MARKET SURVEY OF CALIFORNIA FURNITURE MANUFACTURERS

by

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ABSTRACT

The solid wood sector of the forest products industry in British Columbia has begun to shift its focus away from the low cost manufacturing of commodity products and toward the extraction of higher value from the timber resource. One of the most important constraints to these efforts is the lack of information about markets for value-added wood products. This paper presents the results of an investigation of one such market, the wood furniture industry in California. A survey was mailed to all furniture establishments in the state. The results were compiled from the data provided by 81 respondents and were determined to be representative of the entire furniture industry in California in 1992.

More than 88% of furniture manufacturers in California are single plant companies, and just under 50% employ 20 or fewer people. More than 40% of manufacturers have been operating for less than 11 years. Just under 50% of furniture manufacturers spent less than $50,000 on solid wood raw materials. This emphasizes the role played by the small manufacturer.

Lumber represents about two-thirds of furniture manufacturer's expenditures on solid wood; the remaining third is divided between semi-finished components, fully-machined components and sub-assemblies.

Hardwood species represent 77% of wood volume used; alder is the most popular species accounting for more than 40% of consumption followed by oak at 28% Among softwood species, ponderosa pine is the most popular accounting for just under 50% of consumption

Furniture manufacturers in California rely heavily on wholesalers as a source of supply of solid wood. Most manufacturers prefer to deal with between two and four suppliers. Nearly all manufacturers use trucking as the means of inbound transport.

The furniture industry in California offers potential as a market into which B.C. solid wood manufacturers can sell higher valued, specialty type wood products. The industry is fragmented and would demand a greater understanding of end-user needs than that which is used to market dimension lumber products in commodity markets. Distribution middlemen, primarily wholesalers, play an important role in supplying raw materials to furniture manufacturers in California. Any attempt to exploit opportunities in this market must begin with research into the current supply strategies and tactics of these middlemen.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure

ACKNOWLEDGEMENTS

1.0 INTRODUCTION

The solid wood sector of the forest products industry in B.C. is characterized by an infrastructure that is directed to the production and distribution of construction grades of softwood lumber (Anonymous 1992a). The sector is largely comprised of cost efficient, high volume processors who have effectively utilized what has historically been a high quality, low cost timber resource as a source of international competitive advantage.

Focusing principally on commodity markets for dimension lumber products, B.C. solid wood producers have become the largest part of what has been called the engine that powers the provincial economy. Manufacturing shipments of lumber in 1991 totalled $4.095b, accounting for 18% of total provincial shipments that year (Price Waterhouse 1992). As further evidence of the industry's importance, B.C. is the largest exporter of lumber in the world accounting for 34% of total exports in 1990.

Although sawmilling profitability is normally somewhat erratic, growth has been realised by those manufacturers who, by virtue of their scale of operations, have been able to withstand the troughs and losses associated with downturns in global markets for lumber. Not all sawmillers are so well positioned, however, and there are a number of factors which threaten the

industry's long-term prospects for growth.

Markets for construction grades of softwood lumber are mature and growing slowly (Woodbridge Reed and Associates 1988). Softwood lumber mills are approaching the limits of profitability of their processing technologies and innovation aimed at boosting productivity and lowering cost structures will be less beneficial than in the past (Meil 1990). These factors, along with the threat of imposed reductions in harvest levels, suggest that the historical industry focus on maximizing productivity must be reevaluated.

Diversification and further integration into higher value-added products have been the main strategies advocated by industry analysts. Schuller and Meil, 1990, propose that, "...the prevailing practice of processing as many logs as possible must give way to the practice of product value maximization...", and further, that growth will require "...vertical and horizontal integration to better utilize the resource and add value". Nilsson, 1985, goes further to claim that, "Inevitably there will be some closing down of sawmilling capacity in B.C. The extent will depend on how successful the industry is in getting into higher valued products".

Igor Ansoff developed the product/market matrix in 1956 as an aid in the assessment of a company's growth opportunities; the concept has since been developed and used by many researchers (Chisnal 1989). The matrix is a useful tool in the analysis of the options available to industries operating in mature markets (Figure 1).

2

The matrix defines the firm's markets and its products as either new or mature and offers specific strategies for particular combinations of each. For example, it is suggested that a firm wishing to increase sales of an existing product in current markets should pursue a strategy of market penetration. Conversely, for the firm wishing sell existing products into new markets, a strategy of market development is indicated.

MARKET

	Current	New
Current	Market Penetration	Market Development
New	Product Development	Diversification

(row label: **PRODUCT**)

Figure 1. The product-market matrix.

The strategy of market penetration typically involves stimulating consumption among present customers, taking business from competitors, or

attracting new users to the product. Each of these options is infeasible since solid wood producers operating in commodity markets must play the role of price taker where demand is dictated by economic factors they do not control.

Since opportunities to market construction lumber to new customers are limited, and since there is little need for product innovation to serve present customers, a strategy of diversification is appropriate. The industry should pursue new markets through the development of product lines that can be differentiated from the construction lumber that dominates the present product mix.

Booth and Vertinsky (1991) discuss the concept of related diversification. They suggest that although strong links between old and new product lines in terms of resource and technology characteristics are important, there need not be interactions between markets for final products. Booth and Vertinsky also state that, in general, related diversification accrues higher net benefits to the firm than does unrelated diversification. These findings agree with those of a number of other studies (Bettis 1981, Palepu 1985).

Related diversification can be viewed as forward vertical integration that occurs along a resource - technology - product - market continuum. In this context, from the perspective of the solid wood producer in British Columbia, this suggests some measure of additional processing of the existing product mix. The aim is to add value, or more appropriately, to add margin, to the existing product mix.

Indeed, many manufacturers are actively pursuing a strategy of product and market diversification. Coastal producers in particular, are becoming adept at producing non-traditional products, grades and sizes for new markets. In 1978, 69.7% of coast lumber shipments went to North American markets with the remaining 30.3% being shipped overseas; however, there has been a slow but definite trend to increasing offshore shipments. In 1989, the coast sector exported more than 53% of its production offshore in the form of metric sized lumber, door and window blanks, and other products tailored to specific market needs (Council of Forest Industries 1990).

Many interior manufacturers, while continuing to produce mainly dimension lumber, are also beginning to look for alternate markets. Premium grades and specialty sizes for Japanese and European markets as well as machine stress-rated lumber for residential and non-residential construction are examples of efforts of interior sawmillers to enhance product and market mixes.

It is clear that the industry is gaining some penetration and product acceptance in the more important markets for higher valued wood products. However, industry knowledge of most markets for higher valued wood products is limited. This is not surprising since historical success in commodity markets has generated little incentive to invest the resources required to investigate other opportunities.

As market pressures and raw material constraints continue to force the industry to adapt, more detailed information describing the characteristics of

specific markets for higher valued wood products is needed. It is in this context that this analysis of the wood furniture industry in California is undertaken.

The furniture industry is the most important industrial user of the products of the secondary wood using industries; California manufacturers alone used more than $2.56 billion worth of materials in 1990 (U.S. Department of Commerce, Bureau of Census 1992). The raw material needs of furniture manufacturers comprise a range of products from rough lumber to higher value-added items such as semi-finished and finished components and sub-assemblies.

1.1 OBJECTIVES

Assuming there is a market opportunity present, this descriptive study is intended to serve as the groundwork for a market development program. The broad objectives of this research project are as follows:

1. **define and explain the present raw material supply strategies and tactics of wood furniture manufacturers in California**

2. **develop a clear understanding of marketing opportunities and constraints for B.C. solid wood producers in the California wood furniture industry.**

2.0 THE U.S. WOODEN FURNITURE INDUSTRY

2.1 History of the U.S. Furniture Industry[1]

Furniture manufacturing in the U.S. began with the earliest settlers as essentially a handicraft. European producers with their vast experience in producing fine furniture controlled much of the American market in spite of the added cost of shipping their product to the U.S. It was not until the War of 1812, and a 30% tariff on imported furniture that followed, that the industry began to develop as a commercial entity. The protection of the tariff essentially gave U.S. furniture manufacturers a captive market and allowed them to produce on a scale that could justify the utilization of superior production methods used by European producers.

The plentiful hardwoods of the eastern U.S. forests, along with rapid population growth in the region, spurred the development of an important furniture manufacturing centre in Jamestown, New York, and as the domestic market continued to expand, so too did the U.S. furniture industry. However, the concentration of manufacturers in the northeast region, was such that the surrounding forests were rapidly depleted. As competition for raw materials

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[1]Much of this section is from Wisdom and Wisdom (1983)

intensified, many manufacturers began to look west for the high grade hardwoods they required.

By 1880, a strong furniture manufacturing centre had developed in Grand Rapids, Michigan. It was in this city that the first Furniture Market was held, a method of marketing that has evolved to become the predominant technique by which manufacturers show their products to potential buyers. Grand Rapids quickly became the major U.S. furniture marketing centre and an important producer; however, it was not long before the depletion of the timber resource once again had manufacturers looking to other regions for growth opportunities.

By the turn of the century, a combination of plentiful timber and inexpensive labour had resulted in a shift in manufacturing activity to the U.S. South, particularly North Carolina and Virginia. During the early 1900's, furniture manufacturers in the South concentrated on supplying regional markets with lower priced furniture. When cotton prices collapsed in the early 1920's, a recession was triggered that destroyed local furniture markets, and forced the region's producers to look to other regions for market opportunities.

A number of manufacturers exhibited their products at Furniture Markets in New York and Michigan. The unfavourable reaction their low-quality furniture received prompted manufacturers in High Point, North Carolina to develop a line of medium-priced reproductions of higher quality furniture. It was this product line shift that initiated North Carolina's development as a leading

furniture producing state.

In 1925, New York was still the major furniture supplier producing 15.8% of the nation's output of furniture. By 1954, this had fallen to 9.1% and in 1987, the state was responsible less than 4% of national production. During this period North Carolina increased its share from 8.2% in 1925, to 16.1% in 1954, to more than 30% today. Although much of the industry is still concentrated in the Southern states, significant manufacturing centres have also developed in other regions including California, Texas and Florida. For example, manufacturers in California were responsible for $4.7 billion worth of furniture shipments in 1989, representing nearly 27% of the nations output that year.

2.2   Industry Segmentation

U.S. furniture manufacturers are diverse in terms of plant structure and scale, raw material input, and product mix. Categorization is most conveniently accomplished using U.S. Department of Commerce standard industrial classification codes (SIC) which segments the industry according to both product end-use and principal raw material input. The major wood using segments of the U.S. furniture industry are wood household furniture (SIC 2511), upholstered household furniture (SIC 2512), and wood office furniture (SIC 2521).

The relative scale of these industry segments, along with some smaller segments is shown in Table 1. Wood household furniture is the largest single

segment in each of the indicated categories. With manufacturing shipments valued at nearly $8 billion, producers of wood household furniture are responsible for nearly 50% of household furniture shipments and 20% of total industry shipments. Upholstered furniture manufacturers represent the next largest segment; shipments in 1989 were $5.66 billion.

Table 1.   Basic Data on U.S. Furniture Industry for 1989

SIC Number	SIC Description	Value of Shipments	Value Added in Manufacture	Total Sector Employment
2511	Wood household furniture	$7.98b	$4.17b	121,400
2512	Upholstered household furniture	$5.66b	$2.83b	80,300
2517	Wood TV and radio cabinets	$0.24b	$0.12b	2,800
2519	Furniture and fixtures nec	$2.47b	$1.42b	31,000
2521	Wood office furniture	$1.72b	$0.99b	22,500
	Total	$18.07b	$9.53b	258,000

Source: U.S. Department of Commerce, Bureau of Census, 1991

2.3   Industry Structure

The U.S. wood furniture industry exhibits many characteristics of the economist's model of pure competition. Data from the U.S. Department of Commerce Census of Manufactures indicate that the production of wood and

household furniture is highly fragmented with many thousands of manufacturers, none of whom dominate the market (U.S. Department of Commerce, International Trade Administration 1985).

Furniture products are relatively homogeneous and there is limited recognition of specific manufacturer's brands in the marketplace. Furniture products within a given end-use grouping tend to be defined by manufacturers according to their price point category; the low price point category includes the lowest quality and least expensive furniture products while high price point items include more expensive, fine furniture products. Within a given price point category, very strong price competition is evident among manufacturers

Vertical integration in the manufacturing sector describes the movement of a firm or an industry back along the value chain into the area of raw material supply, or forward into distibution and retailing. The U.S. furniture industry as a whole is not vertically integrated. The large number of small producers and their limited access to capital, along with the wide range of materials used in furniture construction have acted to inhibit manufacturers from integrating backwards. Some of the larger firms have successfully developed their own supply sources, carrying inventories of lumber, running breakout lines and operating dry kilns. However, the small, single plant operations that make up the majority of this sector purchase most of their solid wood materials from lumber wholesalers, brokers or, increasingly, component manufacturers.

U.S. furniture manufacturers have not integrated forward either.

Although some manufacturers, such as La-Z-Boy and Interco's Ethan Allen, have an established presence at the retail level, most wood and upholstered furniture manufacturers market directly to retailers at events known as Furniture Markets (Sinclair 1992, 227-228). Again, the large number of small operators, both retailers and manufacturers, inhibits forward integration by manufacturers.

2.4   Industrial Performance

The low wage structure of the U.S. South, along with the accessability of a large and growing market, helped to ensure growth for the industry through much of this century; however, these advantages are disappearing. The South is becoming more industrialized, driving up wages, and foreign suppliers are overcoming barriers of distance through improved shipping and assembly techniques. The rising cost of increasingly scarce hardwood timber has also contributed to a poor record of profitability in the industry (U.S. Department of Commerce, International Trade Administration 1985).

These low rates of return have, in turn, had a detrimental effect on the ability of the furniture industry, relative to other manufacturing sectors, to reinvest in productive assets such as new machinery and equipment. This has slowed growth in labour productivity and, again, the result has been tighter profit margins.

2.5   Imports into the United States

U.S. furniture manufacturers have suffered from strong import pressures and have experienced a steady erosion of their domestic market share. In 1979, foreign suppliers held a 6% share of the U.S. market; by the end of the 1980s this had grown to 25% (Widman 1990). In 1988, the U.S. imported $4.028 billion worth of furniture while exporting only $304 million. The trend of rising imports was somewhat surprisingly reversed in 1990 and 1991 with imports falling to $2.854 billion and $2.713 billion respectively (Anonymous 1992b).

To a certain extent, the long-term trend of rising imports reflects the increasing wold-wide competition and shifting trade patterns that have come with expanding international trade. However, the rapid success of foreign suppliers in U.S. furniture markets also acts to underscore some characteristics of the U.S. furniture industry that impede long-term industrial performance.

U.S. firms face significantly higher cost structures than do their foreign competitors who benefit from substantially lower labour costs. Furniture production is typically a labour intensive process which does not require high levels of skill or education. Developed economies such as that of the U.S. are generally less competitive in these kinds of industries since they are unable to benefit from a more technologically sophisticated workforce (U.S. Deptartment of Commerce, International Trade Administration 1985).

The major source of market insulation enjoyed by U.S. manufacturers

has traditionally involved the high transportation and inventory costs faced by foreign suppliers. However, improved shipping techniques and the movement of containerloads of ready to assemble (RTA) furniture have eliminated much of that insulation. Some types of furniture, such as upholstered with its high volume to weight ratio and high risk of fabric damage, are still protected by transportation costs; however, foreign suppliers have, in general, been able to overcome historic transportation barriers (Smith and Ma 1990).

2.6   Employment in the U.S. Furniture Industry

U.S. wood household, upholstered and wood office furniture manufacturers, the key wood using furniture sectors, employed 243,000 workers in 4,500 establishments in 1990. Total payroll for the year was $4.16 billion and the annual payroll per employee, averaged between the three sectors was $18,000. Total sector payroll is the entire annual payroll for the sector, not including social security and other nonwage and salary employer payments. Payroll per employee is total sector payroll divided by the total sector employment. Levels for each of the sectors are provided in Table 2.

A survey of 620 U.S. furniture manufacturers conducted in 1990 found that 45% of firms employ between one and five people and that 66% employ fewer than 20 (Vance Research Services 1991). The mean number of employees was reported as 35.7; however, the median was just 9.3. This indicates the significance of the size difference between the many small firms

and the few large ones operating in this industry. It was also determined that the percentage of firms with fewer than 20 employees was highest in the West at 75%.

Table 2. Employment Levels in the U.S. Furniture Industry in 1990.

SIC Code	SIC Description	Total Sector Employment	Employees per Establishment	Payroll per Employee
2511	Wood household furniture	130,900	47	$16,000
2512	Upholstered furniture	83,800	72	$17,700
2521	Wood office furniture	28,200	48	$20,300

Source: U.S. Department of Commerce, Bureau of Census 1992

2.7 Technology in the U.S. Furniture Industry

Although technological innovation is an important tool in gaining competitive advantage in most manufacturing activities, this has historically been much less so in furniture production. The furniture industry is a mature industry where most change has been intended to fine-tune existing practices. Technological innovation has thus been gradual and, in general, aimed at improving efficiency of raw material use (Martens and Araman 1986).

It has been rare for any furniture manufacturer to attempt to gain an absolute technological advantage over its competitors since the machinery

used is nearly always purchased from suppliers who sell worldwide (Sinclair 1992: 223). The dramatic loss of the domestic market share to foreign suppliers has perhaps acted as a catalyst to U.S. manufacturers, opening their eyes to the cost of complacency in today's competitive marketplace. The increasing number of large, well established plants appears to be more responsive to technological innovations, and more willing to invest in its development (West and Sinclair 1991). As the industry restructures and consolidates in an uncertain market environment, this trend would appear likely to continue.

Technological innovations that have increased the efficiency of wood use in furniture manufacture in recent years include computer programs that allow a closer correlation between raw material mix and cutting order requirements and the development of thin kerf sawing to reduce the amount waste in manufacture. In addition, improved staining and finishing techniques are allowing a wider range of species and grade mixes to be utilized.

2.8   Market Characteristics

The market for furniture has historically been driven by the need to furnish new homes; furniture demand normally follows housing starts by approximately one year (Howard 1988). In recent years, however, repair/remodel expenditures as well as the sale of existing single family homes have become the dominant influences on furniture demand (Smith and Ma

1990).

Between 1983 and 1989, single and multi family housing starts in the U.S. fell from 1.7 billion to 1.4 billion while sales of wooden household furniture by U.S. manufacturers rose from less than $6 billion to more than $8 billion. During this same period, annual repair and remodel expenditures increased from less than $50 billion to nearly $100 billion, and existing home sales jumped from 2.5 billion to 3.5 billion.

Annual household expenditures have been shown to vary greatly with age of household heads. The primary purchasers of furniture in the U.S. are households headed by persons in the 35-54 age group (Epperson and Wacker 1989). This age group is expected to grow as a proportion of the U.S. population (U.S. Department of Commerce, International Trade Administration 1985). This market growth is favourable for increased sales of wood furniture at the retail level (Engordio 1986) and increased market opportunities for U.S. manufacturers and their raw material suppliers.

Furniture/Today, in its annual composite forecast, predicts that, building on 1991's long-awaited turnaround, the U.S. furniture industry can look forward to continued rising demand (Howard 1992). It is suggested that these increases in consumer demand will result mainly from continued modest growth in employment and purchasing power, a more optimistic consumer, and a continuation of the housing industry's rebound that began in 1992.

The projected level of furniture retail sales is $38.3 billion in 1993 and

$40.9 billion in 1994. This represents an 11% increase in consumer spending on furniture since 1989 (Howard 1992). The key issue again, however, is whether or not U.S. manufacturers can capitalize on this demand growth in an environment of intensifying international competitiveness.

3.0 FURNITURE PRODUCTION

3.1   Furniture Product Types

The three largest segments of the U.S. furniture industry, in terms of

wood raw materials consumed, are wood household furniture, upholstered

household furniture and wood office furniture. The wood household furniture

segment of the industry produces mainly living room furniture such as

chesterfields, occasional tables and entertainment centres, bedroom furniture

such as beds and dressers, and formal and informal dining room furniture such

as tables, chairs and cabinets. The upholstered furniture industry produces

dual purpose sleep furniture, as well as beds, sofas and chairs. The wood

office furniture industry manufactures mainly desks, chairs and storage units.

Some census data describing product types are available. For example,

the 1987 Census of Manufacturers reports that bedroom furniture represented

31.9% of the value of shipments of wood household furniture in 1987. This

was followed by living room furniture with 20.0% and dining room furniture with

20.8%. The census data are useful for primary analysis; however, they are not

detailed and are somewhat dated. Meyer et al, 1992a, report data on the U.S.

furniture industry that is more comprehensive and more timely.

As is shown in Table 3, bedroom furniture was produced by 66.7% of

responding firms; 65.2% produced dining room furniture; and 53.6% produced occasional furniture. The authors noted that the number of furniture categories produced per firm decreased as the size of the responding firm increased. More than half of respondents with less than $1 million in annual sales were manufacturing at least seven of the ten furniture categories listed. Only three furniture categories were manufactured by more than half of the firms with more than $1 million in sales.

Table 3. U.S. Wood Household Furniture Production by Product Type

Furniture Category	Percent Manufacturing by Firm's Value of Sales			
	< $1 million	$1-10 million	> $10 million	overall
Bedroom	75.0	63.6	70.6	66.7%
Dining room	68.8	67.0	58.8	65.2%
Occasional	56.3	52.3	55.9	53.6%
Entertainment	56.3	48.9	41.2	47.8%
Living room	62.5	48.9	35.3	47.1%
Home office	50.0	37.5	32.4	37.7%
Kitchen	62.5	34.1	26.5	35.5%

Source: Meyer et al, 1992a

There were also some marked differences in the product mixes of firms in different geographic regions. For example, more than 90% of respondents from the Northeast produced dining room furniture and 70% produced living room furniture compared to national averages of 65.2% and 47.1% respectively.

In addition, home office furniture was produced by 52.9% of manufacturers in the West and only 37.7% nationally.

The authors acknowledged that the survey respondents are more representative of larger manufacturers, so it cannot be inferred that the results are truly representative of the U.S. furniture industry. However, responding firms were classified according to sales volume, allowing for consideration of the effect of this response bias in analyzing the data. It also must be noted that the authors did not sample such segments as upholstered and wood office furniture, choosing to focus only on firms classified as wood furniture manufacturers (SIC 2511). Given the aforementioned size of the wood household furniture segment, the study is still representative of a large proportion of the wood furniture constructed in the U.S.

3.2   Furniture Style Types

There are no available U.S. census data describing the importance of specific furniture styles; however, Furniture/Today conducts an annual survey of furniture manufacturers to determine the best selling and fastest growing styles (Anonymous 1993). Respondents are asked to calculate their product shipments within 24 style categories grouped in five style families: American; contemporary; European country; formal European; and Oriental.

American 18th century was found to be the best selling furniture style as named by 33% of respondents, followed by casual contemporary as named by

21%. Casual contemporary was projected to be the fastest growing style by 22% of respondents, followed by shaker by 14%. Styles in the "American" family dominate the market in three of the four product categories surveyed. In bedroom furniture, American styles account for 52% of the market; in dining room, 50%; and in occasional tables, 44%. Only in curios and entertainment centres does another style family, contemporary, represent a greater proportion of production.

3.3   Furniture Construction Type

There are no available U.S. census data describing the importance of specific furniture construction types. However, in the results of recent survey of furniture manufacturers, Meyer et al, 1992a, report that respondent's 1989 sales of wood household furniture consisted of the following: 44.7% solid hardwood; 25.9% artificial laminates over composites or solid softwood; 16.8% hardwood veneers over composites or solid softwood; 8.4% solid softwood; and 4.2% other construction type.

The study also noted some differences in preferred construction methods across regions. The greatest relative volume of solid hardwood furniture was manufactured by firms in the Northeast where solid hardwoods accounted for just under 66% of furniture shipments. In all other regions, solid hardwood construction represented less than 50% of production. The use of artificial laminates over wood composites also varied greatly between regions.

In the Midwest, this method represented close to 40% of the value of shipments followed by just 11% in the South and 10.4% in the West.

Meyer also asked furniture manufacturers to indicate their perceptions of the direction of demand for various types of furniture construction on a scale of 1 (strongly decreasing) to 5 (strongly increasing). Respondents perceived increasing demand for solid hardwood (3.5), artificial laminates over composites (3.5), softwood veneers over composites or solid wood (3.4), and hardwood veneers over composites or solid wood (3.3). Respondents producing solid softwood furniture perceived a stable demand for this type of construction (3.3).

3.4 Wood Raw-material Use

The U.S. wood furniture industry is the country's most important user of high valued hardwood lumber and veneers (Ackerman 1987) as well as being an important market for softwood lumber and wood composite products. The volumes of these materials consumed by furniture manufacturers are such that the industry's use trends are an important factor impacting demand and price movements for a range of solid wood raw materials. Information describing these trends is thus of benefit to primary and secondary processors in general, and to suppliers to the furniture industry in particular. The information is used to anticipate demand and price in developing supply strategies as well as in planning for production levels and workforce size.

Comprehensive data describing the U.S. manufacturing sector are collected every five years, in years ending with two and seven, by the U.S. Department of Commerce; the information is published three years later. The department also conducts a less detailed annual survey of manufacturers which attempts to compensate for the length of time between the census dates.

Although the census data are useful, it does suffer from a number of deficiencies. Perhaps the most serious shortcoming is the lack of data describing certain categories in certain census years. The 1987 Census of Manufacturers, for example, did not report consumption of softwood or composite materials and did not include consumption by wood office or upholstered furniture manufacturers. These gaps, along with the time between data collection periods, result in much of the available data being obsolete.

Another deficiency in the census data is that all of the dimension stock, components, and pre-assembled frames purchased by manufacturers are combined by the Bureau and reported with either hardwood or softwood lumber, neither of which is broken down by species. In addition, the major census classifications do not capture the small manufacturers who are grouped by the bureau into the not-specified-by-kind (nsk) category of the material use category. Since the industry is relatively fragmented, with many small producers, this omission likely represents a significant volume of wood.

Since many of the census data available on material use by furniture

manufacturers are of limited value, researchers have attempted to analyze the industry using mail and/or telephone surveys. Furniture manufacturers historically have a low record of replying to such surveys; however, some researchers have succeeded in obtaining reliable data. The results of several of these studies are reported here.

Table 4 provides estimates of the volume of lumber used by the major industry segments in 1990, as well as projected levels for 1992 (Forbes 1993). The total volume of hardwood lumber used in 1990 was reported as 2.335 billion board feet (BBF). This was expected to rise to nearly 2.752 BBF in 1992, an increase of 13.5%. Softwood lumber usage for 1990 was reported as 831 million board feet (MMBF); a more modest increase of 5.7%, to 862 MMBF was predicted for 1992.

Table 4. Wood Use in the U.S. Furniture Industry

SIC Code	Industry Segment	Hardwood (MMBF)		Softwood (MMBF)	
		1990	1992	1990	1992
2511	Wood household furniture	1,196	1,329	744	774
2512	Upholstered furniture	1,018	1,277	64	88
2521	Wood office furniture	121	146	31	25
	Total	2335	2752	839	887

Source: Forbes, 1993

Although the study did not measure purchases of components or pre-

assembled frames, the authors did account for materials used by dimension part facilities owned by furniture manufacturers. In addition, they surveyed firms whose primary product is something other than wood household, office, or upholstered furniture, and took care to ensure that all classes of firm size were sampled in a representative manner .

Manufacturers of wood household furniture were the largest consumers of hardwood lumber in 1990, using 1.196 BBF; manufacturers of upholstered furniture followed closely, using 1.108 BBF. Wood household furniture manufacturers were also the major users of softwood lumber in 1990. Consumption by this sector was reported as 744 MMBF, representing 88.7% of total consumption; upholstered and wood office furniture followed with 64 MMBF (7.6%) and 31 MMBF (3.7%), respectively.

Meyer et al, 1992b, while not providing values for specific industry groups, did segment 1989 usage according to broad geographic regions (Table 5). Not surprisingly, the South is reported as the largest consumer of both hardwood and softwood lumber. What is notable is the variability of softwood use as a proportion of total lumber use among geographic regions; softwoods account for nearly 70% of the lumber use by western manufacturers as compared to a national average of less than 30%.

Table 5.   Material Use Estimates for the Furniture Industry by Region

	Northeast	South	Midwest	West
Hardwood (MMBF)	254.9	1747.0	207.0	130.4
Softwood (MMBF)	53.3	362.6	130.7	287.5

Source: Meyer et al, 1992b

The scientific names of all the species referred to in this thesis are listed in Appendix 1. According to Forbes, 1993, red oak was the most frequently used hardwood species (Table 6); just under 700 MMBF of this species was consumed by furniture manufacturers in 1990. This represented 30% of all hardwood lumber used by the industry and was projected to increase to 32% in 1992. White oak was the second most popular species, accounting for 16% of the total and poplar was third at 11%.

Table 6.   Hardwood Lumber Consumption by Species

Species	Percent of 1990 total	Percent of 1992 total
Red oak	30	32
White oak	16	18
Yellow-poplar	11	10
Soft maple	9	7
Black cherry	7	7
Hard maple	6	5
Ash	3	3
Other	18	16

Source: Forbes, 1993

Southern pine was by far the most frequently used softwood species (Table 7); furniture manufacturers used nearly 500 MMBF of this species, representing 58% of total softwood consumption, in 1990. Eastern white pine was second with 17% or 143 MMBF. No other species accounted for more than 3% of the total.

Table 7.   Percent of Total Softwood Lumber Consumption by Species

Species	Percent of 1990 total	Percent of 1992 total
Southern pine	58	51
Eastern white pine	17	21
Western pine	3	11
Radiata pine	<1	2
Other	12	12
Not reported by species	9	3

Source: Forbes, 1993

While these estimates provide a reasonably accurate picture of overall species usage levels, they are national in scope and are of limited value in analysis of a particular region. Since manufacturers are constrained to some degree by the cost of inbound transport, there is by necessity, a close fit between the firm's location and its species mix.

As an example, it is likely that the proportion of total softwood consumption that Southern pine represents in the west is far less than the 58%

that is reported nationally. Since much of the furniture industry is concentrated in the South, however, where this species is harvested, national estimates are heavily influenced by this region's supply patterns.

In addition the volume of alder used by manufacturers in the West is likely to be much higher than 1% of the total hardwood volume as is reported nationally. Again, this is due to the proximity of the resource and the resultant lower inbound transport costs for furniture manufacturers as well as the mills, wholesalers, brokers and component manufacturers who supply them.

It is notable that in among furniture manufacturers in 1990, the availability of raw materials was the third most frequently mentioned 'greatest concern', behind the economy and the availability of skilled labour (Vance Research Services 1990). It is likely that this concern will grow in importance in coming years. Although annual hardwood harvest levels in the U.S. remain far below the annual growth, economic and societal barriers limit availability and many mills find it difficult to get enough timber (Araman and Tansey 1991). Land-use conflicts also contribute to uncertainty surrounding softwood raw material availability. Timber output in the U.S. Pacific northwest has been predicted to fall an estimated 35% by the year 2000 (Anonymous 1991).

4.0   METHODOLOGY

4.1   Sample Frame

The classification system used by the Bureau of Census segments the furniture industry according to the principal raw material input. Historically, researchers analyzing wood use in the furniture industry have used as a sample frame, wood household furniture (SIC 2511), wood office furniture (SIC 2521),and upholstered furniture (SIC 2512).

The difficulty with restricting the analysis to these segments, however, is that if a firm's expenditure on wood is not its greatest single material expenditure, or if wood products are not its primary output, then it is not classified as a wood furniture manufacturer. Based on traditional techniques, such firms have no chance of being sampled.

A further complication is that in the material use tables compiled by the Bureau of Census, smaller furniture manufacturers are combined with manufacturers from other sectors in the not-specified-by-kind (nsk) category. Again, using traditional survey methods, these manufacturers are not represented. An unknown amount of wood is thus being consumed by small firms and by firms whose principal material input is something other than

wood.

In order to ensure that as many wood users as possible were given the opportunity to respond, it was decided to approach the survey as a census; that is, to contact all of the furniture plants in the state of California.

4.2   Data Collection

The market survey research method served as the basic research design. A mail survey was used as the data collection vehicle because it is the most efficient and cost-effective means of securing data from a dispersed population (Churchill 1987, 224-258). A mailing list of the entire population of furniture manufacturers in California was purchased from the firm Canadian Business Information (CBI) in Toronto; the list included 1051 individual furniture manufacturing firms. According to CBI the list had been updated in January of 1993 and was comprehensive at that time.

4.2.1 Instrument Design

An important objective in undertaking this analysis was to construct a foundation on which to build a market development strategy targeting the wood furniture industry in California. This objective, and the quantitative

description of the industry required to meet it, was the key factor in deciding on the survey variables.

The primary challenge in designing the survey instrument lay in finding a balance between the detail needed for analysis, and the brevity and simplicity needed to encourage response. Wherever possible, questions were limited to two or three lines of text and required fact rather than opinion type answers.

It was judged to be difficult in many cases for participants to provide precise answers, so the majority of the questions were designed in the fixed alternative form. This technique allows respondents to choose between a limited but all-inclusive number of categories . As well as making the questionnaire easier to complete, standardization of alternative responses to the questions allows more efficient comparison of answers which facilitates coding, tabulation and ultimately interpretation of the resultant data.

The questionnaire is provided in Appendix 2. The layout was in the form of a booklet measuring 21.6 centimeters by 14.0 centimeters. Included with each survey was a personally signed covering letter briefly describing the purpose of the research project and encouraging the subject to participate (Appendix 3).

4.2.2 Pretesting

The survey was pretested on Mr. Gary Stafford, the director of the Western Furniture Manufacturers Association. Mr. Stafford made only minor

suggestions with regard to the structure and content of the questionnaire; however, he stated that, based on his experience with other University and private market research projects, it would be difficult to convince furniture manufacturers in California to participate in such a study. He suggested that a response rate of no higher than four percent could be expected. After discussions with the research supervisor, Dr. Cohen, it was decided that sufficient means were being employed to ensure enough returns and that the study should proceed nevertheless.

4.2.3 Mailout Procedure

Forcing respondents to pay for the postage required to return the questionnaire can deter substantially reduce response rates (Zickmund 1989, 224-225). For this reason a business reply mail permit was purchased from the U.S. Postal Service. A bar code was provided which was photocopied along with the return address on the outside of the back page of the booklet. This allowed the subjects to simply staple the booklet together and mail it without cost.

Because the Business Reply Permit does not allow for mailing across international boundaries, a post office box was leased in Blaine, Washington. The first mailing was conducted on June 18, 1993. On August 12, after a period of two weeks during which no further responses were received, a second mailing was carried out. On September 30, responses were cut-off. At

that point, no responses had been received for two weeks.

5.0   RESULTS

5.1   Response Summary

The response to the survey is detailed in Figure 2. The initial mailing list

consisted of the names and addresses of 1057 furniture manufacturing plants

in California, the population of manufacturers in the state. After adjusting for

incomplete addresses, 1051 surveys were mailed. Of the 1051 mailouts, 860

were delivered to the addressee and 191 were returned as undeliverable.

The 191 surveys returned as undeliverable was a higher number than

had been anticipated. The stamps made by the postal service on the returned

envelopes showed the following breakdown of the reasons for non-delivery: 81

firms had moved and left a forwarding order which had expired; 90 firms were

not at the address provided and had left no forwarding address; 20 firms could

not be contacted because of an incorrect or insufficient address.

It is likely that most of the 90 firms that had not provided any forwarding

address were no longer in business. It is not possible to determine the

proportion of the 81 firms whose forwarding order had expired that were still in

business; some may have ceased operations altogether.   In either case, since

the mailing list had been updated four months prior to the first mailing, the high

number of surveys returned as undeliverable, and the associated high number

of shutdowns or movements, suggests a competitive and dynamic industry in

which many firms compete, perhaps often unsuccessfully, for market share.

1051
mailed

860 (81.8%)   191 (18.2%)
delivered   undeliverable

134 (15.6%)   726 (84.4%)
responded   did not respond

19 (14.2%) do not manufacture furniture

34 (25.3%) manufacture furniture without wood

81 (60.5%) manufacture furniture using wood
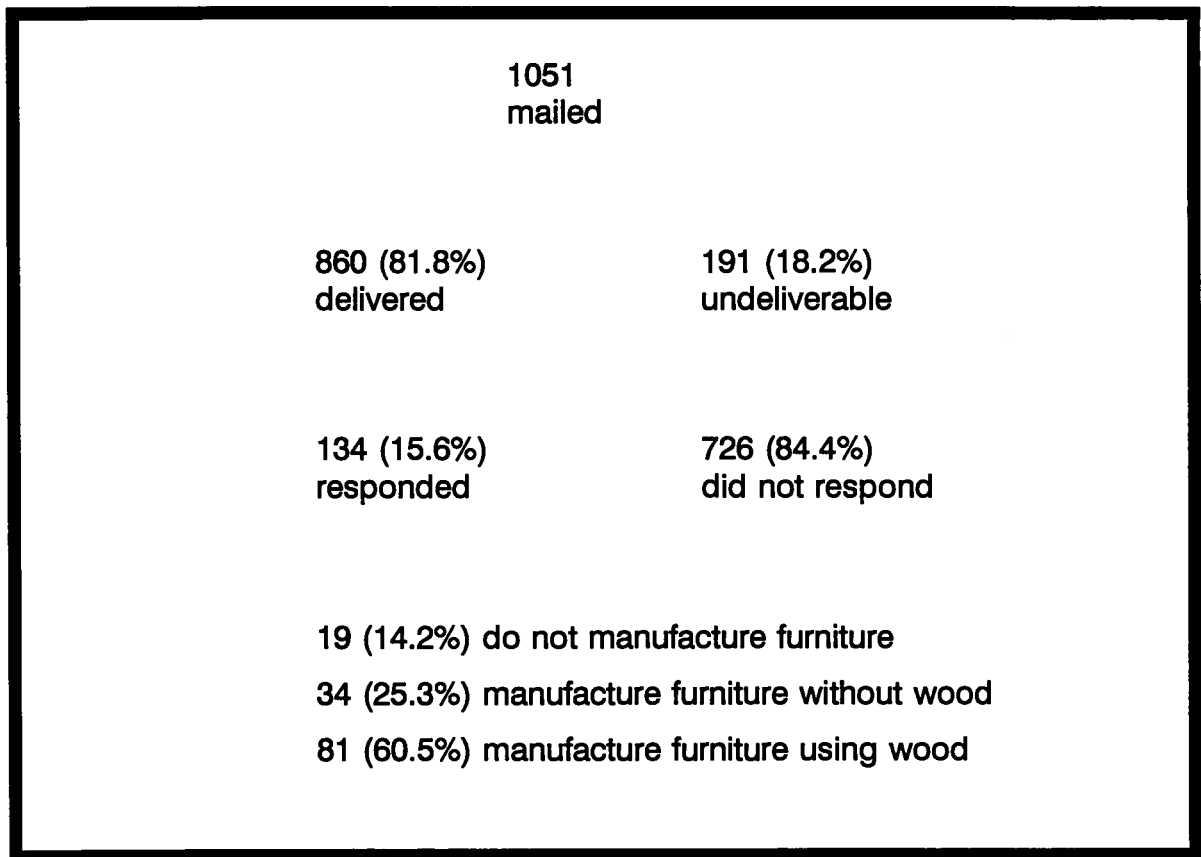
Figure 2.   Questionnaire Response Rate Summary.

Of the 860 firms contacted, 726 did not respond to either of two

mailings. Responses were received by 134 firms; 19 of the respondents

contract manufacturing to other firms and 34 manufacture furniture without

wood. The remaining 81 firms use wood to manufacture furniture.

5.2 Survey Error

The two major sources of survey error are sampling error and systematic error. Random sampling error occurs because of chance variation in the elements of the population that are selected to be sampled; as sample size increases, random sampling error decreases. Since a census of the producers was conducted rather than a sampling procedure, the degree of random sampling error is related to the response rate to the survey.

Systematic, or non-sampling error is a result of some aspect of the research design that causes respondent error, or from a mistake in the execution of the research. The latter type of error is avoided through care in data collection and compilation; the former, respondent error, is more difficult to avoid and is comprised of response bias and non-response bias.

5.2.1 Response Bias

A response bias occurs when respondents tend to answer questions in a way that either inadvertently or intentionally misrepresents the truth. Inadvertent misrepresentation typically results from poorly worded or ambiguous questions or from difficult questions that require the respondent to research the answer. The latter type of question can also lead to deliberate misrepresentation.

The task of minimizing misrepresentation in this survey was related to

the steps taken to encourage response. Questions were kept brief and were designed to be as easy to understand and answer as possible. Wherever possible, respondents were given a choice between categories and the number of categories was limited to five or six. Since respondents to this survey were not asked to identify themselves, it is not likely that they would see any reason to intentionally misrepresent the truth.

5.2.2 Non-response Bias

The major limitations of mail surveys relate to low response rates (Zickmund 1989, 225). To utilize the data resulting from a survey with a low response rate, that is to draw inferences about the industry as a whole, it is necessary to determine if those who responded to the questionnaire are representative of those who did not.

The mailing list included employee size data for 707 firms, representing 67.2% of the population, as well as sales volume size data for 690 firms representing 65.7% of the population. The data were not obtained directly from the firms, but through the California Department of Commerce. It is not surprising then that the data were available for a similar proportion of the 134 respondents, 67.9%, or 91 firms for employee size and 62.7%, or 84 firms for sales volume size. This information allowed convenient comparison between the population and the respondents.

A chi-square contingency table test was used to determine if the

employee size distribution of the non-respondents was the same as that of the respondents. A similar test was carried out using the sales volume size data. As is detailed in Appendix 4, the tests indicated no significant difference.

In the absence of data describing the population, error associated with non-response can be studied based on the assumption that late responders closely resemble non-responders (Fowler 1984, 48-49). A comparison between early and late respondents would thus give results similar to a test comparing respondents and non-respondents. The data for the study were collected using two mailouts, spaced six weeks apart, allowing comparison between those who responded to the first mailout, early respondents, and those who responded to the second, late respondents.

Independent sample t-tests, at the 0.05 level of significance were used to compare the means of firm ages, as well as the means of proportion of total wood consumption represented by hardwood species, of early and late respondents (Appendix 4). For each, the null hypothesis that the means are the same could not be rejected.

The decision to designate all furniture manufacturers as the sample frame makes it very important to ensure that the sample is not skewed toward those who use or do not use wood. To deal with this situation, the proportion of wood-users among early respondents was compared to the proportion among late respondents. Using a z- test for differences in proportions, the null hypothesis that the proportions are equal could not be rejected at the 0.05

level of significance (Appendix 4).

Although some degree of non-response bias is almost certainly present, on the basis of these tests it is believed that those who returned the questionnaire are largely representative of those who did not, and that information gathered in the survey can be used to infer to the population of furniture manufacturers in California.

5.3   Respondent Profile

5.3.1 Firm Structure

The data compiled from the responses to all questions are provided in Appendix 5. The fragmented nature of the furniture industry in California is evidenced by the fact that of the 77 firms reporting on their structure, 69 are single plant companies. Of the eight firms that operate more than one plant, six reported having additional manufacturing locations in states other than California, and one reported a plant outside North America.

5.3.2 Geographic Concentration

The furniture industry in California is heavily concentrated in the Los Angeles area; analysis of the locations of the 1,051 furniture plants on the mailing list revealed that more than 80% are located within 80 kilometres of the Los Angeles core. A further 15% of plants are located in the area around San

Francisco, Oakland and south to San Jose, and the remaining five percent or so are spread between smaller cities such as Sacramento and Bakersfield with only a few firms located in other towns throughout the state.

Of the 134 firms that responded to the survey, 21 did so anonymously, or under a name not on the original mailing list; the location of these firms is thus unknown. The remaining 113 firms show a pattern of geographic concentration that is similar to that of the population. Seventy-two percent are located within 150 kilometres of Los Angeles, 23% are within 150 kilometres of San Francisco, and the remaining five percent are in smaller centres.

Among those respondents who identified themselves as wood users, just under 70% are located within 150 kilometres of Los Angeles, 24% are within 150 kilometres of San Francisco, and six percent are located in other areas.

5.3.3 Firm Size

A summary of firm size as measured by number of employees is provided in Table 8. As expected, smaller companies dominate; nearly 25% of respondents employ five or fewer people and 58% employ 20 or less. These results emphasize the fragmented nature of the furniture industry and the degree to which it is dominated by small, owner-operated firms.

Table 8. Distribution of Respondents by Firm Size

Number of Employees	Respondents
1 - 5	20 (24.7%)
6 - 20	27 (33.3%)
21 - 50	20 (24.7%)
51 - 100	8 (9.9%)
> 100	6 (7.4%)
Total	81 (100%)

5.3.4 Firm Age

Respondents were asked to indicate the year in which their company began operations; the results are provided in Table 9. Of interest is the fact that more than 40% of respondents have been operating for ten years or less, and only 27.5% have been in business for more than 30 years.

As expected, a positive relationship was found between firm size as measured by number of employees, and the length of time the firm had been operating. The average number of years in business for the 20 firms with between one and five employees is 11 years; among the 27 firms with between six and 20 employees, the average is 14 years and among firms with 21 to 50 employees, average firm age is 22 years. The trend continues with the eight firms employing between 51 and 100 people having an average age of 29 years.

Table 9.   Respondent's Year of Start of Operations

Year of Start of Operations	Number of Firms
1922 or before	2 (2.5%)
1922 - 1932	0 (0%)
1933 - 1942	1 (1.2%)
1943 - 1952	8 (9.9)
1953 - 1962	3 (3.7%)
1963 - 1972	8 (9.9%)
1973 - 1982	26 (32.1%)
1983 - 1992	33 (40.7%)
Total	81 (100%)

5.4   Products and Styles Manufactured

5.4.1 Product categories

Respondents were asked to describe the categories of furniture they manufactured in 1992, along with the percent of production represented by each category. The results are provided in Table 10.

Overall, 49.3% of respondents produced living room furniture, 48.1% produced upholstered furniture, 38.3% produced dining room furniture and 34.5% produced bedroom furniture. A more useful measure of the importance of a particular category of furniture is the percent of production that category represents. On average, upholstered furniture represented 29.1% of respondent's production, living room furniture, 18.7%, dining room furniture,

12.6%, and office furniture, 12.3%.

Table 10: Product Groups Produced by Respondents.

Product Group	Number of Firms Producing	Percent of Total Production Value
living room/occasional	40 (49.3%)	18.7
dining room	31 (38.3%)	12.6
bedroom	28 (34.5%)	9.4
children's	7 (8.6%)	2.6
upholstered	39 (48.1%)	29.1
office	24 (29.6%)	12.3
institution	8 (9.9%)	2.0
wall units/shelves	18 (22.2%)	6.2
ready-to-assemble	3 (3.7%)	0.8
other	15 (18.5%)	6.5

Meyer et al, 1992a, reported that, among U.S. furniture manufacturers, as firm size increased, the number of furniture categories produced per firm decreased; this was also found to be the case among manufacturers in California. The average number of product groups produced by firms with between one and five employees was 3.0; firms with between six and twenty employees produced an average of 2.88 product groups; firms with between 21 and 50 employees produced an average of 2.3 groups and firms with between 51 and 100 employees produced an average of 1.1 product groups. The trend is reversed among the largest of respondents; firms with more than

44

100 employees produced an average of 2.8 product groups.

5.4.2 Style categories

Respondents were asked to indicate the style or styles of furniture they
produced in 1992, along with the percent of production represented by each.
The results are provided in Table 11. The most frequently produced styles
were contemporary and American; together, these style groups represented
85% of respondent's furniture production. No relationship was found between
the size of the firm and the number of style categories produced, or between
the number of product categories and the number of style categories
produced.

Table 11. Style Groups Produced by Respondents.

Style group	Number of Firms	Percent of Total Production Value
American	31 (38.3%)	38.3
Contemporary	38 (46.9%)	47.0
Formal European	8 (9.9%)	3.7
European Country	3 (3.7%)	10.0
Other	1 (1.2%)	1.1

5.5 Raw-material Use

5.5.1 Expenditures on Solid Wood

Respondents were asked to estimate their 1992 expenditures on solid wood raw materials including lumber, semi-finished and fully machined components, and excluding veneers and wood composites; the results are shown in Table 12.

Companies who spent less than $50,000 on solid wood in 1992 represent 47.5% of respondents. Companies who spent between $50,000 and $100,000 made up 12.5% of the sample; between $100,000 and $200,000, 16.3%; and between $200,000 and $500,000, about five percent. Somewhat surprisingly, companies who spent more than $500,000 on solid wood represent 20% of the sample.

Table 12.   Respondent's Expenditures on Solid Wood Raw Materials

Expenditures on solid wood	Number of respondents
less than $50,000	38 (47.5%)
$50,001 - $100,000	10 (12.5%)
$100,001 - $200,000	13 (16.3%)
$200,001 - $300,000	2 (2.5%)
$300,001 - $500,000	1 (1.3%)
more than $500,000	16 (20.0%)
Total	80 (100%)

As expected, a positive relationship was observed between firm size, as measured by number of employees, and expenditures on solid wood. Among firms with between one and five employees, 85% report expenditures of less than $50,000. Fifty-two percent of firms with between six and twenty employees spent less than $50,000 on solid wood and only one firm spent more than $200,000. Half of the firms with between 50 and 100 employees and all of the firms with more than 100 employees report expenditures of more than $500,000 on solid wood in 1992.

Respondents were asked to indicate whether they expected the volume of solid wood that they purchased to increase, stay the same, or decrease between 1992 and 1995. Just 3.7% expect to be using less wood in 1995, 46.9% expect no change, and 49.4% expect their volume purchases of solid wood to increase. A summary of respondents percentage of total expenditures represented by solid wood is provided in Table 13.

Table 13.   Percent of Respondent's Expenditures to Solid Wood

Percent of expenditures going to solid wood	Number of respondents
1 - 20	33 (40.7%)
21 - 40	17 (21.0%)
41 - 60	9 (11.1%)
61 - 80	11 (13.6%)
81 - 100	11 (13.6%)
total	81 (100%)

5.5.2 Expenditures on Wood Composites

Until the 1960's, the furniture industry in the U.S. relied almost exclusively on solid lumber as a source of woodraw materials. Few, if any other types of materials were used in the fabrication of furniture (Dufrense, McLagan, Daignault Inc. 1970). As lumber became a scarcer resource, technology was developed which allowed the industry to make more efficient use of lumber. Typical of these developments are the veneers and particleboards now widely used in furniture manufacturing.

No attempt was made here to analyze firms using wood as composites only; however, wood composite use among firms using solid wood was investigated. As is shown in Table 14, the majority of respondents spent less than $25,000 on wood composites in 1992.

Table 14   Respondent's Expenditures on Wood Composite Raw Materials

	Hardboard	Particleboard	Veneer	LVL
$0	45 (55.6%)	57 (70.37%)	49 (60.49%)	76 (93.8%)
$0 - $25,000	19 (23.5%)	11 (13.6%)	11 (13.6%	2 (2.5%)
$25,000 - $50,000	7 (8.6%)	10 (12.4%)	10 (12.4%)	2 (2.5%)
$50,000 - $100,000	3 (3.7%)	0 (0.0%)	3 (3.7%)	1 (1.2%)
$100,000 - $200,000	4 (4.9%)	1 (1.2%)	1 (1.2%)	0 (0.0%)
more than $200,000	3 (3.7%)	2 (2.5%)	7 (8.6%)	0 (0.0%)
total	81 (100%)	81 (100%)	81 (100%)	81 (100%)

5.5.3 Lumber and Component Use

A major trend in the U.S. furniture industry over the last twenty years has been the move toward the use of wood components, as opposed to lumber, precluding the need to maintain a large lumber inventory and to operate a wide range of processing equipment. Wood and Wood Products, in a national survey of furniture and fixture manufacturers reported that an average of 14.7% of the components used to manufacture furniture production were purchased from component manufacturers in 1990 (Vance Research Services 1990).

As noted, the furniture industry in California is heavily concentrated in the area around Los Angeles, an area notably deficient in supplies of wood, and so, understandably, deficient in manufacturers of primary wood products. In addition, land and labour costs are characteristically high, and waste disposal problematic. For these reasons, it was anticipated that the tendency to job-out production among California furniture manufacturers would be higher than the national average. Indeed, this was found to be the case.

As is shown in Table 15, 65.6% of respondents expenditures on solid wood materials in 1992 went to lumber, and the remaining 34.4% was spread between semi-finished components, fully-machined components and sub-assemblies. Very few respondents indicated that they expected the distribution of their expenditures on wood to change appreciably by 1995.

Table 15.   Respondent's Wood Material Expenditures by Product
           Type

Product Type	1992 (actual)	1995 (anticipated)
Lumber	65.6%	64.3%
Semi-finished components	11.7%	11.5%
Fully-machined components	12.4%	13.2%
Sub-assemblies	10.3%	11.0%
	100%	100%

Of interest is whether or not the size of the firm has any influence on the amount of outside processing it does. Intuitively, one might expect that small firms are more likely to purchase components than large firms since specialization as an assembler, for example, would dictate a narrower range of processing equipment, thus require lower capital expenditures. Surprisingly however, this was not observed to be the case among respondents.

The highest proportion of solid wood expenditures going to lumber, as opposed to components, was observed among the smallest firms, those with between one and five employees; among this group, lumber accounted for 81.4% of expenditures. Among firms employing between six and twenty people, lumber accounted for 61.4% of expenditures and among firms employing between 21 and 50 people, an average of 68.2% of wood material expenditures went to lumber. The largest firms surveyed, those with more than 50 employees, showed the lowest level of lumber use at 55.2%.

5.5.4 Species Use

Respondents were asked to indicate the proportion of total solid wood purchases in 1992 represented by hardwoods and by softwoods. On average, hardwoods accounted for 78.5%, and softwoods for 21.5%, of total purchases. Nationally, Forbes et al, 1993, reported the distribution to be 75% hardwoods and 25% softwoods.

5.5.4.1   Hardwood Use by Species

As noted, Forbes et al, 1993, report that oak is the most frequently used species among furniture manufacturers nationally, accounting for 46 % of total hardwood lumber consumption. As is shown in Table 16, oak is less popular among California manufacturers, representing, on average, 27.9% of hardwood consumption. Of interest is the volume of alder being consumed by furniture manufacturers in California. Alder is the most frequently used species by a wide margin, representing 40.6% of hardwood consumption, compared to a national level of less than three percent. Clearly, the plentiful supply of this species in the Pacific Northwest makes it the wood of choice among furniture manufacturers in California.

Table 16.   Respondents Hardwood Species Use.

Species	Number of respondents reporting use	Average percent of hardwood consumption
Oak	44	27.9
Cherry	13	3.1
Poplar	8	2.6
Maple	26	8.9
Birch	11	4.9
Walnut	17	2.8
Ash	10	3.6
Alder	45	40.6
Mahogany	11	0.9
Other	7	4.9

5.5.4.2   Softwood Use by Species

A similar discrepancy between species use nationally and in California exist for softwoods. Southern yellow pine was by far the most frequently used species nationally, accounting for more than 58% of total consumption (Table 6). However, in California, as is shown in Table 17, this species averaged less than three percent of consumption. Conversely, the use of Ponderosa pine was so low as not to be reported nationally; but in California, this species accounted for nearly 50% of softwood consumed.

Table 17. Respondents Softwood Species Use.

Species	Number of respondents reporting use	Average percent of softwood consumption
Ponderosa pine	21	48.9
Yellow pine	1	2.9
Sugar pine	11	13.9
Lodgepole pine	3	3.5
Douglas fir	8	16.7
Redwood	2	5.4
Spruce	0	0
Hemlock	0	0
Western red cedar	3	3.0
Other	3	5.7

None of the respondents reported using any hemlock or spruce, and only three respondents reported using lodgepole pine. Douglas fir was used by eight respondents, representing just under 17% of total softwood consumption.

5.6 Supply characteristics

5.6.1 Sources of Supply

Respondents were asked to indicate the proportion of solid wood raw materials they obtained from wholesalers, brokers, mills and component manufacturers. As is shown in Table 18, the greatest proportions of lumber

and semi-finished components were obtained through wholesalers, while fully-machined components and sub-assemblies tended to come directly from component manufacturers.

Table 18.   Respondent's Wood Material Supply Sources.

| Product Type | Percent of material from: | | | |
	Wholesaler	Mill	Broker	Comp. Mfr.
lumber	75.6	17.7	6.5	0.0
semi-finished components	46.6	10.9	13.6	28.9
fully-machined components	33.0	7.6	1.7	57.6
sub-assemblies	23.1	0.0	0.0	76.9

5.6.2 Number of Suppliers

Respondents were asked to indicate the number of suppliers they used for each raw material category. As is shown in Table 19, the majority of respondents deal with between two and four suppliers, regardless of the product type being considered. Respondents were asked to indicate whether they preferred to keep the number of suppliers they deal with to a minimum; 22.3% said yes and 77.6% said no. Comments are provided in Appendix 6. Respondents were also asked whether or not they prefer to establish long-term contracts with their suppliers; 55.4% said yes and 44.6% said no. Comments

54

are provided in Appendix 7.

Table 19.   Number of Suppliers, by Product Group, Used by
            Respondents

	Respondents Reporting for Each Product Group			
Number of suppliers	Lumber	Semi-finished components	Fully-mach. components	Sub-assemblies
1	12 (19.0%)	6 (27.2%)	4 (17.4%)	5 (33.3%)
2 - 4	42 (66.7%)	14 (58.3%)	17 (73.9%)	8 (53.3%)
5 - 7	7 (11.1%)	4 (16.7%)	2 (8.7%)	1 (6.7%)
8 or more	2 (3.2%)	0 (0.0%)	0 (0.0%)	1 (6.7%)
	63 (100%)	24 (100%)	23 (100%)	15 (100%)

5.6.3 Inbound Transport

Respondents were asked to indicate the mode of transport by which
they received their raw materials; for all product categories, trucking is
overwhelmingly the preferred method. Only five respondents indicated they
received goods by rail and none indicated any other mode. Given the strong
reliance on local wholesalers as a source of supply, this result is not surprising.
It is likely that many of the wholesalers, who purchase larger volumes and
carry larger inventories use rail to receive goods.

SUMMARY AND CONCLUSIONS

The wood furniture industry in California is fragmented, with the majority of firms operating as single plant entities. Although there are some large scale operations, close to 25% of manufacturers in the state employ fewer than six people and only 42% employ more than 20.

More than 40% of furniture manufacturers in California have been operating for less than 11 years, and more than 70% for less than 21 years. Although a large proportion of new entrants is often an indicator of a rapid rate of industrial growth, this is not likely the case in the furniture industry in California. The number of undeliverable mailouts suggests that many firms are also leaving the industry.

Manufacturers tend to expand business activities over time, as evidenced by the fact that older firms were shown to employ more people. It is likely that the small furniture manufacturer in California operates in an environment of intense competition and that survival is particularly tenuous during the firm's early years.

The industry is heavily concentrated in the Los Angeles area; more than 70% of firms are located within 80 kilometres of the city core. San Francisco is also an important furniture manufacturing centre with nearly 25% of firms

located within 150 kilometres of the city core. Since virtually all solid wood materials must be brought in from outside the state, the priorities in deciding on a location are likely proximity to transportation and distribution centres as well as to markets for finished products.

The furniture industry in California is a large, though fragmented, market for solid wood. Although the majority of firms spent less than $100,000 on wood, a sizable minority, 20%, spent more than $500,000. Even the relatively small firms, by virtue of their number, represent a significant market opportunity. Half of the manufacturers expected volume purchases of wood to be higher in 1995 than they were in 1992.

Regional wood supply characteristics as well as land and labour costs suggested that the tendency to job-out' production would be higher among California furniture manufacturers than the 14.7% reported nationaly (Vance Research Services 1990). This was found to be the case with components and sub-assemblies accounting for nearly one-third, on average, of the firms expenditures on solid wood. Few firms expect this distribution of solid wood purchases to change significantly.

The choice of species for solid wood used to manufacture furniture is driven, to a large degree, by consumer demand; however, regional availability and inbound transport costs also play a large part. It is not surprising then, that oak, accounting for 46% of hardwood used nationally, is less popular among California manufacturers, representing, on average, 27.9% of hardwood

consumption.

Of interest is the volume of alder being consumed by furniture manufacturers in California. Alder is the most frequently used species in California, representing 40.6% of hardwood consumption, compared to a national level of less than three percent. Clearly, the plentiful supply of this species in the Pacific Northwest makes it the wood of choice among furniture manufacturers in California.

Furniture manufacturers in California, like those elsewhere in the U.S., tend to prefer hardwood species; hardwoods represented more than 75% of solid wood purchases in 1992. Among softwoods, ponderosa pine was found to be the most popular softwood species, accounting for nearly half of total expenditures on softwoods.

Wholesalers and brokers play a critical role in supplying solid wood raw materials to furniture manufacturers in California. These manufacturing middlemen contribute considerably to the large number of small firms that make up the furniture industry in California. Because they perform such highly specialized functions, they allow small firms to exist competitively with larger ones.

In 1992, more than 75% of lumber and nearly 50% of semi-finished components used by manufacturers in California were supplied by wholesalers. Purchases of finished components and sub assemblies were more likely to be direct from manufacturers. These results are not surprising since furniture

manufacturers purchasing materials which require only finishing and assembly are likely to place smaller, custom type orders. This necessitates direct contact with the manufacturer so that specific requirements can be detailed. Conversely, purchases of lumber, a relatively standardized product whether rough or dressed, can be more conveniently made through a mass distributor such as a wholesaler.

Furniture manufacturers in California deal with few suppliers; the majority use fewer than five and very few use more than seven. Overwhelmingly, trucking is the preferred mode of inbound transport. Given the strong reliance on local wholesalers as a source of supply, this result is not surprising. It is likely that many of the wholesalers, who purchase larger volumes and carry larger inventories use rail to receive goods.

The wood furniture industry is an attractive market due, in part, to the relative stability of demand for its finished products. While not on a scale with residential construction as a market for solid wood products, the furniture manufacturing sector is less vulnerable to general economic cycles. During economic downturns, consumers are less likely to delay purchases of furniture since the expenditure is small relative to housing. In addition, although the industry is a mature one, its finished products are not likely to be substituted for or to become obsolete.

According to Ackerman (1987), future levels of wood material use by the furniture industry in the U.S. will depend primarily on the proportion of North

American demand for wood furniture met by furniture imported from other countries. It is therefore significant that furniture imports into the U.S. fell from $4.028 billion in 1988 to $2.854 billion and $2.713 billion respectively in 1990 and 1991.

The furniture industry in California offers B.C. solid wood producers potential opportunities for increased profit margins through further processing of the resource to meet customers specific requirements. However, developing these opportunities will require a great deal of effort due to the large number of small producers and their preference for purchasing raw materials through wholesalers.

It is clear that any attempt to exploit market opportunities in the California wood furniture industry must involve solid wood wholesalers in the Los Angeles area. It is suggested that any follow-up to this preliminary market investigation focus on the raw material supply strategies of solid wood wholesalers in California.

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APPENDIX 1: LIST OF SPECIES DISCUSSED

Name Used in Surveys	Common Tree Names	Botanical Names
Red oak	Red oak	Quercus rubra
	Pin oak	Quercus palustris
	Black oak	Quercus velutina
	Willow oak	Quercus phellos
White oak	White oak	Quercus alba
	Blue oak	Quercus douglassi
	Bur oak	Quercus macrocarpa
Poplar	Yellow-poplar	Liriodendron tulipifera
Soft maple	Red maple	Acer rubrum
	Silver maple	Acer saccharinum
Hard maple	Black maple	Acer nigrum .
	Sugar maple	Acer saccharum
Ash	Black ash	Fraxinus nigra
	White ash	Fraxinus americana
Beech	Beech	Fagus grandifolia
Cherry	Black cherry	Prunus serotina
Birch	Gray birch	Betula populifolia
	Paper Birch	Betula papyrifera
	River birch	Betula nigra
	Yellow birch	Betula alleghaniensis
Walnut	Black walnut	Juglans nigra
Alder, red	Red alder	Alnus rubra
Mahogany	True mahogany	Swietenia macrophylla

Name Used in Surveys	Common Tree Names	Botanical Names
Southern yellow pine	Longleaf pine Shortleaf pine Loblolly pine Slash pine Pitch pine	Pinus Palustris Pinus echinata Pinus taeda Pinus elliottii Pinus rigida
Ponderosa pine	Ponderosa pine/ Yellow pine	Pinus ponderosa
White pine	Eastern white pine Northern white pine	Pinus strobus
Western white pine	Western white pine Idaho white pine	Pinus monticola
Radiata pine	Radiata pine	Pinus radiata
Sugar pine	Sugar pine	Pinus lambertiana
Lodgepole pine	Lodgepole pine	Pinus contorta
Douglas fir	Douglas fir	Pseudotsuga menziesii
Spruce	White spruce Red spruce Black spruce Engleman spruce Blue spruce Sitka spruce	Picea glauca Picea rubens Picea mariana Picea engelmannii Picea pungens Picea sitchensis
Hemlock	Western hemlock Eastern hemlock Mountain hemlock	Tsuga heterophylla Tsuga canadensis Tsuga mertensiana
Redwood	Redwood	Sequoia sempervirens
Western red cedar	Western redcedar	Thuja plicata

APPENDIX 2: SURVEY QUESTIONNAIRE

INDUSTRIAL MARKET SURVEY

OF

CALIFORNIA FURNITURE MANUFACTURERS

Forest Products Marketing Program

Department of Wood Science

Faculty of Forestry

UNIVERSITY OF BRITISH COLUMBIA

The first group of questions asks for some general information about your firm

1.   Company Name: _____

2.   In what year did your firm start producing furniture?   _____

3.   How many furniture manufacturing plants does your firm operate in California?

     1 ☐   2-4 ☐   5 or more ☐

     How many in North America?   How many outside North America?

     _____   _____

Answer the remaining questions only for your furniture operations in California.

4.   How many people does your firm employ?

     1-5 ☐   6-20 ☐   21-50 ☐   51-100 ☐   more than 100 ☐

5.   Does your firm use any solid wood, either lumber or components, as a raw material to manufacture furniture? (Hardboard, particleboard, veneers and laminated veneer lumber (LVL) are not considered to be solid wood).

     No ☐   Yes ☐

     The questionnaire is complete!   Please continue.
     Simply staple and drop in the mail,
     or you can fax it back to us.
     Thank you for your participation.   ➡

71

1. Estimate the percentage of your 1992 gross sales value for furniture manufactured with solid wood represented by each of the following product grouping. Also, indicate the price category for each grouping (5 = high price, 1 = low price).

Product Grouping	% of Sales Value	Price Category				
		(low)				(high)
living room/occasional	_____%	1	2	3	4	5
dining room	_____%	1	2	3	4	5
bedroom	_____%	1	2	3	4	5
children's	_____%	1	2	3	4	5
upholstered						
sofas/chairs	_____%	1	2	3	4	5
bedding	_____%	1	2	3	4	5
office	_____%	1	2	3	4	5
institution	_____%	1	2	3	4	5
wall units/shelves	_____%	1	2	3	4	5
RTA	_____%	1	2	3	4	5
Other _____	_____%	1	2	3	4	5
_____	_____%	1	2	3	4	5

total = 100%

2. Estimate the approximate percentage of your 1992 gross sales value for wood furniture represented by the following product style families.

American: _____%
(Early, Country, Traditional, Shaker, Mission/arts & crafts)

Contemporary: _____%
(Soft, Casual, Architectural, European modern, Art Deco)

European Country: _____%
(French, English, Victorian/nostalgia, Mediterranean)

Formal European: _____%
(French, Neoclassic, English/French traditional, Italian)

Oriental: _____%
(Chinese, Japanese)

total = 100%

The third group of questions asks for information about the solid wood your firm uses as raw material input.

1. Estimate your yearly expenditure on all <u>solid wood</u> raw materials, either lumber or components, but not including hardboard, particleboard, veneers, or LVL.

    $50,000 or less   ☐ $50,001 - $100,000   ☐

    $100,001 - $200,000   ☐ $200,001 - $300,000   ☐

    $300,001 - $500,000   ☐   more than $500,000   ☐

2. Do you expect your yearly volume purchases of <u>solid wood</u> raw materials to increase, decrease, or stay about the same between 1992 and 1995?

    increase ☐   decrease ☐   about the same ☐

    If you indicated a change, please explain why. _____

    _____

    _____

    _____

3. Estimate your yearly expenditure on <u>hardboard, particleboard, veneers</u> and <u>LVL</u>.

	hardboard	particleboard	veneers	LVL
$25,000 or less	☐	☐	☐	☐
$25,001 - $50,000	☐	☐	☐	☐
$50,001 - $100,000	☐	☐	☐	☐
$100,001 - $200,000	☐	☐	☐	☐
more than $200,000	☐	☐	☐	☐

4. Do you expect your yearly volume purchases of hardboard, particleboard, veneers and LVL to increase, decrease, or stay about the same between 1992 and 1995?

increase ☐   decrease ☐   about the same ☐

If you indicated a change, please explain why._____

_____

_____

_____

5. What percentage of your firm's total expenditure on <u>all</u> raw materials used to manufacture furniture in 1992 went to solid wood products?

1-20% ☐   21-40% ☐   41-60% ☐   61-80% ☐   81-100% ☐

6. a) Indicate the proportion of your total volume of <u>hardwood</u> raw material use represented by the following species in 1992.

Oak	_____%
Cherry	_____%
Poplar	_____%
Maple	_____%
Birch	_____%
Walnut	_____%
Ash	_____%
Alder	_____%
Mahogany	_____%
Other	_____%

total = 100%

b) Indicate the proportion of your total volume of <u>softwood</u> raw material use represented by the following species in 1992.

Ponderosa pine	_____%
Yellow pine	_____%
Sugar pine	_____%
Lodgepole pine	_____%
Douglas fir	_____%
Redwood	_____%
Spruce	_____%
Hemlock	_____%
Western cedar	_____%
Other	_____%

total = 100%

7. Of your total solid wood raw material use in 1992, what was the distribution between hardwood and softwood?

hardwood _____%   softwood _____%   *total = 100%*

Use the following definitions where applicable in subsequent questions.

lumber: dressed or rough, includes beams, boards, planks, and turning squares which have received no contouring.

semi-finished components: includes precut and dimensioned length stock; may have some contouring or drilling, but will require further shaping or finishing.

fully machined components: individual pieces, ready for assembly, may require light sanding.

sub-assemblies: components assembled to some degree by supplier; examples are bed and chair frames.

8. What percentage of your expenditures on solid wood raw materials in 1992 was represented by each of the following categories? What do you expect it to be in 1995?

	1992 (actual)	1995 (anticipated)
lumber	_____%	_____%
semi-finished components	_____%	_____%
fully machined components	_____%	_____%
sub-assemblies	_____%	_____%
	total = 100%	*total = 100%*

If you expect your expenditures in any category to change by more than 20% by 1995, please explain why._____

_____

_____

9. What were your most frequently purchased solid wood raw materials in 1992 in each of the following categories? Include size and tolerance if applicable.

Lumber

product/grade	species	size and tolerance
1) _____	_____	_____
2) _____	_____	_____
3) _____	_____	_____

Semi-finished Components

product/grade	species	size and tolerance
1) _____	_____	_____
2) _____	_____	_____
3) _____	_____	_____

Fully Machined Components

product	species	size and tolerance
1) _____	_____	_____
2) _____	_____	_____
3) _____	_____	_____

Sub-assemblies

product	species	size and tolerance
1) _____	_____	_____
2) _____	_____	_____
3) _____	_____	_____

The final group of questions asks for information about your firm's logistical control of its solid wood raw material supply.

1. How many suppliers did you use in 1992 for solid wood raw materials purchased as:

lumber	1 ☐	2-4 ☐	5-7 ☐	8 or more ☐
semi-finished components	1 ☐	2-4 ☐	5-7 ☐	8 or more ☐
fully machined components	1 ☐	2-4 ☐	5-7 ☐	8 or more ☐
sub-assemblies	1 ☐	2-4 ☐	5-7 ☐	8 or more ☐

2. Estimate the proportion of volume of solid wood raw material in each category that you purchase from the following sources.

	Wholesaler	Broker	Mill	Component Manufacturer	
lumber	____% +	____% +	____% +	____%	= 100%
semi-finished components	____%	____%	____%	____%	= 100%
fully machined components	____%	____%	____%	____%	= 100%
sub-assemblies	____%	____%	____%	____%	= 100%

If you would like to increase or decrease your supply from any of the above sources, please explain.

_____

_____

_____

_____

3. For each raw material category, estimate the proportion of volume that arrived at your plant in 1992 by the following modes of transport.

	Truck	Rail	Other_____	
lumber	____% +	____% +	____%	total = 100%
semi-finished components	____%	____%	____%	total = 100%
fully machined components	____%	____%	____%	total = 100%
sub-assemblies	____%	____%	____%	total = 100%

If you would like to increase or decrease the use of any of these systems of transport, please explain.

_____

_____

_____

_____

4. Do you prefer to establish long term contracts with your solid wood raw material suppliers?

Yes ☐   No ☐

If yes, please explain.

_____

_____

_____

_____

5.   Do you prefer to deal with a minimum number of suppliers?

Yes ☐   No ☐

If yes, please explain.

_____

_____

_____

6.   Describe any specific packaging requirements you have for incoming solid wood raw materials in each category.

lumber   _____

_____

_____

semi-finished components   _____

_____

_____

fully machined components   _____

_____

_____

sub-assemblies   _____

_____

_____

The questionnaire is complete; your participation is greatly appreciated. You can remove the staples and return it to us by fax at (604) 822-9104 or staple it closed and drop it in the mail; the postage has been prepaid!
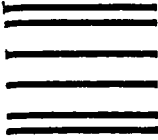
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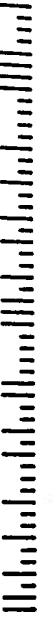
APPENDIX 3: COVERING LETTERS

THE UNIVERSITY OF BRITISH COLUMBIA

June 11,1993

Department of Wood Science
Faculty of Forestry
#389 - 2357 Main Mall
Vancouver, B.C. Canada V6T 1Z4

Tel: (604) 822-5303
Fax:(604) 822-9104

Dear Furniture Manufacturer:

I am a graduate student in Forest Products Marketing at the University of British Columbia in Vancouver, Canada. Along with my research supervisor, Dr. David Cohen, I am presently working on a research project focusing on the furniture manufacturing industry in California. This survey questionnaire is intended to collect information about the raw material supply strategies of furniture manufacturers such as GEORGE'S AUTO UPHOLSTERY.

Although a number of studies have been conducted which characterize the U.S. furniture industry as a whole, much of the focus has been on the U.S. Southeast. Given the increasing importance of the industry in California, we believe that it is important that your unique priorities and problems be recognized and addressed. By participating in this survey, you will enable suppliers to better meet your raw material supply needs.

The questionnaire is designed for quick and easy completion; we expect it will take less than fifteen minutes of your time.

The information collected in the survey will be summarized in a report. All answers will be kept strictly confidential; individual firms will not be identified and any information published will use aggregate data only.

If you should have any questions or comments you can contact us by telephone at (604) 822-6716 or by fax at (604) 822-9104. When you have completed the questionnaire you can return it by fax or staple it where indicated and drop it in the mail; the postage has been prepaid!

Thank you in advance for your cooperation.

Derek Goudie
MSc Candidate
University of British Columbia

82

THE UNIVERSITY OF BRITISH COLUMBIA

August 9, 1993

Department of Wood Science
Faculty of Forestry
#389 - 2357 Main Mall
Vancouver, B.C. Canada V6T 1Z4

Tel: (604) 822-5303
Fax: (604) 822-9104

Dear Furniture Manufacturer:

You may recall that I recently sent you a survey questionnaire that was intended to collect information about California furniture manufacturers such as yourself. Although overall industry response to the survey has been encouraging, it is important that firms such as yours be represented in the analysis. I would like to encourage you to participate and have enclosed another copy of the questionnaire for your convenience.

In order to take as little of your time as possible, I have designed the questionnaire to be quick and easy to complete; it should take just a few minutes of your time.

All answers will be kept strictly confidential; individual firms will not be identified. The information collected will be summarized in a report using aggregate data only. The report should help your suppliers to serve you better.

As a graduate student in Forest Products Marketing at the University of British Columbia, I am relying on the results of this survey to complete the thesis that is required for my graduation. I would be personally grateful for your cooperation.

If you have any questions or comments, you can contact me by telephone at (604) 822-6716 or by fax at (604) 822-9104. When you have completed the questionnaire, you can return it by fax or staple it where indicated and drop it in the mail; the postage has been prepaid.

Thank you in advance for your cooperation!

Yours truly,

Derek Goudie
M.Sc. Candidate
University of British Columbia

83

APPENDIX 4: TESTS FOR NON-RESPONSE BIAS

Chi-square contingency table test to determine if the employee size category distribution of non-respondents is the same as that of respondents.

Ho: there is no relationship between employee size category and whether or not the firm responded to the survey

Category	Employees	Non-respondents	Respondents	Total
A	1 - 4	279	33	312
B	5 - 9	72	11	83
C	10 - 19	75	14	89
D	20 - 49	88	18	106
E	50 - 99	60	7	67
F,G,H	100 - 999	42	8	50
	Total	616	91	707

(Note that categories have been combined to ensure no cells have expected frequencies less than five.)

Category	Observed	Expected	$(O - E)^2/E$	Observed	Expected	$(O - E)^2/E$
A	279	271.8	0.1885	33	40.2	1.2760
B	72	72.3	0.0014	11	10.7	0.0094
C	75	77.5	0.0835	14	11.5	0.5652
D	88	92.4	0.2055	18	13.6	1.3910
E	60	58.4	0.0452	7	8.6	0.3057
F,G,H	42	43.6	0.0562	8	6.4	0.3803
Totals	616	616	0.5802	91	91	3.9276

$$\Sigma \, ((O - E)^2 / E) \;=\; \chi^2 \quad = \; 4.51$$

$$\text{with df} = 5 \qquad \chi^2_{0.05} \;=\; 11.07$$

therefore, the null hypothesis cannot be rejected.

Chi-square contingency table test to determine if the sales value size category distribution of non-respondents is the same as that of respondents.

Ho: there is no relationship between sales value size category and whether or not the firm responded to the survey

Category	Sales Volume (x $1,000)	Non-respondents	Respondents	Total
A	1 - 499	296	37	312
B	500 - 999	70	15	83
C	1,000 - 2,499	93	12	89
D	2,500 - 4,999	58	12	106
E,F,G,H	5,000 - 49,999	89	8	50
Total		606	84	707

(Note that categories have been combined to ensure no cells have expected frequencies less than five.)

Category	Observed	Expected	$(O - E)^2/E$	Observed	Expected	$(O - E)^2/E$
A	296	292.5	0.0428	37	40.5	0.3090
B	70	74.7	0.2899	15	10.3	2.0915
C	93	92.2	0.0066	12	12.8	0.0479
D	58	61.5	0.1968	12	8.5	1.4197
E,F,G,H	89	85.2	0.1703	8	11.8	1.2284
Totals	606	606	0.7065	84	84	5.0965

$$\Sigma ((O - E)^2 / E) = \chi^2 = 5.80$$

with df = 4 $\chi^2_{0.05} = 9.49$

therefore, the null hypothesis cannot be rejected.

t-test to determine if the difference between the means of hardwood use of early and late respondents is significant.

Ho: the mean proportion of total wood use represented by hardwoods is the same for early and late respondents

n_1 =   number of early respondents
x_1 =   percentage of wood as hardwood for early respondent
$\bar{x}_1$ =   mean percentage of wood use as hardwood among all early respondents

n_2 =   number of late respondents
x_2 =   percentage of wood as hardwood for late respondent
$\bar{x}_2$ =   mean percentage of wood use as hardwood among all late respondents

All data used to generate these values are provided on the following page.

n_1 =   38

$\bar{x}_1$ =   77.24

$\Sigma (x_1 - \bar{x}_1)^2$ =   45926.87

n_2 =   42

$\bar{x}_2$ =   82.26

$\Sigma (x_2 - \bar{x}_2)^2$ =   41812.12

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\Sigma (x_1 - \bar{x}_1)^2 + \Sigma (x_2 - \bar{x}_2)^2}{(n_1 + n_2 - 2)} * (1/n_1 + 1/n_2)}}$$

$$= \frac{77.24 - 82.26}{\sqrt{\frac{45927.87 + 41812}{(38 + 42 - 2)} * (1/38 + 1/42)}}$$

$$= -0.669$$

$$t_{0.05} = +- 1.99$$

Therefore, the null hypothesis that the means are equal cannot be rejected.

Early respondents			Late Respondents		
X_1	$X_1 - \bar{X}_1$	$(X_1 - \bar{X}_1)^2$	X_2	$X_2 - \bar{X}_2$	$(X_2 - \bar{X}_2)^2$
100	22.76	518.16	100	17.74	314.64
100	22.76	518.16	80	-2.26	5.12
80	2.76	7.64	90	7.74	59.88
95	17.76	315.53	50	-32.26	1040.83
65	-12.24	149.74	100	17.74	314.64
100	22.76	518.16	1	-81.26	6603.50
100	22.76	518.16	100	17.74	314.64
80	2.76	7.64	0	-82.26	6767.02
50	-27.24	741.85	100	17.74	314.64
100	22.76	518.16	100	17.74	314.64
10	-67.24	4520.79	100	17.74	314.64
100	22.76	518.16	50	-32.26	1040.83
5	-72.24	5218.16	70	-12.26	150.35
100	22.76	518.16	100	17.74	314.64
100	22.76	518.16	100	17.74	314.64
98	20.76	431.11	99	16.74	280.16
40	-37.24	1386.58	100	17.74	314.64
100	22.76	518.16	80	-2.26	5.12
100	22.76	518.16	100	17.74	314.64
100	22.76	518.16	100	17.74	314.64
20	-57.24	3276.06	100	17.74	314.64
0	-77.24	5965.53	100	17.74	314.64
100	22.76	518.16	100	17.74	314.64
60	-17.24	297.11	90	7.74	59.88
100	22.76	518.16	100	17.74	314.64
2	-75.24	5660.58	100	17.74	314.64
100	22.76	518.16	100	17.74	314.64
98	20.76	431.11	100	17.74	314.64
100	22.76	518.16	100	17.74	314.64
100	22.76	518.16	100	17.74	314.64
50	-27.24	741.85	100	17.74	314.64
0	-77.24	5965.53	100	17.74	314.64
85	7.76	60.27	100	17.74	314.64
99	21.76	473.64	100	17.74	314.64
100	22.76	518.16	10	-72.26	5221.78
98	20.76	431.11	95	12.74	162.26
100	22.76	518.16	100	17.74	314.64
100	22.76	518.16	80	-2.26	5.12
			100	17.74	314.64
			0	-82.26	6767.02
			30	-52.26	2731.31
			30	-52.26	2731.31
					88

t-test to determine if the difference between the means of firm age of early and late respondents is significant.

Ho: the mean firm age is the same for early and late respondents

n_1 = number of early respondents
x_1 = age of early respondent
$\bar{x}_1$ = mean age among all early respondents

n_2 = number of late respondents
x_2 = age of late respondent
$\bar{x}_2$ = mean age among all late respondents

All data used to generate these values are provided on the following two pages

n_1 = 38

$\bar{x}_1$ = 20.26

$\sum (x_1 - \bar{x}_1)^2$ = 13,153.37

n_2 = 42

$\bar{x}_2$ = 16.36

$\sum (x_2 - \bar{x}_2)^2$ = 8469.64

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\dfrac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{(n_1 + n_2 - 2)} * (1/n_1 + 1/n_2)}}$$

$$= \frac{20.26 - 16.36}{\sqrt{\dfrac{13,153.37 + 8469.64}{(38 + 42 - 2)} * (1/38 + 1/42)}}$$

= 1.046

$t_{0.05}$ = +- 1.99

Therefore, the null hypothesis that the means are equal cannot be rejected.

Early Respondents

Year of Start	x_1	$x_1 - \bar{x}_1$	$(x_1 - \bar{x}_1)^2$
1980	13	-7.26	52.75
1979	14	-6.26	39.23
1956	37	16.74	280.12
1982	11	-9.26	85.81
1983	10	-10.26	105.33
1918	75	54.74	2996.12
1946	47	26.74	714.86
1946	47	26.74	714.86
1964	29	8.74	76.33
1980	13	-7.26	52.75
1989	4	-16.26	264.49
1988	5	-15.26	232.96
1988	5	-15.26	232.96
1946	47	26.74	714.86
1979	14	-6.26	39.23
1971	22	1.74	3.02
1984	9	-11.26	126.86
1983	10	-10.26	105.33
1985	8	-12.26	150.39
1980	13	-7.26	52.75
1988	5	-15.26	232.96
1988	5	-15.26	232.96
1970	23	2.74	7.49
1980	13	-7.26	52.75
1918	75	54.74	2996.12
1992	1	-19.26	371.07
1980	13	-7.26	52.75
1980	13	-7.26	52.75
1987	6	-14.26	203.44
1986	7	-13.26	175.91
1975	18	-2.26	5.12
1976	17	-3.26	10.65
1946	47	26.74	714.86
1979	14	-6.26	39.23
1974	19	-1.26	1.60
1948	45	24.74	611.91
1990	3	-17.26	298.02
1980	13	-7.26	52.75

Late Respondents

Year of Start	x_1	$x_1 - \bar{x}_1$	$(x_1 - \bar{x}_1)^2$
1963	30	13.64	186.13
1982	11	-5.36	28.70
1990	3	-13.36	178.41
1987	6	-10.36	107.27
1990	3	-13.36	178.41
1990	3	-13.36	178.41
1937	56	39.64	1571.56
1983	10	-6.36	40.41
1978	15	-1.36	1.84
1990	3	-13.36	178.41
1980	13	-3.36	11.27
1981	12	-4.36	18.98
1984	9	-7.36	54.13
1986	7	-9.36	87.56
1976	17	0.64	0.41
1978	15	-1.36	1.84
1986	7	-9.36	87.56
1980	13	-3.36	11.27
1968	25	8.64	74.70
1946	47	30.64	938.98
1963	30	13.64	186.13
1985	8	-8.36	69.84
1988	5	-11.36	128.98
1964	29	12.64	159.84
1945	48	31.64	1001.27
1981	12	-4.36	18.98
1983	10	-6.36	40.41
1968	25	8.64	74.70
1978	15	-1.36	1.84
1985	8	-8.36	69.84
1953	40	23.64	558.98
1991	2	-14.36	206.13
1946	47	30.64	938.98
1984	9	-7.36	54.13
1980	13	-3.36	11.27
1986	7	-9.36	87.56
1988	5	-11.36	128.98
1976	17	0.64	0.41
1958	35	18.64	347.56
1992	1	-15.36	235.84
1991	2	-14.36	206.13
1979	14	-2.36	5.56

z-test to determine if the proportion of early respondents using wood to manufacture furniture is the same as the proportion of late respondents using wood to manufacture furniture.

Ho: the proportion of early respondents using wood to manufacture furniture is the same as the proportion of late respondents using wood to manufacture furniture

64 = n1 = number of early respondents
38 = x1 = number using wood

69 = n2 = number of late respondents
43 = x2 = number using wood

$$z = \frac{(x1/n1) - (x2/n2)}{p(1 - p)(1/n1 + 1/n2)}$$

where, $p = \frac{x1 + x2}{n1 + n2} = \frac{38 + 43}{64 + 69} = 0.609$

so, $z = \frac{38/64 - 43/69}{0.609(1 - 0.609)(1/64 + 1/69)} = -0.348$

$z_{0.05} = +- 1.96$

therefore, the null hypothesis that the proportions are the same cannot be rejected

APPENDIX 5: SURVEY DATA

STYLE CATEGORIES AS PERCENT OF FURNITURE PRODUCTION

FIRM	DATE OF INCEPTION	EMPLOYEE SIZE CATEGORY	AMERICAN	CONTEMP.	EUROPEAN COUNTRY	FORMAL EUROPEAN	ORIENTAL
1	1980	1	10	15	70	5	0
2	1979	2	30	10	30	30	0
3	1956	5	0	0	100	0	0
4	1982	2	10	50	10	20	10
5	1983	2	10	90	0	0	0
6	1918	4	0	80	10	10	0
7	1946	2	0	100	0	0	0
8	1946	2	0	0	80	20	0
9	1964	3	0	100	0	0	0
10	1980	2	0	100	0	0	0
11	1989	1	20	80	0	0	0
12	1988	2	25	75	0	0	0
13	1988	2	0	100	0	0	0
14	1946	3	40	0	0	60	0
15	1979	5	100	0	0	0	0
16	1971	4	95	0	5	0	0
17	1984	3	80	5	0	15	0
18	1983	1	15	50	25	10	0
19	1985	2	100	0	0	0	0
20	1980	2	80	20	0	0	0
21	1988	1	50	50	0	0	0
22	1988	1	90	10	0	0	0
23	1970	1	90	10	0	0	0
24	1980	3	25	75	0	0	0
25	1918	4	100	0	0	0	0
26	1992	1	100	0	0	0	0
27	1980	3	0	100	0	0	0
28	1980	3	100	0	0	0	0
29	1987	1	10	75	15	0	0
30	1986	1	0	100	0	0	0
31	1975	1	20	40	20	20	0

STYLE CATEGORIES AS PERCENT OF FURNITURE PRODUCTION

FIRM	DATE OF INCEPTION	EMPLOYEE SIZE CATEGORY	AMERICAN	CONTEMP.	EUROPEAN COUNTRY	FORMAL EUROPEAN	ORIENTAL
32	1976	2	25	75	0	0	0
33	1946	3	0	100	0	0	0
34	1979	5	90	10	0	0	0
35	1974	2	0	100	0	0	0
36	1948	2	80	20	0	0	0
37	1990	2	50	50	0	0	0
38	1980	1	0	100	0	0	0
39	1963	1	60	20	20	0	0
40	1982	1	20	80	0	0	0
41	1990	1	50	0	50	0	0
42	1987	1	80	20	0	0	0
43	1990	1	0	15	0	20	65
44	1990	1	100	0	0	0	0
45	1937	1	0	5	0	95	0
46	1983	1	0	0	100	0	0
47	1978	2	0	100	0	0	0
48	1990	2	100	0	0	0	0
49	1980	2	0	60	40	0	0
50	1981	2	0	100	0	0	0
51	1984	2	35	65	0	0	0
52	1986	2					
53	1976	2	60	20	10	10	0
54	1978	3	0	100	0	0	0
55	1986	3	25	75	0	0	0
56	1980	3	0	90	5	5	0
57	1968	3	0	100	0	0	0
58	1946	3	60	40	0	0	0
59	1963	3	50	50	0	0	0
60	1985	4	50	25	25	0	0
61	1988	4	100	0	0	0	0
62	1964	4	67	5	28	0	0

STYLE CATEGORIES AS PERCENT OF FURNITURE PRODUCTION

FIRM	DATE OF INCEPTION	EMPLOYEE SIZE CATEGORY	AMERICAN	CONTEMP.	EUROPEAN COUNTRY	FORMAL EUROPEAN	ORIENTAL
63	1945	5	30	65	0	5	0
64	1981	4	25	75	0	0	0
65	1983	4	50	40	10	0	0
66	1968	3	100	0	0	0	0
67	1978	5	70	30	0	0	0
68	1985	2	80	20	0	0	0
69	1953	3	0	90	10	0	0
70	1991	2	0	100	0	0	0
71	1946	2	0	0	50	50	0
72	1984	2	0	100	0	0	0
73	1980	1	100	0	0	0	0
74	1986	3	0	100	0	0	0
75	1988	2	0	100	0	0	0
76	1976	3	80	20	0	0	0
77	1958	3	0	100	0	0	0
78	1992	3	80	20	0	0	0
79	1991	2	0	0	100	0	0
80	?	5	?	?	?	?	?
81	1979	3	10	85	0	5	0

EMPLOYEE SIZE CATEGORY

1 = 1 - 5
2 = 6 - 20
3 = 21 - 50
4 = 51 - 100
5 = > 100

PRODUCT CATEGORIES AS PERCENT OF FURNITURE PRODUCTION

FIRM	LIVING ROOM	DINING ROOM	BED-ROOM	CHILD.	UPHOLST. SEATING	UPHOLST. BEDDING	OFFICE	INST.	WALL UNITS	RTA	OTHER
1	100	0	0	0	0	0	0	0	0	0	0
2	50	50	0	0	0	0	0	0	0	0	0
3	20	20	10	0	15	0	20	15	0	0	0
4	20	20	15	0	20	0	25	0	0	0	0
5	25	50	25	0	0	0	0	0	0	0	0
6	0	0	0	0	100	0	0	0	0	0	0
7	20	0	0	0	80	0	0	0	0	0	0
8	30	20	0	0	30	0	0	0	0	0	20
9	0	100	0	0	0	0	0	0	0	0	0
10	20	0	0	0	80	0	0	0	0	0	0
11	10	0	0	0	90	0	0	0	0	0	0
12	20	70	1	0	0	5	0	0	0	0	9
13	0	40	0	0	55	0	0	0	0	0	0
14	80	0	0	0	0	0	0	0	20	0	0
15	60	10	10	0	0	0	0	0	20	0	0
16	0	90	0	0	0	0	0	0	10	0	0
17	60	0	22	0	0	0	0	0	18	0	0
18	20	20	10	0	50	0	0	0	0	0	0
19	0	60	0	0	0	0	0	0	40	0	0
20	0	0	20	0	0	0	0	0	80	0	0
21	20	20	20	0	0	0	0	0	40	0	0
22	0	10	0	0	0	0	0	0	0	0	90
23	0	0	0	0	90	0	0	0	0	0	10
24	0	75	20	0	0	0	0	0	5	0	0
25	0	0	0	0	100	0	0	0	0	0	0
26	40	30	20	0	4	0	5	0	0	0	0
27	20	0	20	20	0	0	20	0	20	0	0
28	0	0	0	8	0	0	0	88	0	0	0
29	0	2	0	0	0	0	5	3	10	0	80
30	90	10	0	0	0	0	0	0	0	0	0

PRODUCT CATEGORIES AS PERCENT OF FURNITURE PRODUCTION

FIRM	LIVING ROOM	DINING ROOM	BED-ROOM	CHILD.	UPHOLST. SEATING	UPHOLST. BEDDING	OFFICE	INST.	WALL UNITS	RTA	OTHER
31	40	0	0	0	0	0	0	0	40	0	20
32	0	0	0	100	0	0	0	0	0	0	0
33	0	0	0	0	0	0	100	0	0	0	0
34	15	50	15	0	10	0	10	0	0	0	0
35	10	20	25	0	5	0	10	0	20	10	0
36	0	0	0	0	90	5	5	0	0	0	0
37	0	0	0	0	40	0	60	0	0	0	0
38	0	0	0	0	0	0	100	0	0	0	0
39	0	0	0	0	100	0	0	0	0	0	0
40	0	0	20	0	0	0	15	0	65	0	0
41	60	30	10	0	0	0	0	0	0	0	0
42	10	20	10	40	0	0	0	0	0	0	0
43	20	40	40	0	0	0	0	0	0	0	0
44	15	75	0	0	0	0	0	0	0	0	10
45	30	10	10	0	30	0	0	0	0	0	20
46	10	15	25	0	0	0	0	0	0	0	50
47	10	0	0	0	80	0	10	0	0	0	0
48	20	0	0	0	20	0	60	0	0	0	0
49	0	0	0	0	100	0	0	0	0	0	0
50	15	10	0	10	0	0	50	15	0	0	0
51	10	0	90	0	0	0	0	0	0	0	0
52	0	0	0	0	70	0	0	0	0	0	30
53	0	0	0	0	0	0	0	0	0	0	100
54	0	0	0	0	0	0	95	5	0	0	0
55	0	0	0	0	100	0	0	0	0	0	0
56	30	10	10	0	0	0	30	0	0	0	20
57	3	0	0	0	80	0	7	10	0	0	0
58	95	5	0	0	0	0	0	0	0	0	0
59	0	0	0	0	100	0	0	0	0	0	0
60	0	0	0	0	100	0	0	0	0	0	0

PRODUCT CATEGORIES AS PERCENT OF FURNITURE PRODUCTION

FIRM	LIVING ROOM	DINING ROOM	BED-ROOM	CHILD.	UPHOLST. SEATING	UPHOLST. BEDDING	OFFICE	INST.	WALL UNITS	RTA	OTHER
61	0	0	100	0	0	0	0	0	0	0	0
62	0	0	0	0	100	0	0	0	0	0	0
63	0	0	0	0	40	0	60	0	0	0	0
64	0	0	0	0	0	0	100	0	0	0	0
65	100	0	0	0	0	0	0	0	0	0	0
66	0	0	0	0	85	0	15	0	0	0	0
67	0	0	0	0	70	0	0	0	0	0	30
68	5	20	5	5	5	5	5	5	5	5	35
69	0	0	0	0	100	0	0	0	0	0	0
70	100	0	0	0	0	0	0	0	0	0	0
71	0	0	0	0	100	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	50	50	0
73	0	0	0	0	0	0	90	0	10	0	0
74	0	0	100	0	0	0	0	0	0	0	0
75	100	0	0	0	0	0	0	0	0	0	0
76	0	0	0	0	20	0	80	0	0	0	0
77	0	0	0	0	100	0	0	0	0	0	0
78	10	10	80	0	0	0	0	0	0	0	0
79	0	0	0	0	100	0	0	0	0	0	0
80	0	0	0	0	100	0	0	0	0	0	0
81	0	5	25	25	0	0	0	0	45	0	0

FIRM	SOLID WOOD EXPEND. CATEGORY	SOLID WOOD AS PCT. OF TOTAL	SOLID WOOD TREND	HARD-BOARD	PARTICLE-BOARD	VENEER	LAMIN. VENEER LUMBER	COMP. TREND
1	1	3	0	?	?	?	?	0
2	6	4	1	1	1	1	0	0
3	1	3	1	?	?	?	?	-1
4	1	1	-1	0	2	2	0	0
5	1	2	0	2	2	2	0	1
6	2	4	1	0	?	?	?	0
7	1	4	1	2	0	0	0	1
8	2	5	0	0	0	0	0	1
9	1	4	1	2	0	0	0	0
10	3	4	1	0	0	0	0	1
11	1	2	1	1	0	1	0	1
12	1	4	0	1	0	1	0	0
13	2	1	1	1	5	5	0	1
14	5	4	1	?	?	5	?	0
15	6	3	0	5	0	5	0	1
16	6	4	1	4	0	0	0	0
17	3	5	0	0	0	2	0	1
18	2	3	0	?	?	0	0	0
19	1	1	1	1	0	2	0	0
20	1	2	0	3	1	0	0	0
21	1	5	0	0	0	?	0	1
22	1	2	1	?	?	0	0	0
23	1	1	0	3	0	3	0	1
24	3	1	1	0	0	0	?	0
25	1	5	1	?	?	0	0	1
26	1	5	1	3	2	5	0	0
27	6	4	0	0	0	3	0	1
28	6	2	1	3	?	?	?	1
29	2	2	1	0	2	1	2	1
30	1	3	1	0	0	1	1	1
31	1	4	0	1	1	1	0	0
32	1	3	0	0	2	0	0	0

FIRM	SOLID WOOD EXPEND. CATEGORY	SOLID WOOD AS PCT. OF TOTAL	SOLID WOOD TREND	HARD-BOARD	PARTICLE-BOARD	VENEER	LAMIN. VENEER LUMBER	COMP. TREND
33	1	1	0	?	2	?	3	0
34	6	5	1	0	2	2	0	1
35	2	2	1	0	0	2	0	0
36	1	1	1	?	?	?	?	0
37	1	2	0	2	1	0	0	0
38	1	5	-1	?	2	?	?	-1
39	2	1	1	0	0	0	0	0
40	1	5	0	?	?	?	?	0
41	1	2	1	0	0	0	0	0
42	1	2	0	?	?	2	?	1
43	1	5	1	0	0	0	1	0
44	1	2	0	?	?	?	?	?
45	1	5	0	1	0	1	0	0
46	1	2	0	0	0	0	0	0
47	3	2	1	1	0	0	0	0
48	3	1	1	2	0	0	0	0
49	3	1	0	0	2	1	0	1
50	1	3	1	1	1	0	0	1
51	1	2	1	0	0	0	0	0
52	3	1	0	0	0	0	0	0
53	3	1	0	0	0	0	0	0
54	3	1	1	0	1	1	0	1
55	4	1	1	2	0	0	2	1
56	1	1	0	0	0	?	0	0
57	1	1	0	0	0	0	0	1
58	1	2	1	0	1	0	0	0
59	2	1	0	0	5	?	?	1
60	6	1	1	5	0	5	0	0
61	6	1	0	3	0	0	0	1
62	3	2	1	1	4	5	0	0
63	6	2	1	4	?	5	?	1
64	6	2	1	?	?	?	?	1

FIRM	SOLID WOOD EXPEND. CATEGORY	SOLID WOOD AS PCT. OF TOTAL	SOLID WOOD TREND	HARD-BOARD	PARTICLE-BOARD	VENEER	LAMIN. VENEER LUMBER	COMP. TREND
65	4	1	1	?	?	0	?	0
66	6	5	0	5	0	0	0	0
67	6	1	0	0	0	0	0	0
68	5	1	1	1	0	0	0	0
69	1	1	0	0	0	0	0	0
70	1	1	1	0	1	0	0	0
71	3	1	0	0	2	2	0	0
72	1	1	0	0	0	1	0	0
73	1	3	0	0	?	?	?	0
74	2	1	0	?	2	1	0	0
75	2	3	0	2	?	4	?	0
76	3	1	1	4	2	0	0	0
77	3	1	0	4	?	0	?	0
78	2	2	-1	0	0	0	0	0
79	3	4	1	1	0	0	0	1
80	6	1	1	0	0	0	0	0
81	3	4	1	1	0	2	0	0

SOLID WOOD
EXPEND. CATEGORIES
1 = < $50,000
2 = $50,001 - $100,000
3 = $100,001 - $200,000
4 = $200,001 - $300,000
5 = $300,001 - $500,000
6 = > $500,000

SOLID WOOD
AS % OF TOTAL
1 = 1 - 20%
2 = 21 - 40%
3 = 41 - 60%
4 = 61 - 80%
5 = 81 - 100%

COMPOSITE
EXPEND. CATEGORIES
1 = < $25,000
2 = $25,001 - $50,000
3 = $50,001 - $100,000
4 = $100,001 - $200,000
5 = > $200,000

TRENDS
-1 = DECRE
0 = NO CHA
1 = INCREAS

FIRM	HARDWOOD % OF TOTAL WOOD USE	OAK	CHERRY	POPLAR	MAPLE	BIRCH	WALNUT	ASH	ALDER	MAHOG.	OTHER
1	100	0	0	0	0	0	0	0	100	0	0
2	100	10	0	0	0	0	0	0	50	0	40
3	80	30	0	0	0	0	0	0	70	0	0
4	95	10	10	0	40	0	0	10	20	10	0
5	65	5	0	0	1	10	0	80	10	4	0
6	100	0	0	0	10	0	0	0	80	0	0
7	100	0	0	0	0	0	0	0	100	0	0
8	80	0	0	0	20	0	0	0	80	0	0
9	50	70	0	0	0	0	30	0	0	0	0
10	100	0	0	0	0	0	0	0	100	0	0
11	10	100	0	0	0	0	0	0	0	0	0
12	100	25	0	0	0	0	0	0	75	0	0
13	5	0	0	0	0	0	0	0	100	0	0
14	100	100	0	0	0	0	0	0	0	0	0
15	100	100	0	0	0	0	0	0	0	0	0
16	98	100	0	0	0	0	0	0	0	0	0
17	40	40	0	0	0	0	0	0	60	0	0
18	100	0	0	0	0	0	0	0	100	0	0
19	100	100	0	0	0	0	0	0	0	0	0
20	100	15	0	0	85	0	0	0	0	0	0
21	20	0	0	0	0	0	0	0	100	0	0
22	0	0	0	0	0	0	0	0	0	0	0
23	100	0	0	20	0	0	0	0	80	0	0
24	60	0	0	0	50	50	0	0	0	0	0
25	100	0	0	0	0	5	5	0	85	5	0
26	2	0	0	0	100	0	0	0	0	0	0
27	100	100	0	0	0	0	0	0	0	0	0
28	98	45	0	6	45	0	0	0	0	4	0
29	100	88	0	2	0	0	5	0	3	2	0
30	100	40	0	0	0	0	5	0	0	0	55

SPECIES AS % OF TOTAL HARWOOD USE

FIRM	HARDWOOD % OF TOTAL WOOD USE	OAK	CHERRY	POPLAR	MAPLE	BIRCH	WALNUT	ASH	ALDER	MAHOG.	OTHER
31	50	30	5	45	20	0	0	0	0	0	0
32	0										
33	85	5	17	60	18	0	0	0	0	0	0
34	99	100	0	0	0	0	0	0	0	0	0
35	100	20	0	0	0	40	0	0	0	0	40
36	98	2	2	0	2	0	2	0	90	2	0
37	100	10	0	0	0	0	10	0	80	0	0
38	100	50	10	0	10	0	20	0	0	10	0
39	100	0	0	5	0	0	0	0	95	0	0
40	80	10	5	0	5	0	0	0	80	0	0
41	90	10	0	0	75	0	5	0	0	0	10
42	50	60	0	0	40	0	0	0	0	0	0
43	100	0	0	0	25	50	5	15	5	0	0
44	1	0	0	0	0	0	0	0	0	0	100
45	100	0	0	0	0	95	0	0	5	0	0
46	0										
47	100	15	0	0	0	0	0	0	80	5	0
48	100	10	0	0	0	0	10	0	80	0	0
49	100	0	0	0	0	0	0	0	100	0	0
50	50	15	50	0	15	0	0	10	0	10	0
51	70	0	0	0	0	0	0	0	100	0	0
52	100	15	0	0	10	0	0	0	75	0	0
53	100	0	0	0	0	0	0	0	80	5	20
54	99	40	15	0	3	2	20	10	10	0	0
55	100	0	10	15	30	0	5	0	100	0	0
56	80	20	10	1	10	1	1	0	10	0	0
57	100	2	0	0	0	0	0	10	75	0	0
58	100	0	0	0	0	0	0	0	100	0	0
59	100	100	0	0	0	0	0	0	0	0	0
60	90	0	0	40	0	50	0	10	0	0	0

SPECIES AS % OF TOTAL HARDWOOD USE

FIRM	HARDWOOD % OF TOTAL WOOD USE	OAK	CHERRY	POPLAR	MAPLE	BIRCH	WALNUT	ASH	ALDER	MAHOG.	OTHER
61	100	30	5	0	30	0	20	0	15	0	0
62	100	80	0	0	10	0	0	0	10	0	0
63	100	0	0	0	0	0	0	0	100	0	0
64	100	0	0	0	0	0	0	0	100	0	0
65	100	80	0	0	0	0	0	10	10	0	0
66	100	0	0	0	0	0	20	0	80	0	0
67											
68	100	0	85	0	0	0	0	15	0	0	0
69	100	0	0	0	0	0	0	10	90	0	0
70	100	0	0	0	0	60	40	0	0	0	0
71	100	100	0	0	0	0	0	0	0	0	0
72	10	100	0	0	0	0	0	0	0	0	0
73	95	100	0	0	0	0	0	0	0	0	0
74	100	60	10	0	10	0	10	0	0	10	0
75	80	0	0	0	0	0	0	0	100	0	0
76	100	0	0	0	0	0	0	0	100	0	0
77	0										
78	30	0	0	0	0	0	0	0	100	0	0
79	30	80	0	0	10	10	0	0	0	0	0

SPECIES AS PERCENT OF TOTAL SOFTWOOD USE

FIRM	SOFTWOOD % OF TOTAL WOOD USE	POND. PINE	YELLOW PINE	SUGAR PINE	LODGE. PINE	SPRUCE	DOUG. FIR	REDWOOD	HEMLOCK	WEST. RED CEDAR	OTHER
1	0										
2	0										
3	20	0	0	100	0	0	0	0	0	0	0
4	5	0	0	100	0	0	0	0	0	0	0
5	35	40	0	0	60	0	0	0	0	0	0
6	0										
7	0										
8	20	100	0	0	0	0	0	0	0	0	0
9	50	70	0	0	0	0	0	0	0	0	30
10	0										
11	90	100	0	0	0	0	0	0	0	0	0
12	0										
13	95	90	0	10	0	0	0	0	0	0	0
14	0										
15	0										
16	2	50	0	0	0	0	50	0	0	0	0
17	60	80	0	20	0	0	0	0	0	0	0
18	0										
19	0										
20	0										
21	80	0	0	40	40	0	20	0	0	0	0
22	100	0	0	0	0	0	0	100	0	0	0
23	0										
24	40	0	0	0	0	0	0	0	0	0	100
25	0										
26	98	15	0	0	0	0	85	0	0	0	0
27	0										
28	2	0	0	0	0	0	100	0	0	0	0
29	0										
30	0										

SPECIES AS PERCENT OF TOTAL SOFTWOOD USE

FIRM	SOFTWOOD % OF TOTAL WOOD USE	POND. PINE	YELLOW PINE	SUGAR PINE	LODGE. PINE	SPRUCE	DOUG. FIR	REDWOOD	HEMLOCK	WEST. RED CEDAR	OTHER
31	50	100	0	0	0	0	0	0	0	0	0
32	100	100	0	0	0	0	0	0	0	0	0
33	15	0	0	0	0	0	100	0	0	0	0
34	1	0	0	0	0	0	0	0	0	100	0
35	0										
36	2	100	0	0	0	0	0	0	0	0	0
37	0										
38	0										
39	0										
40	20	0	0	70	0	0	30	0	0	0	0
41	10	100	0	0	0	0	0	0	0	0	0
42	50	100	0	0	0	0	0	0	0	0	0
43	0										
44	99	60	0	16	24	0	0	0	0	0	0
45	0										
46	100	0	0	5	0	0	0	90	0	5	0
47	0										
48	0										
49	0										
50	50	0	0	0	0	0	100	0	0	0	0
51	30	0	100	0	0	0	0	0	0	0	0
52											
53											
54	1	0	0	0	0	0	2	0	0	0	0
55											
56	20	0	0	30	0	0	0	0	0	0	70
57											
58											
59											
60	10										

SPECIES AS PERCENT OF TOTAL SOFTWOOD USE

FIRM	SOFTWOOD % OF TOTAL WOOD USE	POND. PINE	YELLOW PINE	SUGAR PINE	LODGE. PINE	SPRUCE	DOUG. FIR	REDWOOD	HEMLOCK	WEST. RED CEDAR	OTHER
61											
62											
63	0										
64	0										
65	0										
66	0										
67											
68	0										
69	0										
70	0										
71	0										
72	90	100	0	0	0		0	0	0	0	0
73	5	10	0	0	0		0	0	0	0	0
74	0										
75	20	100	0	0	0		0	0	0	0	0
76	0										
77	100	25	0	75	0		0	0	0	0	0
78	70	100	0	0	0		0	0	0	0	0
79	70	80	0	20	0		0	0	0	0	0

PERCENT OF SOLID WOOD PURCHASED AS:

FIRM	LUMBER 1992	LUMBER 1995	SEMI-FIN. COMP. 1992	SEMI-FIN. COMP. 1995	FULLY-MACH. COMP. 1992	FULLY-MACH. COMP. 1995	SUB-ASSEMBLIES. 1992	SUB-ASSEMBLIES. 1995
1	100	100	0	0	0	0	0	0
2	40	40	0	0	0	0	60	60
3	60	60	10	10	10	10	30	30
4	90	90	10	10	0	0	0	0
5	95	85	0	0	0	0	5	15
6								
7	100	100	0	0	0	0	0	0
8	40	40	0	0	0	0	60	60
9	100	100	0	0	0	0	0	0
10	100	100	0	0	0	0	0	0
11	100	100	0	0	0	0	0	0
12	25	25	0	0	0	0	75	75
13	100	100	0	0	0	0	0	0
14	70	70	0	0	30	30	0	0
15	100	100	0	15	5	5	0	0
16	95	80	0	0	0	0	0	0
17	100	100	0	0	0	0	0	0
18	50	50	0	0	0	0	50	50
19	100	100	0	0	0	0	0	0
20	100	100	100	100	0	0	0	0
21	100	100	0	0	0	0	0	0
22	0	0	100	100	20	20	0	0
23	60	60	0	0	0	0	20	20
24	0	0	50	50	0	0	50	50
25	100	100	0	0	0	0	0	0
26	90	90	10	10	0	0	0	0
27	0	0	100	100	0	0	0	0
28	88	88	10	10	2	2	0	0
29	5	25	90	75	5	0	0	0

PERCENT OF SOLID WOOD PURCHASED AS:

FIRM	LUMBER 1992	LUMBER 1995	SEMI-FIN. COMP. 1992	SEMI-FIN. COMP. 1995	FULLY-MACH. COMP. 1992	FULLY-MACH. COMP. 1995	SUB-ASSEMBLIES. 1992	SUB-ASSEMBLIES. 1995
30	100	90	0	0	0	0	0	10
31	60	60	0	0	0	0	40	40
32	80	80	0	0	20	20	0	0
33	95	95	5	5	0	0	0	0
34	100	100	0	0	0	0	0	0
35	100	100	0	0	0	0	0	0
36	0	0	0	0	0	0	100	100
37	100	100	0	0	0	0	0	0
38	100	100	0	0	0	0	0	0
39	98	98	0	0	2	2	0	0
40	100	100	0	0	0	0	0	0
41	65	85	35	15	0	0	0	0
42	100	100	0	0	0	0	0	0
43	100	100	0	0	0	0	0	0
44	100	100	0	0	0	0	0	0
45	100	100	0	0	0	0	0	0
46	100	100	0	0	0	0	0	0
47	0	0	0	0	100	100	0	0
48	60	60	20	20	20	20	0	0
49	0	0	0	0	0	0	100	100
50	30	20	10	10	40	50	20	20
51	100	100	0	0	0	0	0	0
52	100	100	0	0	0	0	0	0
53	100	100	0	0	0	0	0	0
54	100	100	0	0	0	0	0	0
55	0	0	5	5	95	95	0	0
56	80	75	15	15	5	10	0	0
57	30	30	65	65	5	5	0	0
58	0	0	100	100	0	0	0	0

PERCENT OF SOLID WOOD PURCHASED AS:

FIRM	LUMBER 1992	LUMBER 1995	SEMI-FIN. COMP. 1992	SEMI-FIN. COMP. 1995	FULLY-MACH. COMP. 1992	FULLY-MACH. COMP. 1995	SUB-ASSEMBLIES. 1992	SUB-ASSEMBLIES. ASSEMBLIES. 1995
59	100	0	0	0	0	0	0	0
60	0	0	0	0	100	100	0	0
61	0	0	50	0	50	0	0	0
62	10	10	0	0	80	80	10	10
63	100	100	0	0	0	0	0	0
64	70	70	10	10	10	10	10	10
65	2	2	0	0	98	98	0	0
66	100	100	0	0	0	0	0	0
67	0	0	0	0	100	100	0	0
68	0	0	0	0	50	50	50	50
69								
70	0	0	0	0	0	0	100	100
71	99	99	1	1	0	0	0	0
72	0	0	0	0	100	100	0	0
73	100	100	0	0	0	0	0	0
74	100	100	0	0	0	0	0	0
75	0	0	20	20	70	70	10	10
76	0	0	100	100	0	0	0	0
77	100	100	0	0	0	0	0	0
78	100	100	0	0	0	0	0	0
79	100	80	0	0	0	0	0	0
80	80	60	0	0	0	0	20	20
81	100	100	0	0	0	0	0	40

NUMBER OF SUPPLIERS CATEGORY

PERCENT OF LUMBER FROM:

FIRM	LUMBER	SEMI-FIN. COMP.	FULLY-MACH. COMP.	SUB-ASSEMBLIES.	WHOLE-SALER	BROKER	MILL	COMP. MFR.
1	1	0	0	0	0	100	0	0
2	1	3	0	4	100	0	0	0
3	4	3	2	2	40	0	60	0
4	3	2	0	0	100	0	0	0
5	2	0	0	2	100	0	0	0
6								
7	1	0	0	0	100	0	0	0
8	2	0	0	0	100	0	0	0
9	3	0	0	0	0	0	100	0
10	1	0	0	0	100	0	0	0
11	2	0	0	1	100	0	0	0
12	2	0	0	0	100	0	0	0
13	2	0	0	0	100	0	0	0
14	2	0	2	0	100	0	0	0
15	3	0	0	0	100	0	0	0
16	3	0	2	0	95	5	0	0
17	2	0	0	0	100	0	0	0
18	2	0	0	0	0	0	100	0
19	2	2	0	0	100	0	0	0
20	2	0	0	0	100	0	0	0
21	2	2	0	0	100	0	0	0
22	0	0	2	2	0	0	0	0
23	1	2	0	1	0	0	100	0
24	0	0	0	0				
25	2	2	0	0	80	20	0	0
26	2	0	0	0	100	0	0	0
27	0	2	0	0				
28	4	3	1	0	30	10	60	0
29	2	2	2	0	95	5	0	0
30	2	0	0	0	100	0	0	0

NUMBER OF SUPPLIERS CATEGORY · PERCENT OF LUMBER FROM:

FIRM	LUMBER	SEMI-FIN. COMP.	FULLY-MACH. COMP.	SUB-ASSEMBLIES.	WHOLE-SALER	BROKER	MILL	COMP. MFR.
31	2	0	0	2	100	0	0	0
32	2	0	2	0	95	5	0	0
33	2	1	0	0	100	0	0	0
34	3	0	0	0	0	95	5	0
35	2	0	0	0	100	0	0	0
36	0	0	0	0				
37	2	0	0	0	100	0	0	0
38	2	0	0	0	100	0	0	0
39	2	0	1	0	100	0	0	0
40	2	0	0	0	100	0	0	0
41	1	1	0	0	100	0	0	0
42	2	0	0	0	100	0	0	0
43	1	0	0	0	0	100	0	0
44	2	0	0	0				
45	2	0	0	0	100	0	0	0
46	0	0	2	0	100	0	0	0
47	1	0	2	0				
48	0	2	2	2	100	0	0	0
49	1	0	2	0				
50	2	1	0	0	100	0	0	0
51	2	0	0	0	100	0	0	0
52	2	0	0	0	0	0	100	0
53	2	0	0	0	100	0	0	0
54	2	0	2	0	100	0	0	0
55	0	2	1	1				
56	2	2	0	0	80	0	10	10
57	1	1	0	0	100	0	0	0
58	1	1	0	0				
59	1	0	0	0	0	0	100	0
60	0	0	2	0				

FIRM	LUMBER	SEMI-FIN. COMP.	FULLY-MACH. COMP.	SUB-ASSEMBLIES.
61	0	2	2	0
62	0	1	2	1
63	3	0	0	0
64	2	2	2	2
65	1	0	2	0
66	2	0	0	0
67	0	0	1	0
68	0	0	3	3
69				
70	0	0	0	1
71	2	2	0	0
72	0	0	2	0
73	2	0	0	0
74	2	0	0	2
75	0	3	3	0
76	0	2	0	0
77	2	0	0	0
78	2	0	0	0
79	2	0	0	0
80	2	0	0	2
81	3	0	0	0

PERCENT OF LUMBER FROM:

FIRM	WHOLE-SALER	BROKER	MILL	COMP. MFR.
61	0	20	80	0
62	50	20	20	10
63	100	0	0	0
64	80	20	0	0
70	20	0	80	0
73	100	0	0	0
74	100	0	0	0
77	100	0	0	0
78	0	0	100	0
79	100	0	0	0
80	0	0	100	0
81	20	0	80	0

NUMBER OF SUPPLIERS CATEGORY

0 = 0
1 = 1
2 = 2 - 4
3 = 5 - 7
4 = > 8

PCT. OF SEMI-FIN.COMP. FROM: | PCT. OF FULLY-MACH.COMP. FROM: | PCT. OF SUB-ASSEMB. FROM:

FIRM	WHOLE-SALER	BROKER	MILL	COMP. MFR.	WHOLE-SALER	BROKER	MILL	COMP. MFR.	WHOLE-SALER	BROKER	MILL	COMP. MFR.
1												
2									100			
3	60	0	40	0	0	0	0	100	0	0	0	100
4	100	0	0	0								
5									0	0	0	100
6												
7												
8												
9												
10												
11												
12									0	0	0	100
13					100	0	0					
14					0	0	0	100				
15												
16												
17												
18												
19												
20	100	0	0	0								
21												
22	0	100	0	0								
23	100	0	0	0	0	0	0	100	0	0	0	100
24	100	0	0	0					0	0	0	100
25												
26	100	0	0	0								
27	0	100	0	0								
28	0	0	100	0	0	0	100	0				
29	80	0	0	20	0	0	0	100				

FIRM	PCT. OF SEMI-FIN. COMP. FROM:				PCT. OF FULLY-MACH. COMP. FROM:				PCT. OF SUB-ASSEMB. FROM:			
	WHOLE-SALER	BROKER	MILL	COMP. MFR.	WHOLE-SALER	BROKER	MILL	COMP. MFR.	WHOLE-SALER	BROKER	MILL	COMP. MFR.
30												
31												
32												
33	0	0	5	0	100	0	0	0	100	0	0	0
34												
35												
36												
37												
38												
39					100	0	0	0				
40												
41	100	0	0	0								
42												
43												
44												
45												
46					100	0	0	0				
47					0	0	0	100				
48	0	0	0	100	100	0	0	0				
49	0	0	0	100	0	0	50	50	0	0	0	100
50												
51												
52												
53												
54												
55	0	0	0	100	0	0	0	100				
56	10	0	10	80	0	0	0	100				
57	0	0	0	100								
58					100	0	0	0				

116

PCT. OF SEMI-FIN. COMP. FROM: PCT. OF FULLY-MACH. COMP. FROM: PCT. OF SUB-ASSEMB. FROM:

FIRM	WHOLE-SALER	BROKER	MILL	COMP. MFR.	WHOLE-SALER	BROKER	MILL	COMP. MFR.	WHOLE-SALER	BROKER	MILL	COMP. MFR.
59												
60												
61	0	10	90	0	0	0	25	75	0	0	0	
62	0	90	0	10	0	0	0	100	0	0	0	100
63					0	0	0	100				
64	75	0	0	25	0	0	0	100	0	0	0	100
65					60	40	0	0				
66												
67					0	0	0	100				
68												
69									0	0	0	100
70												
71	100	0	0	0	0	0	0	100				
72												
73												
74				0	0	0	0	0	100	0	0	0
75	100	0	0		100	0	0	0				
76	100	0	0									
77												
78												
79									0	0	0	
80												100
81												

117

FIRM	PCT OF LUMBER RCVD BY: TRUCK	RAIL	OTHER	PCT SEMI-FIN COMP BY: TRUCK	RAIL	OTHER	PCT FULLY-MACH COMP BY: TRUCK	RAIL	OTHER	PCT SUB-ASSEMB BY: TRUCK	RAIL	OTHER
1	100	0	0							100	0	0
2	100	0	0	100	0	0				100	0	0
3	100	0	0	100	0	0						
4	100	0	0				100	0	0			
5	100	0	0							100	0	0
6												
7	100	0	0									
8	100	0	0									
9	0	0	100									
10	100	0	0									
11	100	0	0									
12	100	0	0							100	0	0
13	100	0	0									
14	10	90	0				100	0	0			
15	100	0	0				100	0	0			
16	100	0	0				100	0	0			
17	100	0	0									
18	100	0	0									
19	100	0	0									
20	100	0	0	100	0	0						
21	100	0	0	100	0	0						
22				100	0	0	100	0	0			
23	100	0	0	100	0	0	100	0	0	100	0	0
24				100	0	0				100	0	0
25	100	0	0	100	0	0						
26	100	0	0	100	0	0						
27				100	0	0						
28				100	0	0	100	0	0	100	0	0
29	100	0	0				100	0	0	100	0	0
30	100	0	0									
31										100	0	0

FIRM	PCT OF LUMBER RCVD BY:			PCT SEMI-FIN COMP BY:			PCT FULLY-MACH COMP BY:			PCT SUB-ASSEMB BY:		
	TRUCK	RAIL	OTHER	TRUCK	RAIL	OTHER	TRUCK	RAIL	OTHER	TRUCK	RAIL	OTHER
32	100	0	0				100	0	0			
33	100	0	0	100	0	0						
34	50	50	0									
35	100	0	0									
36												
37	100	0	0									
38	100	0	0									
39	100	0	0				100	0	0			
40	100	0	0									
41	100	0	0	100	0	0						
42	100	0	0									
43	100	0	0									
44	100	0	0							100	0	0
45	100	0	0									
46	100	0	0									
47	100	0	0									
48	100	0	0	100	0	0	100	0	0			
49	100	0	0				100	0	0	100	0	0
50	100	0	0	100	0	0	100	0	0			
51	100	0	0				100	0	0			
52	100	0	0									
53	100	0	0									
54				100	0	0	100	0	0			
55				100	0	0	100	0	0			
56	100	0	0	100	0	0				100	0	0
57	100	0	0	100	0	0						
58	100	0	0				100	0	0			
59												
60				20	80	0	50	50	0			
61				90	0	10	100	0	0			
62							80	0	20	10	0	90

	PCT OF LUMBER RCVD BY:			PCT SEMI-FIN COMP BY:			PCT FULLY-MACH COMP BY:			PCT SUB-ASSEMB BY:		
FIRM	TRUCK	RAIL	OTHER	TRUCK	RAIL	OTHER	TRUCK	RAIL	OTHER	TRUCK	RAIL	OTHER
63	100	0	0	100	0	0	100	0	0			
64	100	0	0	100	0	0	100	0	0	100	0	0
65	100	0	0				100	0	0			
66												
67							100	0	0			
68												
69												
70				100	0	0				100	0	0
71	100	0	0				100	0	0			
72												
73	100	0	0									
74	100	0	0							100	0	0
75				100	0	0	100	0	0			
76				100	0	0						
77	100	0	0									
78	100	0	0									
79	100	0	0							100	0	0
80	100	0	0									
81	100	0	0									

APPENDIX 6: RESPONDENTS COMMENTS
ON NUMBER OF SUPPLIERS

✿ "Keep price, quality, availability of supply locked in".

✿ "Ensure consistent quality".

✿ "Results in better service".

✿ "Continuity of supply".

✿ "The supplier would better understand my quality requirements".

✿ "Price stability and product quality are maintained".

✿ "Ensure stability".

✿ "Better pricing".

✿ "We use recycled wood from demolitions".

✿ "Better control of delivery".

✿ "Better service and price".

✿ "Better service".

✿ "Building a rapport with a supplier is important especially if you run into a problem or need a favor. Someone you know is more likely to help you."

✿ "Better relations."

✿ "We don't like running short of supply".

✿ "Easier to order; they know my expectations, etc".

✿ "Better discounts".

✿ "For a steady source and the best price".

✿ "Less expensive and time consuming; more economical".

✿ "As long as the product is consistently clear and acceptable".

✿   "Reliability and price".

✿   "Better service; if a large customer with one supplier".

✿   "Ensure a consistent supply".

✿   "Good to establish a working relationship".

✿   "I want them to become familiar with my needs".

APPENDIX 7: RESPONDENTS COMMENTS ON
LONG-TERM CONTRACTS

✿ "Less problems."

✿ "Better relationships."

✿ "Less headaches, better service, better pricing."

✿ "Price stability and product quality are maintained."

✿ "Competitive pricing."

✿ "Service and convenience."

✿ "Better service; better problem solving."

✿ "Confidence."

✿ "Less problems."

✿ "Makes things that much simpler."

✿ "Better relationships."

✿ "Too time consuming otherwise."

✿ "Easier to order; they know my expectations, etc."

✿ "For a steady source and best price. Best to enter into a contract so both know what each other is doing.

✿ "Easier to control pricing."

✿ "In all major material categories we keep one back-up vendor."

✿ "We own our own frame component plant; they are our suppliers."

✿ "For standardization and reliability."

✿ "Closer relationship."

✿ "Too many suppliers is a bother."

✿ "I like a personal relationship with the suppliers I use."

✿   "Less problems."

✿   "They get to know my company and my needs."

✿   "Efficiency, averaging."

✿   "Better prices, better quality and consisitent."

✿   "You become more important if you do a small volume with a few suppliers.

✿   "Reliability of inventory."

✿   "Consistency."

✿   "We can be sure they know the type of material they use."

✿   "Better reliability and service.

✿   "To obtain best price."

✿   "We like to have 3-4 suppliers; creates a good working relationship."

✿   "General rule for us just to simplify transactions."

✿   "Trust and reliability."

✿   "Less problems"

✿   "Become important to each other."

✿   "Less paperwork; less confusion."

✿   "Better relationships."

✿   "Less work; better relations; more trust - credit, etc."