final reliability test required that the cluster solution based on Ward's method of cluster formation be compared to the solutions based on alternative methods. This test is necessary since each method of cluster formation has certain biases. For example, single linkage cluster methods tend to form long, weakly connected clusters and Ward's method is biased in favor of spherical clusters with equal numbers

(Saunders 1980). If the cluster solution based on Ward's method is non-trivial, it should exhibit relative stability when compared to the solutions generated by other clustering methods. Table 3 provides the results of a multi-method comparison. The relatively good agreement between the clustering methods provide additional evidence of the reliability of the solution.

RESULTS AND DISCUSSION

Strategic Groups

Figure 2 illustrates the strategic position of the five groups that were identified by the cluster analysis. Locations correspond to cluster centroids and symbol size is proportional to the mean squared Euclidian distance between pairs of companies within the group – a measure of intra-group homogeneity. Table 4 profiles the clusters on the strategic dimensions represented by the three factors.

As Figure 2 illustrates, the greatest portion of strategic variation between groups is attributable to the Differentiation dimension. The groups differ less on the Focus and Cost Leadership dimensions. Similarly, Dess and Davis (1984) found that Cost Leadership did not differentiate strategic groups well and that managers did not have strong Focus orientations. This finding could indicate a basic similarity between the industries studied or a bias in the measure used to operationalize business-level strategy.

Figure 2 also suggests that larger strategic groups within the industry are not necessarily less homogeneous. For example, Group 2 has the largest number of members (22) but intra-group homogeneity (as measured by the mean squared

Euclidian distance) is greater than Group 4 with only nine members. Group homogeneity has implications to intra-group rivalry and stability (Harrigan 1985b). Harrigan theorized that less homogeneous groups are more likely to face intra-group discord and are more likely to revert to price as a basis for competition. This theory is supported by the position of Group 4 (the least homogeneous group) whose intended strategy displays no distinctive orientation. Without a distinctive orientation on one of the strategic dimensions, the only alternative for these companies may be to depend on price competition. The result is likely to be depressed profitability for all companies in the group. Porter (1980) termed this situation "Stuck in the middle" and concluded that such a strategic position assures low profitability.

Group 1 also appears to be "Stuck in the middle". This group has an intended strategy that is lowest on both the Focus and Cost leadership dimensions and exhibits a medium level of Differentiation orientation. The intended strategy of this group appears to give its members little competitive advantage.

Group 2 is large (22 members) but relatively homogeneous. It is strategically similar to Group 1 in terms of Differentiation but has developed a stronger Cost Leadership orientation.

Ideally, companies would avoid becoming "Stuck in the middle" (Porter 1980) by developing and implementing a strong strategic orientation along one of the dimensions while maintaining only a nominal level on the remaining dimensions. However, in a pseudo-commodity (Unger 1983) industry such as hardwood lumber this nominal level of Cost Leadership orientation could be expected to be higher than in industries producing true specialty products.

Group 3 has the strongest Differentiation orientation and is also high on the Cost Leadership dimension. This dual strategy clearly has competitive advantages if the two goals can be achieved simultaneously. Porter (1980 p.38) states:

"...achieving differentiation will imply a trade-off with cost position if the activities required in creating it are inherently costly, such as extensive research, product design, high quality materials, or intensive customer support."

This does not seem to be the case in the hardwood lumber industry. In addition, Murray (1988) concludes that the external preconditions for *Cost Leadership* and *Differentiation* strategies do not preclude such dual strategies. Calori and Ardisson (1988), in their study of "stalemate" industries, define a "total advantage" position (differentiation and low cost) that they associated with market share growth and profitability. This position coincides well with the position of Group 3. Consequently, the strategy of Group 3, if implemented, is likely to provide significant competitive advantage.

Table 5 depicts the generic strategy or combination of strategies that informants at top-twenty companies chose as best representing their company's competitive strategy. Also provided are cluster membership and factor scores. This qualitative measure of strategy provides weak support for the quantitative classifications. For example, both the qualitative (self-typed) and quantitative measures captured the low emphasis on *Focus* strategies among the interviewed companies. However, the quantitative measure provided finer distinctions between the remaining strategy types than did the qualitative

measure. This is not surprising given the fact that the qualitative measure tended to force companies into fewer categories than did the quantitative measure.

General information obtained during the in-person interviews also supported the low emphasis on *Focus* strategies. Informants pointed out that such strategies were impractical for primary producers of hardwood products since the production process unavoidably produces a range of products that no one market consumes. Another reason for avoiding *Focus* strategies was the perceived risk of becoming dependent on specific market segments. Companies preferred to reduce this risk by serving a variety of markets.

Strategic Change

Figure 3 indicates the directions of changes that were found to be significant (i.e. present and predicted future group centroids were significantly different at the $\alpha=.10$ level). With the exception of Group 3, all groups planned significant changes. Groups 1, 4, and 5 planned increases in their emphasis on Differentiation. In general, companies in Group 2 planned to increase both their Focus and Differentiation emphasis.

No significant changes in group membership were predicted. This finding is in agreement with Fiegenbaum, McGee and Thomas (1987 p.13) who state: *"...the composition of strategic-group membership is most likely to be the same over time"*.

The predicted movement toward increased emphasis on differentiation strategies supports Doyle and Saunders' (1985) observation of the need for basic industries to shift from commodity to specialty products. Differentiation strategies can be more effective and enduring than cost based strategies (Levitt 1986) and more successful in

turbulent environments (White 1986). However, White (1986) notes that differentiation strategies are also more uncertain than cost based strategies. Many of the companies studied appear to be positioning themselves for changes in the industry (especially the turbulence if the industry moves from maturity to decline) by adopting differentiation strategies, in spite of their uncertainty.

Data obtained during the interviews indicates that the quantitatively predicted changes are generally consistent with industry trends as expressed by the informants. Informants predicted shortened distribution channels, increased emphasis on product quality, and increased emphasis on service aspects such as the ability to provide specialized orders and prompt delivery.

These trends would clearly provide the opportunity for companies to differentiate themselves based, primarily, on service. Calori and Ardisson (1988) found that this strategy, which they called "total quality" (product quality regularity, punctuality of deliveries, quick response to unexpected orders, quick and correct answers to requests, short delivery times) was the major opportunity for differentiation in the industries they studied. This strategy is also consistent with Hofer's (1975) contention that, in mature industries, firms should seek to innovate in marketing, distribution, or credit rather than product or process design.

Finally, it should be noted that changes in strategy are difficult for a company to make and imply major modifications to technology, structure, or process (Oster 1982, Snow and Hambrick 1980). Such changes are not necessarily indicated by the data gathered in this study. Consequently, predicted strategic group movements are best viewed as strategic adjustments rather than major changes in strategy (using Snow and Hambrick's terminology).

CONCLUSIONS

Strategic Classification

The existence of dual differentiation and cost based strategies in a mature industry setting is supported by both the quantitative and qualitative results. Based on this result, the strategic matrices proposed by Day (1984) and White (1986), which allow for dual cost/differentiation strategies, may best explain the strategy types found in a mature industry. Porter's (1980) typology does not adequately provide for such strategies. However, Porter appeared to recognize the importance of cost positions in some industries when he stated that differentiators seek cost parity or proximity relative to competitors.

White's (1986) classification of four strategic positions (pure cost, cost and differentiation, no competitive advantage, pure differentiation) along the dimensions of cost position and differentiation position captures the results of this study well. Groups 1 and 4 can be categorized as having no competitive advantage ("stuck in the middle", using Porter's terminology); group 3 has a cost and differentiation position; group 5 has a pure differentiation position; and group 2 has a pure cost position. Although White's classifications do not encompass a focus type dimension, the lack of such a strategy in the hardwood lumber industry (as indicated by both the quantitative and qualitative segments of the study) suggests that a parsimonious typology need not include this dimension.

Methodological Implications

As Miller (1986 p.220) states: *"Any attempt to categorize the complex phenomenon of business strategy into a limited number of strategy types will necessarily involve simplification"*. However, the results of this study demonstrate the usefulness of the quantitative, multivariate approach to identifying strategic groups and strategic evolution in a mature industry. The usefulness of multivariate statistical techniques (specifically factor analysis to determine dimensionality and cluster analysis to determine group membership) in identifying strategic groups in an industry has been demonstrated by numerous studies (for example; Dess and Davis 1984, Doyle and Saunders 1985, Galbraith and Schendel 1983). The same methodology is useful in quantifying and analyzing strategic evolution in an industry.

Self-typing of strategy based on written descriptions of generic strategies, as used in the interview portion of this study and by Rich (1986), appear to be of limited use. Informants may have difficulty comprehending the strategy based on the brief description and the method precludes strategies that do not fall into the *a priori* defined types. In addition, Snow and Hambrick (1980) contend that many managers believe their organizations to be unique and resist attempts to classify it. This problem was evident in this study and undoubtedly contributed to the limited usefulness of the results of the strategic self-typing.

However, qualitative approaches in general (exploratory interviews and case studies) do provide important understanding of the industry and companies' strategic positions that is not captured by the quantitative questions. Consequently, a hybrid methodology that utilizes interviews and multivariate quantitative approaches is recommended.

While the accuracy of predictions of strategic change in an industry cannot be assessed at this time, the methodological approach is a logical extension of previous work and could be pragmatically useful. Predictions of changes in the industry obtained via company interviews help to validate the accuracy of quantitative predictions of changes in strategic positions, assuming that firms are correctly positioning themselves with respect to these changes.

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Table 1. Factor and Sub-Measure Structure

Variable	Factor 1 Differentiation	Factor 2 Focus	Factor 3 Cost Leadership
	————— Factor Loadings ^a —————		
Market research	.75	.16	.13
Using new marketing techniques/methods	.73	.52	-.14
Developing brand identification	.71	.28	-.22
Serving special geographic markets	.67	-.15	.16
Promotion and advertising	.65	.37	.10
Serving particular customer groups	.64	.10	.25
Ability to manufacture specialty products	.50	.06	.11
Developing new products	.46	.40	.16
Maintaining a company sales force	.45	.15	.38
Controlling channels of distribution	.45	.26	.16
Owning timberlands and/or logging operations	.32	-.19	.22
Providing customer service	.04	.77	.07
Product quality control	.16	.73	.19
Efficient operation of production facilities	-.05	.62	.35
Reputation within the industry	.15	.52	.08
Competitive pricing	.06	-.06	.69
Employing trained/experienced personnel	.09	.39	.68
Providing rapid delivery	.04	.10	.63
Procurement of raw materials	.07	.16	.56
Investment in new processing equipment	.30	.32	.50
Eigenvalue	5.73	2.13	1.57
Percent of Total Variance	28.6	10.6	7.9
Coefficient Alpha (For items forming sub-measure)	.84	.69	.69

^a Bold type denotes the variables used to form the factor sub-measure

Table 2. Comparison of Cluster Structure to Random Data

Number of Clusters	Standardized Distance Coefficient		t Statistic	Probability p
	Actual (Ward's)	Mean Random ^a		
1	3307.8	3985.3	6.07	< .001
2	1464.2	1800.6	5.83	< .001
3	934.9	1168.5	5.93	< .001
4	670.8	897.4	8.62	< .001
5	536.9	736.6	10.09	< .001
6	458.4	624.4	10.55	< .001
7	387.6	537.7	12.38	< .001
8	333.6	471.3	12.57	< .001
9	301.9	415.4	11.30	< .001
10	220.9	367.0	16.50	< .001
20	122.3	159.8	8.19	< .001
30	64.7	73.9	4.53	< .001
40	35.4	35.4	0.00	> .5
50	15.1	14.6	0.67	> .5
60	3.1	3.0	0.31	> .5
61	2.4	2.4	0.00	> .5
62	1.7	1.9	1.02	.3 > p > .2
63	1.2	1.4	1.43	.2 > p > .1
64	0.9	1.0	0.71	.5 > p > .4
65	0.6	0.6	0.55	> .5
66	0.3	0.3	1.37	.2 > p > .1
67	0.1	0.1	1.45	.2 > p > .1

^a Mean distance for each cluster level from 15 sets of random data

Table 3. Comparison of Clustering Methods

	Ward's Method	Complete Linkage	Average Linkage
Ward's Method	---		
Complete Linkage	79% ^a	---	
Average Linkage	76%	68%	---

^a Percent of cases consistently grouped based on five cluster solutions. Naive assignment of cases to the largest Ward's cluster results in correct classification of 32% of the cases.

Table 4. Cluster Profiles

Cluster Number	<i>N</i>		Factor 1 Differentiation	Factor 2 Focus	Factor 3 Cost Leadership
			Factor Scores		
1	8	Mean:	21.4	15.3	14.5
		SD:	1.9	1.1	1.0
2	22	Mean:	22.8	17.2	18.7
		SD:	2.2	1.1	1.5
3	14	Mean:	33.7	17.5	19.0
		SD:	1.8	1.1	1.0
4	9	Mean:	13.8	16.1	16.5
		SD:	3.5	1.2	1.7
5	15	Mean:	28.4	16.8	16.3
		SD:	1.3	1.4	2.2
All Companies	68	Mean:	24.9	16.8	17.4
		SD:	6.5	1.4	2.2

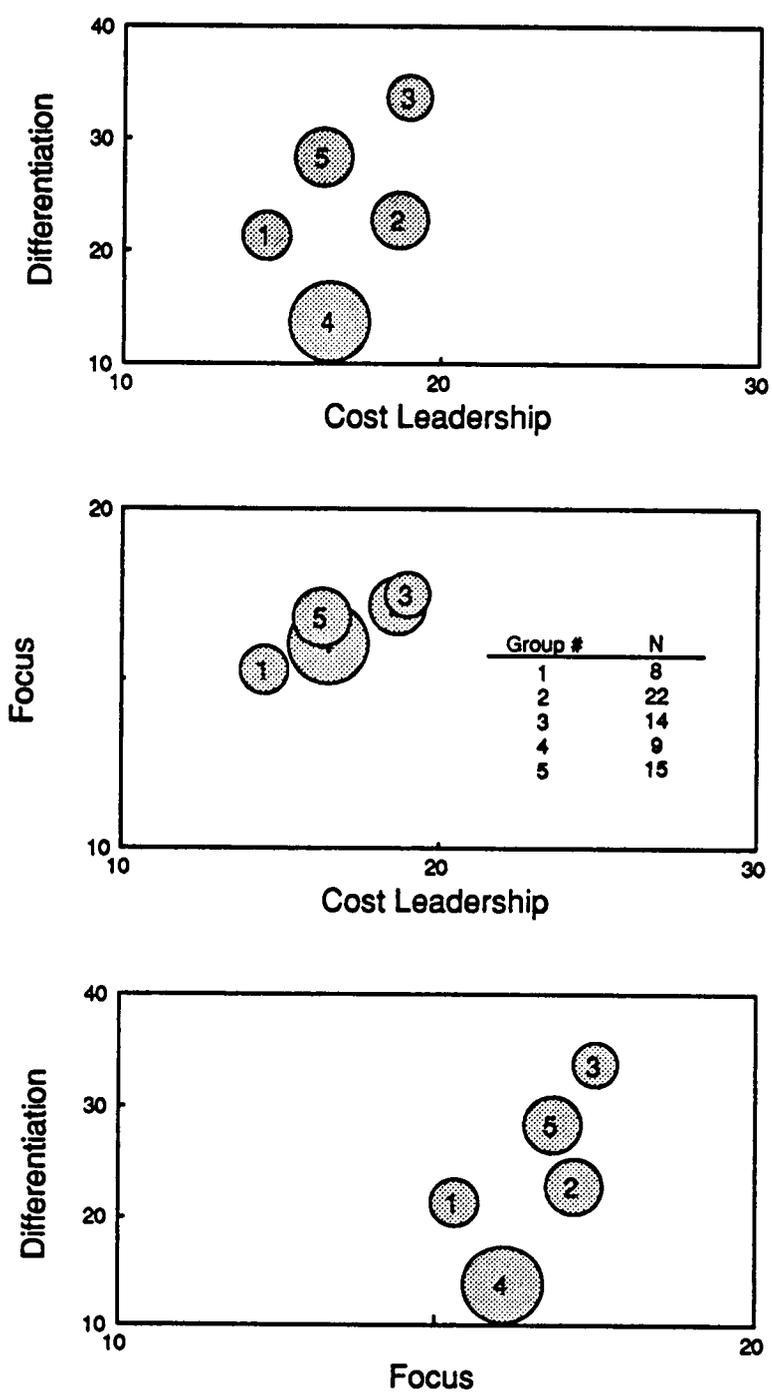
Table 5. Factor Scores and Self Reported Generic Strategy for Interviewed Companies

Company ^a Number	Reported ^b Strategy	Cluster Membership	Factor 1 Differentiation	Factor 2 Focus	Factor 3 Cost Leadership
----- Factor Scores -----					
1	OCL	5	27.3	14.9	15.8
2	D	1	24.7	15.8	14.6
3	OCL	2	18.6	17.8	20.0
4	D	2	25.2	18.3	16.9
5	OCL-D	3	35.8	17.5	19.5
6	F-D	2	23.4	16.9	16.3
7	OCL	2	26.1	16.8	21.4
8	OCL	3	32.9	16.4	19.0
9	D	3	34.4	17.7	18.4
10	OCL	5	28.0	13.8	14.8
11	OCL-D	5	26.5	15.6	17.1
12	OCL-D	2	24.6	17.1	18.6
All Companies:					
Mean			24.9	16.8	17.4
Standard Deviation			6.5	1.4	2.2

- ^a Some companies are not included due to missing information
^b OCL = Overall Cost Leadership; D = Differentiation; F = Focus

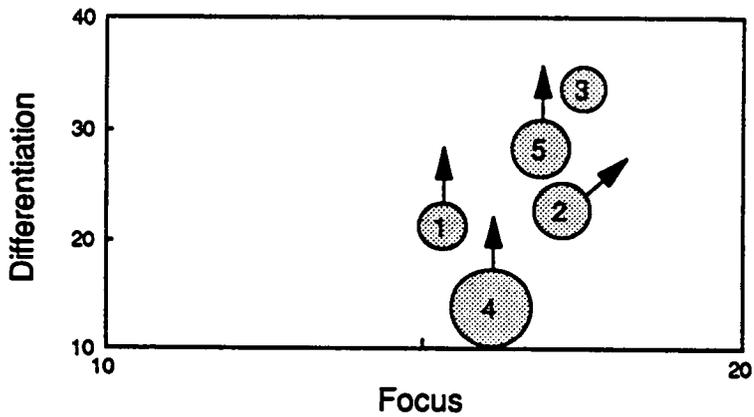
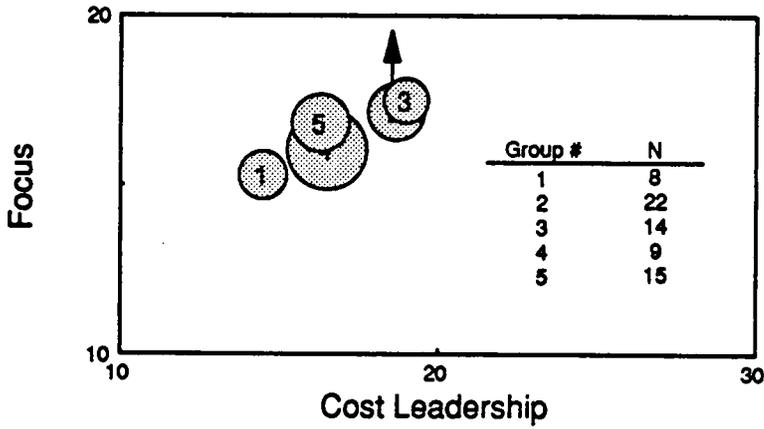
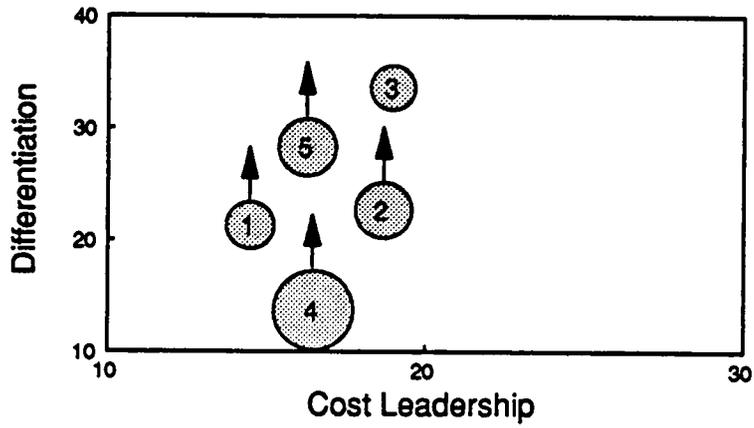
- | | |
|---|--|
| 1. Developing new products | 11. Serving special geographic markets |
| 2. Providing customer service | 12. Ability to manufacture specialty products |
| 3. Efficient operation of production facilities | 13. Promotion and advertising |
| 4. Product quality control | 14. Maintaining a company sales force |
| 5. Employing trained/experienced personnel | 15. Owning timberlands and/or logging operations |
| 6. Competitive pricing | 16. Providing rapid delivery |
| 7. Developing brand identification | 17. Market research |
| 8. Using new marketing techniques/methods | 18. Investment in new processing equipment |
| 9. Controlling channels of distribution | 19. Serving particular customer groups |
| 10. Procurement of raw materials | 20. Reputation within the industry |

Figure 1. Variables Used to Operationalize Business-Level Strategy (Adapted from Dess and Davis 1984)



Note: Groups are centered on cluster centroids. The size of the circle represents the mean intra-group squared Euclidian distance between companies.

Figure 2. Strategic Groups on Three Strategic Dimensions



Note: Arrows indicate the directions of significant changes in group centroid location.

Figure 3. Predicted Strategic Group Movement: Next Five Years

SUMMARY

This research investigated several aspects of competition in an important segment of the U.S. wood-based economy – the hardwood lumber industry. First, the perceived and actual needs of four significant segments of the market for hardwood grade lumber were compared. A mail survey was used to gather data from the largest companies in each of four market segments and from large lumber producers. Product and supplier attributes that are most determinant in lumber purchase decisions were identified. Price was one of the most determinant attributes but the supplier's reputation and some aspects of lumber quality were found to be more determinant. Lumber producers appeared to have underestimated the importance of quality to their customers and this finding may provide an opportunity for a business strategy that seeks to optimize these critical attributes.

In the second segment of the research, a quantitative approach to identifying and categorizing competitive strategy in the industry was taken. Data were gathered via a written questionnaire that was administered to the largest (by production) hardwood lumber producers in the United States. Multivariate statistical techniques were used to identify five strategic groups along dimensions that encompassed Porter's (1980) generic strategies (*Overall Cost Leadership, Differentiation, and Focus*). Significant findings included the presence of groups that had no strong strategic orientation and the presence of a group that exhibited a dual Cost Leadership/Differentiation strategy. This latter finding suggests the industry is best modeled by strategic typologies that allow for such combinations of Porter's basic strategies.

Another significant finding is the lack of Focus strategies (or variation along this dimension) among the sample companies. This finding was further emphasized by the results of the third major segment of the study – interviews with executives at the twenty largest hardwood lumber companies.

When asked to categorize their company's overall strategy using Porter's typology, few executives indicated Focus strategies and several chose dual strategies. This result reinforces the findings of the quantitative investigation of strategy in the industry. Specifically, the low emphasis on Focus based strategies and the use of dual strategies. It is theorized that the low reliance on Focus based strategies is due, in part, to the variety of products resulting from hardwood lumber production and the perceived risk of serving a single market segment.

The data obtained during the interview segment of the study also provided insight into the nature of competition in the industry. Quality, customer service, and price were found to be the most important competitive tools for many companies, especially those that were categorized as medium-sized. Larger and smaller companies were more likely to use price as a competitive tool than the medium-sized companies. In addition, differences in distribution channels and use of competitive tools such as proprietary grading were found between categories of companies.

In addition to the present state of the industry, changes and trends in the industry were investigated in both the quantitative and qualitative segments of the research. Quantitative investigation indicated a trend toward increased emphasis on a Differentiation based business strategy in the near future (next five years). All but one of the strategic groups indicated significant movement in this strategic direction.

Several trends were consistently reported during the interview or qualitative portion of

the research. These included, shortened distribution channels, increased specialization of orders, and movement of the inventory carrying function back to the hardwood lumber producer.

The limitations of this research should be considered. Primary among these is the fact that several segments of the research concentrated on large companies. Consequently, the applicability of the results to the entire industry is untested. In particular, determinant attributes were investigated for only the largest companies in each market segment. Smaller companies in the market segments may have different needs than these large companies and different determinant attributes. The finding of little emphasis on Focus strategies among large lumber producers does not preclude the use of this strategy by smaller companies. In fact, this type of strategy may be most appropriate for smaller companies.

OPPORTUNITIES OF FURTHER RESEARCH

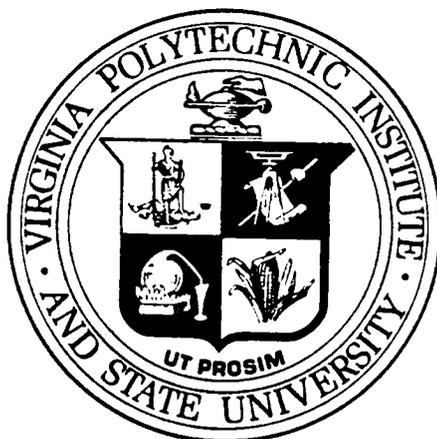
As is often the case, this study poses at least as many questions as it answers. Some are specific to the hardwood lumber industry and others address more theoretical aspects of strategy research.

Certainly, opportunities exist for further investigation of the hardwood lumber industry. The expansion of the sample frame to the entire industry would allow a complete picture of competitive strategy in the industry to be developed. Investigation of attributes that are determinant in the purchase decisions of smaller lumber users and segments of the hardwood lumber market not investigated in this study could also add to understanding of the industry. A comparison of the determinant attributes identified in this study to those of foreign lumber users would be of particular interest.

The search for a valid and generally applicable operationalization of the strategy construct and a definitive strategic typology is an ongoing process that requires additional work. While the operationalization developed by Dess and Davis (1984) and used in this research holds promise, the need to modify the operationalization to make it applicable to the specific industry context suggests that improvements can be made. Similarly, Porter's (1980) generic typology has proved extremely useful in categorizing strategic diversity. However, its failure to account for dual strategies suggests that a definitive typology has yet to be developed. Finally, research that replicated the study at a future date could determine the usefulness of the methodology used to predict strategic evolution.

APPENDIX A
LUMBER USER QUESTIONNAIRE AND ACCOMPANYING LETTERS

Survey of Lumber Users



*Virginia Polytechnic Institute and State University
Department of Wood Science & Forest Products
Blacksburg, Virginia 24061-0503*

703/231-5876

Virginia Tech
Survey of Lumber Users

This survey asks about your company's operations that use hardwood lumber. If your company has more than one plant using hardwood lumber, please include all of them in your answers.

If your company does not use any hardwood lumber, please excuse our mistake. However, we would appreciate it if you would check here [] and return the survey in the postpaid envelope.

Thank you for your help!

1. Does your company purchase any hardwood lumber (rough or planed)?
(Please check one box)

No →

Please return the
survey in the
postpaid envelope

Thanks!

Yes ↓

The following questions ask about the hardwood lumber your company buys from outside sources - that is, from sawmills or other suppliers not owned by your company.

2. Which of the following factors is your company usually LEAST satisfied with when buying hardwood lumber?
(Please check one box)

- LUMBER QUALITY
 DELIVERY TIME
 PRICE
 CREDIT TERMS
 AVAILABILITY OF CERTAIN SPECIES
 OTHER: _____
 COMPANY IS SATISFIED WITH ALL FACTORS

Many hardwood lumber users find that certain characteristics of the lumber they buy (and the suppliers they buy from) are more important than others. Please tell us which characteristics are important and unimportant to your company.

3. How important are the following characteristics in the hardwood lumber your company buys?
(Please circle the number that best indicates the importance of each characteristic)

	NOT AT ALL IMPORTANT	←—————→					EXTREMELY IMPORTANT
ABSENCE OF ...							
CHIPPED GRAIN	1	2	3	4	5	6	7
SURFACE CHECKS	1	2	3	4	5	6	7
END SPLITS	1	2	3	4	5	6	7
WANE	1	2	3	4	5	6	7
PRESENCE OF ...							
END COATING	1	2	3	4	5	6	7
SQUARE EDGES	1	2	3	4	5	6	7
SQUARE END TRIMMING	1	2	3	4	5	6	7
SUPPLIER'S TRADEMARK	1	2	3	4	5	6	7
ACCURACY OF ...							
GRADING	1	2	3	4	5	6	7
MOISTURE CONTENT	1	2	3	4	5	6	7
WITHIN-LOAD CONSISTENCY OF ...							
MOISTURE CONTENT	1	2	3	4	5	6	7
THICKNESS	1	2	3	4	5	6	7
LENGTH	1	2	3	4	5	6	7
LUMBER STRAIGHTNESS	1	2	3	4	5	6	7
GENERAL CLEANLINESS	1	2	3	4	5	6	7

4. When choosing a hardwood lumber supplier, how important are the following factors?
(Please *circle* the number that best indicates the importance of each factor)

	NOT AT ALL IMPORTANT						EXTREMELY IMPORTANT	
		←—————→						
SUPPLIER'S ABILITY TO PROVIDE ...								
RAPID DELIVERY	1	2	3	4	5	6	7	
TECHNICAL INFORMATION	1	2	3	4	5	6	7	
KILN DRIED LUMBER	1	2	3	4	5	6	7	
PLANED LUMBER	1	2	3	4	5	6	7	
SUPPLIER'S ABILITY TO PROVIDE ...								
PROTECTIVE PACKAGING (BANDING, WRAPPING, ETC.)	1	2	3	4	5	6	7	
A VARIETY OF SPECIES	1	2	3	4	5	6	7	
BOTH DIMENSION STOCK AND LUMBER	1	2	3	4	5	6	7	
SET WIDTH LUMBER	1	2	3	4	5	6	7	
SUPPLIER'S ABILITY TO ...								
FILL LARGE ORDERS	1	2	3	4	5	6	7	
ARRANGE CREDIT	1	2	3	4	5	6	7	
ARRANGE SHIPPING	1	2	3	4	5	6	7	
FILL SMALL ORDERS	1	2	3	4	5	6	7	
PERSONAL RELATIONSHIP WITH SUPPLIER	1	2	3	4	5	6	7	
SUPPLIER'S REPUTATION	1	2	3	4	5	6	7	
WILLINGNESS TO QUOTE FIRM PRICES	1	2	3	4	5	6	7	
PREVIOUS BUSINESS WITH SUPPLIER	1	2	3	4	5	6	7	
COMPETITIVE PRICING	1	2	3	4	5	6	7	
NEARBY LOCATION	1	2	3	4	5	6	7	

There is often a difference from one supplier to another in the quality of the lumber they provide. Suppliers may also differ on the quality of service they offer. From your experience, please tell us how much difference you have noticed.

5. How does the hardwood lumber offered by various suppliers differ on the following characteristics? (Please *circle* the number that best indicates how lumber differs between suppliers on each characteristic)

		No DIFFERENCE BETWEEN SUPPLIERS			LARGE DIFFERENCE BETWEEN SUPPLIERS
		←	→		
ABSENCE OF ...					
CHIPPED GRAIN	1	2	3	4	5
SURFACE CHECKS	1	2	3	4	5
END SPLITS	1	2	3	4	5
WANE	1	2	3	4	5
PRESENCE OF ...					
END COATING	1	2	3	4	5
SQUARE EDGES	1	2	3	4	5
SQUARE END TRIMMING	1	2	3	4	5
SUPPLIER'S TRADEMARK	1	2	3	4	5
ACCURACY OF ...					
GRADING	1	2	3	4	5
MOISTURE CONTENT	1	2	3	4	5
WITHIN LOAD CONSISTENCY OF ...					
MOISTURE CONTENT	1	2	3	4	5
THICKNESS	1	2	3	4	5
LENGTH	1	2	3	4	5
LUMBER STRAIGHTNESS	1	2	3	4	5
GENERAL CLEANLINESS	1	2	3	4	5

Next, we would like to ask a few questions about the lumber used by your company. Your answers will allow us to group your company with similar companies when we look at the survey results. They will also help us to better understand the needs of lumber users.

7. Approximately, how much lumber did your company use in 1988?
 (Please include both lumber purchased outside the company and lumber produced within the company)

BOARD FEET
 _____ SOFTWOOD LUMBER
 _____ HARDWOOD LUMBER

8. What percent of the hardwood lumber your company used in 1988 was purchased from outside the company?

_____ % OF TOTAL HARDWOOD LUMBER

9. Approximately, how much of the hardwood lumber your company bought in 1988 was purchased from each of the following sources?
 (Please write the approximate percentage next to the source)

%
 OF TOTAL BOARD FEET
 PURCHASED

_____ LUMBER WHOLESALER/DISTRIBUTOR
 _____ LUMBER BROKER
 _____ DIRECT FROM SAWMILLS
 _____ LUMBER IMPORTER
 _____ OTHER _____

100%

10. How was the hardwood lumber your company purchased in 1988 split among the following types?

%
 OF TOTAL BOARD FEET
 PURCHASED

_____ WHITE OAK
 _____ RED OAK
 _____ YELLOW POPLAR
 _____ BLACK CHERRY
 _____ HARD MAPLE
 _____ SOFT MAPLE
 _____ YELLOW BIRCH
 _____ ASH
 _____ BLACK WALNUT
 _____ GUM
 _____ RED ALDER
 _____ OTHER DOMESTIC SPECIES
 _____ IMPORTED SPECIES

100%

11. Approximately, how was the hardwood lumber your company purchased in 1988 split among the following grades?

%
 OF TOTAL BOARD FEET
 PURCHASED

_____ FIRST AND SECONDS
 _____ SELECTS
 _____ No. 1 COMMON
 _____ No. 2 COMMON
 _____ No. 3A
 _____ No. 3B
 _____ OTHER GRADE
 _____ UN-GRADED

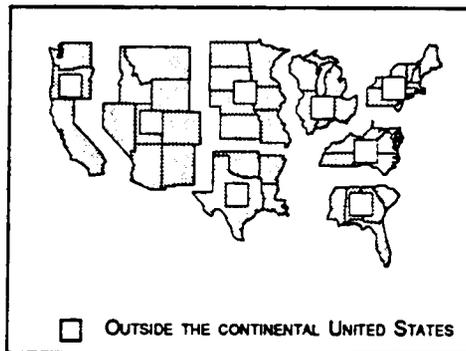
100%

Finally, we would like to ask a few questions about your company. Of course, all information is strictly confidential and will be used only for statistical purposes.

13. Which of the following is your company's PRIMARY product (by value of sales)?
(Please check only one box)

- MOULDING/MILLWORK
- DIMENSION STOCK
- WOOD FLOORING
- WOOD FURNITURE
- CABINETS
- OTHER _____

12. Where does your company produce the majority of its PRIMARY product (as indicated above)?
(Please check the box that best indicates the location)



14. In 1988, how many people were employed at the plant(s) your company operated to produce its PRIMARY product?

_____ PRODUCTION EMPLOYEES

_____ NON-PRODUCTION EMPLOYEES

15. Which category best describes your company's total 1988 sales of its PRIMARY product?
(Please check one box)

- LESS THAN \$10 MILLION
- \$10 MILLION TO \$24.9 MILLION
- \$25 MILLION TO \$49.9 MILLION
- \$50 MILLION TO \$74.9 MILLION
- \$75 MILLION TO \$99.9 MILLION
- \$100 MILLION TO \$249.9 MILLION
- OVER \$250 MILLION

Comments:

Is there anything else you would like to tell us about your company's lumber needs or problems? Anything we should have asked but did not? Please use the space below if you have any additional comments.

Thank you for your help! Please return the questionnaire in the postpaid envelope.

If you would like to receive a summary of the results of this study, just return the prepaid postcard at your convenience.



SCHOOL OF FORESTRY AND WILDLIFE RESOURCES

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061-0503

DEPARTMENT OF WOOD SCIENCE & FOREST PRODUCTS

FAX: (703) 231-8868

Thomas M. Brooks Forest Products Center

May 19, 1989

Wanda A. Sutherland
 Vice President
 WAS Incorporated
 P. O. Box 1001
 West Nichols, MS 39284

Dear Ms. Sutherland:

As someone involved in the manufacture of wood products, you undoubtedly face many day-to-day problems. One of these problems may be obtaining lumber with the "quality" characteristics (straightness, freedom from checks, etc.) that your company needs. However, many lumber producers don't know which characteristics are most important and least important to wood products manufacturers.

We are trying to solve this problem by conducting a study that will help lumber producers learn more about your needs. Your firm has been randomly selected to be included in this study. We are asking for your participation by completing and returning the enclosed questionnaire. Since only a small number of firms are being contacted, it is important that your opinions are heard.

Of course, all responses are **strictly confidential** and you will remain anonymous. We are not asking you to identify yourself or your company.

The results of the study will be made available to lumber producers in order to aid them in serving the needs of wood products manufacturers like yourself. We will also be glad to send you a summary of the results. Simply fill out the enclosed request card and drop it in the mail. The postage is prepaid.

The questionnaire will take only a few minutes of your time. Should you have any questions or comments, please write to me at the address listed above or call collect.

Thank you for your help.

Sincerely,

Robert J. Bush
 Project Coordinator



SCHOOL OF FORESTRY AND WILDLIFE RESOURCES

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061-0503

DEPARTMENT OF WOOD SCIENCE & FOREST PRODUCTS

FAX: (703) 231-8868

Thomas M. Brooks Forest Products Center

May 26, 1989

Wanda A. Sutherland
Vice President
WAS Incorporated
P. O. Box 1001
West Nichols, MS 39284

Dear Ms. Sutherland:

Last week I mailed you a survey questionnaire seeking your help in identifying the needs and problems faced by wood products manufacturers when buying lumber. I believe the results of the survey will help to improve the service and product quality provided by lumber producers to companies such as your's.

If you have returned the questionnaire, please accept my thanks. If not, I urge you to complete and return the questionnaire as soon as possible. Since only a small number of scientifically selected firms were contacted, it is important that your opinions are heard.

I realize that the questionnaire may not have reached you or may have been misplaced. If so, please contact me at the address listed above or call collect at (703) 231-8868. I will send a replacement immediately.

Thanks for your help!

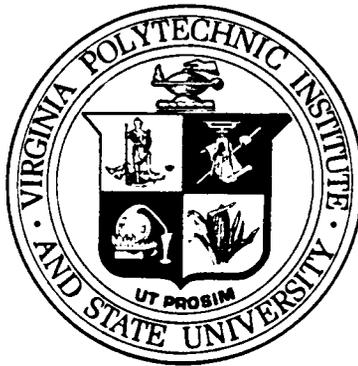
Sincerely,

Robert J. Bush
Project Coordinator

APPENDIX B

LUMBER PRODUCER QUESTIONNAIRE AND ACCOMPANYING LETTERS

Survey of Lumber Producers



*Virginia Polytechnic Institute and State University
Department of Wood Science & Forest Products
Blacksburg, Virginia 24061-0503*

**Virginia Tech
Survey of Lumber Producers**

This survey asks about your company's **hardwood** lumber operations. If your company has more than one mill producing hardwood lumber, please include all of them in your answers.

Thank you for your help!

1. Does your company produce hardwood lumber (either rough or planed)?
(Please check one box)

No →

Please return the survey in the postpaid envelope
Thanks!

Yes
↓

2. With which of the following factors do you believe your hardwood lumber customers are **LEAST** satisfied?
(Please check one box)

- LUMBER QUALITY
- DELIVERY TIME
- PRICE
- CREDIT TERMS
- AVAILABILITY OF CERTAIN SPECIES
- OTHER _____

- CUSTOMERS ARE SATISFIED WITH ALL FACTORS

Many lumber producers find that certain lumber (and supplier) characteristics are more important to their customers than other characteristics. Based on your experience, which characteristics are important and unimportant?

3. How important are the following LUMBER characteristics to your customers?
(Please *circle* the number that best indicates the importance of each characteristic)

	NOT AT ALL IMPORTANT	←—————→					EXTREMELY IMPORTANT
ABSENCE OF ...							
CHIPPED GRAIN	1	2	3	4	5	6	7
SURFACE CHECKS	1	2	3	4	5	6	7
END SPLITS	1	2	3	4	5	6	7
WANE	1	2	3	4	5	6	7
PRESENCE OF ...							
END COATING	1	2	3	4	5	6	7
SQUARE EDGES	1	2	3	4	5	6	7
SQUARE END TRIMMING	1	2	3	4	5	6	7
SUPPLIER'S TRADEMARK	1	2	3	4	5	6	7
ACCURACY OF ...							
GRADING	1	2	3	4	5	6	7
MOISTURE CONTENT	1	2	3	4	5	6	7
WITHIN-LOAD CONSISTENCY OF ...							
MOISTURE CONTENT	1	2	3	4	5	6	7
THICKNESS	1	2	3	4	5	6	7
LENGTH	1	2	3	4	5	6	7
LUMBER STRAIGHTNESS	1	2	3	4	5	6	7
GENERAL CLEANLINESS	1	2	3	4	5	6	7

4. How important are the following SUPPLIER characteristics to buyers of hardwood lumber - your customers?
(Please circle the number that best indicates the importance of each characteristic)

	NOT AT ALL IMPORTANT	←—————→					EXTREMELY IMPORTANT
SUPPLIER'S ABILITY TO PROVIDE ...							
RAPID DELIVERY	1	2	3	4	5	6	7
TECHNICAL INFORMATION	1	2	3	4	5	6	7
KILN DRIED LUMBER	1	2	3	4	5	6	7
PLANED LUMBER	1	2	3	4	5	6	7
SUPPLIER'S ABILITY TO PROVIDE ...							
PROTECTIVE PACKAGING (BANDING, WRAPPING, ETC.)	1	2	3	4	5	6	7
A VARIETY OF SPECIES	1	2	3	4	5	6	7
BOTH DIMENSION STOCK AND LUMBER	1	2	3	4	5	6	7
SET WIDTH LUMBER	1	2	3	4	5	6	7
SUPPLIER'S ABILITY TO ...							
FILL LARGE ORDERS	1	2	3	4	5	6	7
ARRANGE CREDIT	1	2	3	4	5	6	7
ARRANGE SHIPPING	1	2	3	4	5	6	7
FILL SMALL ORDERS	1	2	3	4	5	6	7
PERSONAL RELATIONSHIP WITH CUSTOMER	1	2	3	4	5	6	7
SUPPLIER'S REPUTATION	1	2	3	4	5	6	7
WILLINGNESS TO QUOTE FIRM PRICES	1	2	3	4	5	6	7
PREVIOUS BUSINESS WITH CUSTOMER	1	2	3	4	5	6	7
COMPETITIVE PRICING	1	2	3	4	5	6	7
NEARBY LOCATION	1	2	3	4	5	6	7

6. Which of the following business areas will be most and least important to your company FIVE YEARS from now?

	1	2	3	4	5	6	7
	NOT		← IMPORTANT →			EXTREMELY	
	IMPORTANT					IMPORTANT	
DEVELOPING NEW PRODUCTS	1	2	3	4	5	6	7
PROVIDING CUSTOMER SERVICE	1	2	3	4	5	6	7
EFFICIENT OPERATION OF PRODUCTION FACILITIES	1	2	3	4	5	6	7
PRODUCT QUALITY CONTROL	1	2	3	4	5	6	7
EMPLOYING TRAINED/EXPERIENCED PERSONNEL	1	2	3	4	5	6	7
COMPETITIVE PRICING	1	2	3	4	5	6	7
DEVELOPING BRAND IDENTIFICATION	1	2	3	4	5	6	7
USING NEW MARKETING TECHNIQUES/METHODS	1	2	3	4	5	6	7
CONTROLLING CHANNELS OF DISTRIBUTION	1	2	3	4	5	6	7
PROCUREMENT OF RAW MATERIALS	1	2	3	4	5	6	7
SERVING SPECIAL GEOGRAPHIC MARKETS	1	2	3	4	5	6	7
ABILITY TO MANUFACTURE SPECIALTY PRODUCTS	1	2	3	4	5	6	7
PROMOTION AND ADVERTISING	1	2	3	4	5	6	7
MAINTAINING A COMPANY SALES FORCE	1	2	3	4	5	6	7
OWNING TIMBERLANDS AND/OR LOGGING OPERATIONS	1	2	3	4	5	6	7
PROVIDING RAPID DELIVERY	1	2	3	4	5	6	7
MARKET RESEARCH	1	2	3	4	5	6	7
INVESTMENT IN NEW PROCESSING EQUIPMENT	1	2	3	4	5	6	7
SERVING PARTICULAR CUSTOMER GROUPS	1	2	3	4	5	6	7
REPUTATION WITHIN THE INDUSTRY	1	2	3	4	5	6	7

Next, we would like to ask a few questions about the lumber your company produces. Your answers will allow us to group your company with similar companies when we look at the survey results.

7. Approximately, how much lumber did your company produce in 1988?

BOARD FEET
 _____ SOFTWOOD LUMBER
 _____ HARDWOOD LUMBER

8. How much of your company's 1988 hardwood lumber production was sold through each of the following channels? (Please write the percent next to the appropriate channel)

%
 OF TOTAL BOARD FEET
 PRODUCED

_____ SOLD THROUGH COMPANY OWNED
 DISTRIBUTION YARD(S)
 _____ SOLD TO LUMBER WHOLESALERS
 _____ SOLD THROUGH LUMBER BROKER
 _____ SOLD TO RETAIL OPERATIONS
 _____ SOLD DIRECTLY TO END USERS
 _____ EXPORTED
 _____ OTHER _____

_____ 100%

9. Approximately, how was the lumber your company produced in 1988 split among the following types?

%
 OF TOTAL BOARD FEET
 PRODUCED

_____ ROUGH, GREEN GRADE LUMBER
 _____ ROUGH, AIR-DRIED GRADE LUMBER
 _____ ROUGH, KD GRADE LUMBER
 _____ PLANED, KD GRADE LUMBER
 _____ CANTS AND/OR PALLET LUMBER
 _____ OTHER _____

_____ 100%

10. How was the hardwood lumber your company produced in 1988 split among the following species?

%
 OF TOTAL BOARD FEET
 PRODUCED

_____ WHITE OAK
 _____ RED OAK
 _____ YELLOW POPLAR
 _____ BLACK CHERRY
 _____ HARD MAPLE
 _____ SOFT MAPLE
 _____ BIRCH
 _____ ASH
 _____ BLACK WALNUT
 _____ GUM
 _____ RED ALDER
 _____ OTHER DOMESTIC SPECIES
 _____ IMPORTED SPECIES

_____ 100%

11. Approximately, how was the hardwood lumber your company produced in 1988 split among the following grades?

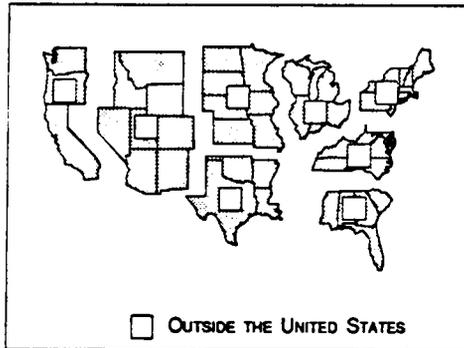
%
 OF TOTAL BOARD FEET
 PRODUCED

_____ FIRST AND SECONDS
 _____ SELECTS
 _____ No. 1 COMMON
 _____ No. 2 COMMON
 _____ No. 3A
 _____ No. 3B
 _____ OTHER GRADE
 _____ UN-GRADED

_____ 100%

Finally, we would like to ask a few questions about your company. As mentioned, all information is strictly confidential and will be used only for statistical purposes.

12. Where does your company produce the majority of its hardwood lumber?
(Please check the box that best indicates the location)



13. Does your company produce any of the products listed below in addition to lumber?
(Please check all that apply)

- MOLDING/MILLWORK
 DIMENSION STOCK
 WOOD FLOORING
 WOOD FURNITURE
 CABINETS
 PALLETS
 NONE OF THE ABOVE

14. What was the average number of full-time people employed in your company's hardwood lumber manufacturing plant(s) during 1988?

_____ PRODUCTION EMPLOYEES

_____ NON-PRODUCTION EMPLOYEES

15. Which category best describes your company's total 1988 hardwood lumber sales?
(Please check one box)

- LESS THAN \$10 MILLION
 \$10 MILLION TO \$24.9 MILLION
 \$25 MILLION TO \$49.9 MILLION
 \$50 MILLION TO \$74.9 MILLION
 \$75 MILLION TO \$99.9 MILLION
 \$100 MILLION TO \$249.9 MILLION
 OVER \$250 MILLION

Comments:

Is there anything else you would like to tell us about how your company serves its hardwood lumber customers? Anything we should have asked but did not? Please use the space below if you have any additional comments.

Thank you for your help! Please return the questionnaire in the postpaid envelope.

If you would like to receive a summary of the results of this study, just return the postcard at a later date.



SCHOOL OF FORESTRY AND WILDLIFE RESOURCES

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061-0503

DEPARTMENT OF WOOD SCIENCE & FOREST PRODUCTS

FAX: (703) 231-8868

Thomas M. Brooks Forest Products Center

June 26, 1989

Michael P. Anthony
President
Tony's Lumber Co.
57 Cove Road
Capital City, NY 10023

Dear Mr. Anthony:

As someone involved in the manufacture of lumber, you undoubtedly face many day-to-day problems. One of these problems may be finding ways to profitably meet the needs of your customers. However, it may not always be clear what these needs are.

By studying both lumber users and lumber producers, we are attempting to learn more about these needs and the ways in which the hardwood lumber industry is likely to change in the near future. We are contacting your company because it is one of the largest hardwood lumber producers in the country.

We are asking for your help in completing and returning the enclosed questionnaire. Since only a small number of companies are being contacted, your opinions are important.

Of course, all responses are strictly confidential. The questionnaire has an identification number to allow us to remove your company's name from the mailing list when it is returned. However, neither your name nor your company's name will ever be placed on the questionnaire or reports of the study results.

The study results will compare information from lumber producers and lumber users in the furniture, cabinet and dimension industries to suggest ways that lumber producers can profit by better serving the needs of their customers. In addition, the results will outline ways in which the industry is expected to change. We will be glad to send you a summary of the results. Simply fill out the enclosed request card and drop it in the mail. The postage is prepaid.

The questionnaire will take only a few minutes of your time. Should you have any questions or comments, please write to me at the address listed above or call collect at

Thank you for your help.

Sincerely,

Robert J. Bush
Project Coordinator



SCHOOL OF FORESTRY AND WILDLIFE RESOURCES

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061-0503

DEPARTMENT OF WOOD SCIENCE & FOREST PRODUCTS

FAX: (703) 231-8868

Thomas M. Brooks Forest Products Center

July 5, 1989

Michael P. Anthony
President
Tony's Lumber Co.
57 Cove Road
Capital City, NY 10023

Dear Mr. Anthony:

Last week I mailed you a questionnaire seeking your help in a study of the hardwood lumber industry. I believe the results of the study will help lumber producers to profitably serve the needs of various types of lumber users.

If you have returned the questionnaire, please accept my thanks. If not, I urge you to complete and return the questionnaire as soon as possible. Since only a small number of firms were contacted, it is important that your opinions are heard.

I realize that the questionnaire may not have reached you or may have been misplaced. If so, please contact me at the address listed above or call collect at . I will send a replacement immediately.

Thanks for your help!

Sincerely,

Robert J. Bush
Project Coordinator

APPENDIX C
GENERIC STRATEGY DESCRIPTIONS USED IN INTERVIEWS

The following descriptions of Porter's (1980) generic strategies, adapted from Rich (1986), were provided to respondents to facilitate strategic self-typing:

Overall Cost Leadership

The firm seeks to achieve overall low cost through aggressive construction of efficient scale facilities, adoption of new technologies, avoidance of marginal customer accounts or market segments, and cost minimization in areas such as marketing.

Differentiation

The firm seeks to differentiate the product and service offered, creating something that is perceived *industry-wide* as being unique. Differentiation may take many forms, such as consumer service, brand image, strong captive distribution system, and/or a reputation for being on the forefront in new product development.

Focus

The firm focuses on a particular type of buyer, market group, or segment of the product line. The firm seeks to serve a particular target very well -- better than its competitors who are competing more broadly.

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