Assessment of Market Opportunities for British Columbia Lumber in the California Furniture Industry

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Assessment of Market Opportunities for British Columbia Lumber in the California Furniture Industry

by

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Executive Summary

The California Furniture Industry

✪ Business Characteristics

- Predominantly small firms with less than 20 employees
- 75% located within 150 kilometers of Los Angeles, 20% within 150 kilometers of San Francisco
- over half less than 20 years in business
- produce mostly living room, upholstered, dining room and bedroom furniture
- produce mostly American and Contemporary styles

✪ Material Use

- over half spend less than $US 100,000 per year on solid wood
- over half spend less than $US 25,000 on wood composite materials
- most (2/3) purchase lumber with 1/3 buying semi-finished and fully-machined components or sub-assemblies
- hardwood accounts for 75% , softwood for 25% of solid wood purchases
- preferred hardwood species are Alder (41%) and Oak (28%)
- preferred Ponderosa Pine (49%), Douglas Fir (17%) and Sugar Pine(14%)
- available supplies of Ponderosa Pine are decreasing

✪ Supply Characteristics

- prefer few suppliers (less than 4) for lumber and components
- prefer truck as method of transport
- prefer small order quantities

Opportunities for the BC Solid Sector

- developing alternative lumber supplies to replace Ponderosa Pine
- developing suitable alder lumber products for furniture manufacturing
- the small, diverse, and erratic industry would be difficult to supply from British Columbia with only few exceptions for large scale furniture manufacturers
- BUT opportunities may exist after linking with key wholesalers to furniture operations and assessing their lumber and component needs

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1.0 INTRODUCTION

1.1 BACKGROUND

The solid wood sector of the forest products industry in British Columbia (BC) is characterized by an infrastructure directed to the production and distribution of construction grades of softwood lumber. This 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. These facilities are now located predominantly in the Interior of British Columbia and produce an S-P-F (Spruce-Pine-Fir) grade of lumber.

Focusing principally on commodity markets for dimension lumber products, BC solid wood producers have become the largest component of what has been called the engine that powers the provincial economy (31). Manufacturing shipments of lumber in 1991 totaled over $4 billion, accounting for 18 percent of total provincial shipments that year (19). As further evidence of the industry's importance, BC is the largest exporter of coniferous lumber in the world accounting for 34% of total exports in 1990 (19).

There are a number of factors which threaten the industry's long-term prospects for continued prosperity and growth. Markets for construction grades of softwood lumber are mature and growing very slowly and recent surges notwithstanding, real aggregate softwood lumber prices have been trending down since the late 1960's (31)[1]. Softwood lumber mills are approaching the limits of profitability based on processing technologies. Innovation aimed at boosting productivity and lowering cost structures will be less beneficial than in the past (20). These factors, along with the threat of imposed reductions of harvest levels, suggest that the historical industry focus on maximizing productivity must be re-evaluated.

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[1] Volatile price fluctuations during 1993 and 1994 may be indicating an end to this historic downward trend.

1.2 THEORETICAL FOUNDATION

Diversification and further integration into higher value-added products have been the main strategies advocated by industry analysts. Schuler 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*".

The product/market matrix provides a theoretical and practical tool that defines a firm's markets and its products as either new or mature and offers specific strategies for particular combinations of each (Figure 1). For example, this matrix indicates that a firm wishing to increase sales of an existing product in current markets should pursue a strategy of market penetration which would require stimulating consumption among current customers. Conversely, for the firm wishing to sell existing products into new markets, a strategy of market development is indicated.

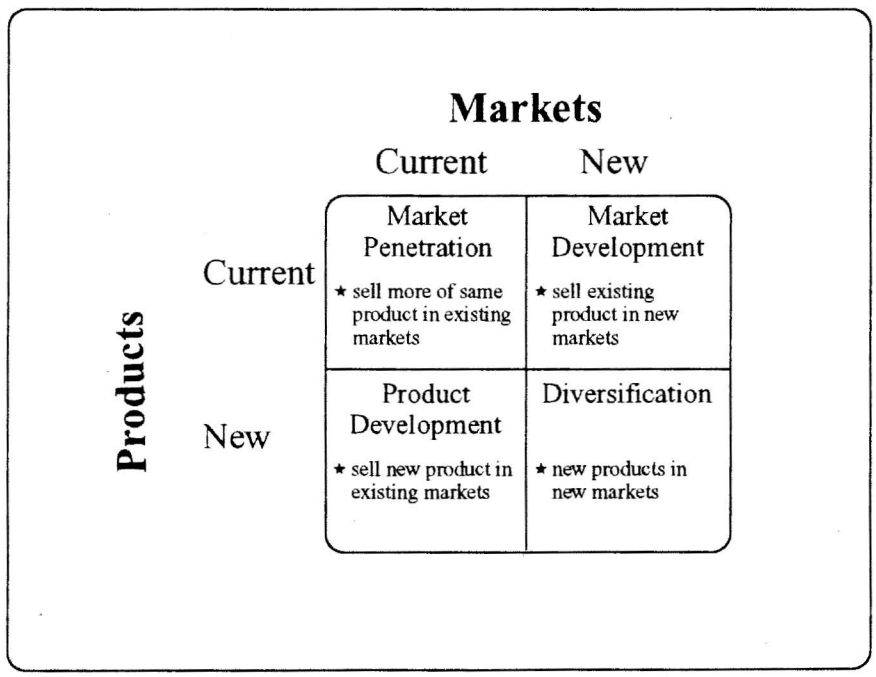

Figure 1: The product-market matrix.

Producing higher valued lumber products for the California furniture industry would fit into the quadrant labelled "diversification". Booth and Vertinsky (1991) discuss the concept of related diversification with respect to the forest products sector. 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. They also relate higher net benefits to a firm that selects related diversification. A BC lumber firm shifting from commodity lumber production to manufacturing wood lumber and/or components for the California furniture industry would qualify as related diversification.

Indeed, many manufacturers are actively pursuing a strategy of product and market diversification. Coastal producers in particular, are becoming adept at producing a wide variety of non-traditional products, grades and sizes (7). The Coast sector presently exports more than 50% of its production offshore in the form of metric sized lumber, door and window blanks, and other products tailored to specific market needs.

Many interior manufacturers, while continuing to produce mainly dimension lumber, are also beginning to look for alternate markets. Premium grades and speciality 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 market penetration and product acceptance in some of 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 for Interior producers to invest the resources required to investigate other opportunities.

1.3 OBJECTIVES

As raw material constraints and global market pressures 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 was undertaken. The furniture industry is a very important industrial user of both

commodity and value added wood products. California manufacturers alone use consumed more than US$ 2.5 billion worth of wood materials in 1990 (25). The raw material needs of the furniture industry encompass a range of products from rough lumber to higher value-added items such as semi-finished and finished components and sub-assemblies.

The first step in assessing the merits of a diversification strategy focusing on the value-added wood sector in British Columbia as a source of supply for the California furniture industry is a descriptive market analysis. This reports presents market information necessary for assessing a market development program.

The specific objectives of this research project are:

1. to define and explain the present raw material supply strategies and tactics of wood furniture manufacturers in California,
2. to assess the marketing opportunities and constraints for BC solid wood producers in the California wood furniture industry.

2.0 THE UNITED STATES FURNITURE INDUSTRY

2.1 HISTORY OF THE U.S. FURNITURE INDUSTRY[2]

Furniture manufacturing in the U.S. began with the earliest settlers as essentially a handicraft using limited tools and sometimes limited skills. 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 US. It was not until the War of 1812, and a 30 percent tariff on imported furniture that followed, that the industry began to develop as a commercial entity. The

[2] Much of this information is summarized from Wisdom & Wisdom, 1983 (30) and articles from Furniture Today.

protection of the tariff essentially gave U.S. furniture manufacturers a captive market and provided the opportunity to adopt the superior production methods used by European producers.

Plentiful hardwoods in the eastern US, along with rapid population growth in the region, spurred the development of an important furniture manufacturing centre in Jamestown, New York. The high concentration of furniture manufacturers in the northeast region resulted in the rapid depletion of the surrounding forests. As competition for raw materials 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 followed the same pattern as Jamestown and 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 shifted 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. Over time these Southern manufacturers expanded into medium and high priced furniture and North Carolina developed into the leading furniture producing state in the United States.

In 1925, New York was still the major furniture supplier producing 15.8 percent of the nations output of furniture. By 1954, this had fallen to 9.1 percent and in 1987, the state was responsible less than 4 percent 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 percent 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 percent of the U.S. output.

2.2 INDUSTRY SEGMENTATION

U.S. furniture manufacturers are diverse in terms of plant structure, processing scale, raw material input, and product mix. Categorization is most conveniently accomplished using U.S. Department of Commerce Standard Industrial Classification codes (SIC) which segment the industry according to both product end-use and principal input of raw materials. Major wood using segments of the U.S. furniture industry are wood household furniture (SIC 2511), upholstered household furniture (2512), and wood office furniture (SIC 2521). General information on each industry segment is shown in Table 1.

Wood household furniture is the largest single segment in each of the U.S. furniture industry with manufacturing shipments valued at nearly US$8 billion (24). In 1989 producers of wood household furniture were responsible for almost half of all household furniture shipments (SIC 2511, 2512, 2517 and 2519) . Upholstered furniture manufacturers represented the next largest segment with shipments of $5.7 billion.

Table 1: Basic Data on U.S. Furniture Industry for 1989 (in billions of $US).

SIC Number	Description	Value of Shipments	Value added in Manufacture	Number of employees
2511	Wood household furniture	$7.98	$4.10	121,400
2512	Upholstered household furniture	$5.66	$2.83	80,300
2517	Wood TV and radio cabinets	$0.24	$0.12	2,800
2519	Furniture and fixtures	$2.47	$1.42	31,000
2521	Wood office furniture	$1.72	$0.99	22,500
	Total	$18.07	$9.53	258,000

United States wood household, upholstered and wood office furniture manufacturers employed 243,000 workers in 4,500 establishments in 1990 (24, 25). Total payroll for the year was $4.16 billion and the annual payroll per employee, averaged between the three sectors was $18,000. Employment levels for each of the sectors are provided in Table 2 (24, 25).

A survey of 620 U.S. furniture manufacturers conducted in 1990 found that 45% of firms employ between 1 and 5 people and that 66% employ fewer than twenty (26, 27). Results also indicated the importance of the relatively small number of firms with more than 100 employees. It was further indicated that the West had the highest percentage of firms (75%) with fewer than twenty employees.

Table 2:. Employment Levels in the U.S. Furniture Industry in 1989.

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

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 (23). 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 according to the quality or price point category. Within a given price point category, very strong price competition is evident among manufacturers.

The U.S. furniture industry as a whole is not vertically integrated. The large number of small producers as well as 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 also not integrated forward. 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. Again, the large number of small operators, both retailers and manufacturers, inhibits forward integration by manufacturers.

2.4 INDUSTRY PERFORMANCE

The low wage structure of the U.S. South, along with the accessibility of a large and growing markets helped to ensure growth for the U.S. furniture industry through much of this century. However, these advantages are fading. The South is becoming more industrialized, driving up wages, and foreign suppliers are overcoming barriers of distance through improved shipping and assembly techniques. Rising costs of increasingly scarce hardwood timber has also contributed to the recent poor record of profitability in the industry.

Low rates of return have had a detrimental effect on the furniture industry, relative to other manufacturing sectors. Investment in productive assets such as new machinery and equipment has been below international averages (28). This has slowed growth in labour productivity, profit margins, and international competitiveness.

2.5 IMPORTS INTO THE UNITED STATES

U.S. furniture manufacturers have suffered from strong import pressures and 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% (29). In 1988, the U.S. imported over $4 billion worth of furniture while exporting only $304 million. This apparent trend was reversed in 1990 and 1991 with imports falling to $2.9 billion and $2.7 billion respectively (2).

This long-term trend of rising imports reflects increasing global 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 that impede long-term industrial performance. U.S. firms face significantly higher cost structures than do their foreign competitors often due to differences in labour costs and taxation levels. 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 industries which cannot benefit from a more technologically sophisticated work force (23).

Traditional sources of market protection were from high transportation, inventory, and other logistic costs faced by foreign suppliers. However, improved shipping techniques, the movement of containerloads of ready to assemble (RTA) furniture, and improved information technologies have eliminated most transportation barriers. 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 the historic transportation barriers.

2.6 TECHNOLOGY IN THE U.S. FURNITURE INDUSTRY

Technological innovation has historically been relatively unimportant in furniture production. The furniture industry is a mature industry where most change has been intended to incrementally fine-tune existing practices. Thus, technological innovation has been gradual and, in general, aimed at improving efficiency of raw material use (16). It has been rare for any furniture manufacturer to hold a technological advantage for any length of time since processing machinery is supplied from firms that sell worldwide. Very few firms are active in developing in-house technology.

Dramatic loss of domestic market share to foreign suppliers has acted as a catalyst to U.S. manufacturers. An increasing number of large, well established plants appear to be more responsive to technological innovation (21, 28). As the industry restructures and consolidates in an uncertain market environment, this trend would appear likely to continue. Technological

innovations have increased the efficiency of wood use in furniture manufacture and improved staining and finishing techniques which has increased the range of acceptable wood species and grades. Technology, including new veneer and laminating techniques, has contributed to the opportunity for BC wood species to be considered for furniture manufacturing.

2.7 MARKET CHARACTERISTICS

The consumer market for furniture has historically been driven by the need to furnish new homes with changes in furniture sales lagging behind changes in housing starts by one year (13). In recent years, however, repair/remodel expenditures as well as the sale of existing single family homes have become the dominant influence on furniture demand (22). Decreased demand for furniture based on reduced new housing starts due to changing age demographics has been balanced by increased expenditures from repair and remodeling. Home renovations seem to be bundled with new furniture purchases.

Annual household expenditures have been shown to vary greatly depending on the age of household heads. Primary purchasers of furniture in the U.S. are households headed by persons in the 35-54 age group (10) This age group is expected to grow as a proportion of the U.S. population as the "baby boomers" move through society (23). This market growth is favourable for increased sales of wood furniture at the retail level (9) and increased market opportunities for U.S. manufacturers and their raw material suppliers.

Furniture/Today, in its annual composite forecast, predicts that the U.S. furniture industry can look forward to continued rising demand (14). Increased 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. Projected retail furniture sales are $38.3 billion in 1993 and $40.9 billion in 1994. This represent an 11% increase in consumer spending on furniture since 1989 (14). Preliminary results for 1993 and 1994 indicate even higher levels of growth than originally forecast. 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 wood household furniture segment produces mainly living room furniture such as chesterfields, occasional tables, entertainment units, bedroom furnishings, and dining room furniture. 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. Table 3 summarizes U.S. production by furniture type.

Table 3: U.S. Wood Household Furniture Production by Product Type in 1989 (18).

	Percentage (in %) Manufacturing by Value of Sales			
Furniture Category	< $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

Bedroom furniture was produced by 66.7 percent of furniture firms; 65.2 percent produced dining room furniture; and 53.6 produced occasional furniture (18). The authors noted that as the size of the responding firms increased, the number of furniture categories produced per firm decreased. More than half of respondents with less than $1 million in annual sales were manufacturing at least 7 of the 10 furniture categories listed. Only 3 furniture categories were manufactured by more than half of firms with more than $ 1 million in sales. Geographical differences showed that home

office furniture was produced by 52.9 percent of manufacturers in the West but only 37.7 percent nationally.

3.2 FURNITURE STYLE TYPES

Furniture/Today conducts an annual survey of furniture manufacturers to determine the best selling and fastest growing styles. Respondents are asked to calculate their product shipments within 24 style categories grouped in 5 style families: American; Contemporary; European Country; Formal European; and Oriental.

Styles in the "American" family dominate the market in 3 of the 4 product categories surveyed. In bedroom furniture, American styles account for 52 percent of the market; in dining room, 50 percent; and in occasional tables 44 percent. Only in curios and entertainment centres does another style family, Contemporary, represent a greater proportion of production.

American 18th century was found to be the best selling furniture style category as named by 33 percent of respondents, followed by Casual Contemporary at 21 percent. Casual Contemporary was projected to be the fastest growing style by 22 percent of respondents, followed by Shaker with 14 percent.

3.3 FURNITURE CONSTRUCTION TYPE

Results of a recent survey of furniture manufacturers reported 1989 sales of wood household furniture consisted of the following:

44.7 % solid hardwood;
25.9 % artificial laminates over composites or softwood;
16.8 % hardwood veneers over composites or softwood;
8.4 % solid softwood; and,
4.2 % other construction type (17).

There were 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 percent of furniture shipments. In all other regions, solid hardwood construction represented less than 50 percent of production. The use of artificial laminates over wood composites also varied greatly between regions. In the Midwest, this method represented close to 40 percent of the value of shipments followed by just 11 percent in the South and 10.4 percent 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 Use in the U.S. Furniture Industry

The wood furniture industry is the most important user of high valued hardwood lumber and veneers in the United States (1). It is also an important market for softwood lumber and wood composite products. Material consumption patterns by furniture manufacturers impact demand and price movements for a range of solid wood raw materials.

Comprehensive data describing the U.S. manufacturing sector is 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. Gaps in data and the time between data collection periods results in much of the available data being obsolete by the time it is available to the public.

Because of this deficiency 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, a number of researchers have succeeded in obtaining reliable data. The results of several of these studies are reported here. The estimates of Forbes et al. (1993) of the volume of

lumber used by the major industry segments in 1990, as well as projected levels for 1992 are summarized in Table 4.

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

	Hardwood (MMBF)		Softwood (MMBF)	
Industry Segment	1990	1992	1990	1992
wood household furniture	1,196	1,329	744	774
upholstered furniture	1,018	1,277	64	88
wood office furniture	121	146	31	25
Total	2,335	2,752	839	887

The total volume of hardwood lumber used in 1990 was reported as 2.3 billion board feet (BBF). This was expected to rise to nearly 2.8 BBF in 1992, an increase of 13.5 percent. Softwood lumber usage for 1990 was reported as 831 million board feet (MMBF); a more modest increase of 5.7 percent, to 862 MMBF was predicted for 1992.

Manufacturers of wood household furniture were the largest consumers of hardwood lumber in 1990, using 1.2 BBF; manufacturers of upholstered furniture followed closely, using 1.1 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 percent of total consumption; upholstered and wood office furniture followed with 64 MMBF (7.6 percent) and 31 MMBF (3.7 percent) respectively.

Meyer (1992a) presented 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 that softwoods account for nearly 70 percent of the lumber use by western manufacturers as compared to a national average of less than 30 percent.

Table 5: Material Use Estimates For The Furniture Industry By Geographic Region.

	Regions				
in MMBF	Northeast	South	Midwest	West	West Coast
Hardwood lumber	254.9	1747.0	207.0	22.5	107.9
Softwood lumber	53.3	362.6	130.7	153.0	134.5

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 percent of all hardwood lumber used by the industry and was projected to increase to 32 percent in 1992.

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

Table 6: Percent of Total Hardwood Lumber Consumption.

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
Beech	3	2
Other	15	16

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 firms 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 percent 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 regions supply patterns.

Table 7: Percent Of Total Softwood Lumber Consumption.

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

In addition the volume of alder used by manufacturers in the West is likely to be much higher than one-percent 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 their suppliers.

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 (27). 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, and large tracts of hardwood forests are becoming mature and of harvestable age class, economic and societal barriers limit availability and many mills find it difficult to get enough timber (3).

4.0 METHODOLOGY

4.1 SAMPLE FRAME AND SAMPLE

Researchers analyzing wood use in the furniture industry have traditionally used as a sample frame the Standard Industrial Code segmentation. The difficulty with restricting 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. Thus firms that either use large volumes of wood but do not produce furniture classified as wood furniture or that use large quantities on non-wood materials are ignored in research results. In order to ensure that as many wood users as possible were contacted, the most appropriate survey technique was deemed to be a census; that is, the designation of the population of all furniture plants in the state of California as the sample frame.

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 (6). A mailing list of the population of furniture manufacturers in California was purchased from the firm Canadian Business Information (CBI) in Toronto. The list included 1,051 individual furniture manufacturing firms and according to CBI, the list was comprehensive as of January of 1993.

4.2 SAMPLING INSTRUMENT

Survey variables were chosen to provide a balance between the detail needed for meaningful analysis, and the brevity and simplicity needed to encourage an adequate response rate from a historically reticent population. Wherever possible, questions were limited to two or three lines of text and the majority of the questions were designed in the fixed alternative form rather than more time consuming open ended questions.

The survey was pre-tested on Mr. Gary Stafford, the director of the Western Furniture Manufacturers Association. Though making only minor suggestions with regard to the structure

and content of the questionnaire, Mr. Stafford suggested that, based on his experience with surveys conducted by Stanford University, a response rate of no higher than four percent could be expected. Despite this negative prediction, it was decided that the study would proceed.

To improve response rates, a business reply mail permit was purchased from the U.S. Postal Service (32).. A bar code was provided which was printed on the back of each survey 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 RESPONSES

The response to the survey is detailed in figure 2. The initial mailing list consisted of the names and addresses of 1,057 furniture manufacturing plants in California, the population of manufacturers in the state. After adjusting for incomplete addresses, 1,051 surveys were mailed. Of these, 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 following reasons were given 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; and, 20 firms could not be contacted because of an incorrect or insufficient address. 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 small firms compete, perhaps often unsuccessfully, for market share.

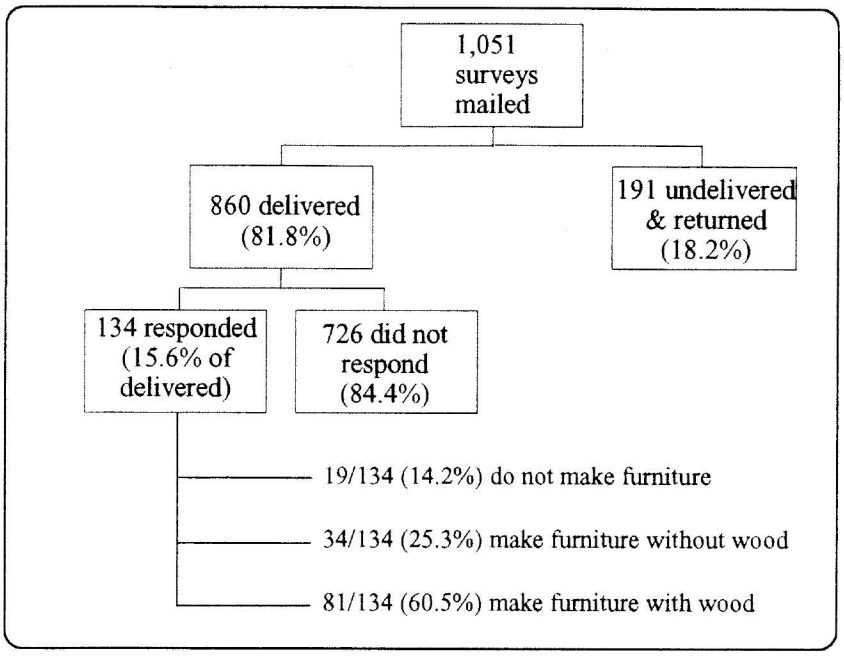

Figure 2: Summary of Response Rates

Of the 860 firms contacted, 726 did not respond to either of two mailings. Responses were received by 134 firms, for a response rate of 15.6%. Nineteen of the respondents contracted manufacturing to other firms, 34 manufactured furniture without wood, and the remaining 81 firms used wood to manufacture furniture.

5.2 SURVEY ERROR

The two major sources of survey error are random 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.

5.21 Response Bias

Response bias occurs when respondents tend to answer questions in a way that either inadvertently or intentionally misrepresents the truth. To minimize misrepresentation 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 and anonymity was assured in the covering letter, it is not likely that they would see any reason to intentionally misrepresent the truth.

Response rates for industrial mail surveys are typically in the range of five to twenty percent (5, 15).. To utilize the data resulting from a such survey, 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 the all those sampled (i.e. non-response bias).

5.22 Non-response Bias

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

population and the respondents on some key variables. Statistical tests indicated no significant differences between respondents and the population on these two variables.[3]

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 (12). A comparison between early and late respondents produces results similar to a test comparing respondents and non-respondents. The data for the study was 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.

Statistical tests on employee size categories found no difference between early and late respondents. In addition there was not difference for firm age, or the proportion of wood consumed as represented by hardwood species[4] In addition statistical tests indicated that equal proportions of early and late respondents used wood in furniture manufacture.

The decision to designate all furniture manufacturers as the sample frame makes the need to ensure that the sample is not skewed toward those who use or do not use wood very important. To deal with this situation, the proportion of wood-users among early respondents was compared to the proportion among late respondents and no differences were uncovered.[5]

On the basis of these tests it is believed that those who returned the questionnaire are 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

The vast majority of respondent firms (90%) indicated that they were single plant companies. Eight firms reported more than one plant while 6 firms reported having manufacturing facilities

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[3] A chi-square goodness-of-fit test was used at the 0.05 level of significance to determine goodness of fit.

[4] For these variables t-tests, at the 0.05 level of significance were used to compare means.

[5] A z- test, at the .05 significance level was used to test for differences in proportions

outside of California. Thus, the California furniture industry can be classified as dominated by small, regional firms.

Companies were concentrated around Lost Angeles with more than 72% of the responding firms located within 150 kilometers of the city core. Twenty-three per cent of the respondents were located within 150 kilometers of Sand Francisco. Smaller companies dominated the California furniture industry as is obvious from figure 3. These results emphasize the fragmented nature of the industry which is largely made up of small, owner-operated, geographically centred firms.

More than 40% of respondents indicated that they have been operating for 10 years or less, and only 27.5% have been in business for more than 30 years. The high proportion of relatively new firms is an indicator of the rate of growth of furniture manufacturing in California (see Table 8). However, the high number of undeliverable surveys suggests that a large proportion of firms are also leaving the industry.

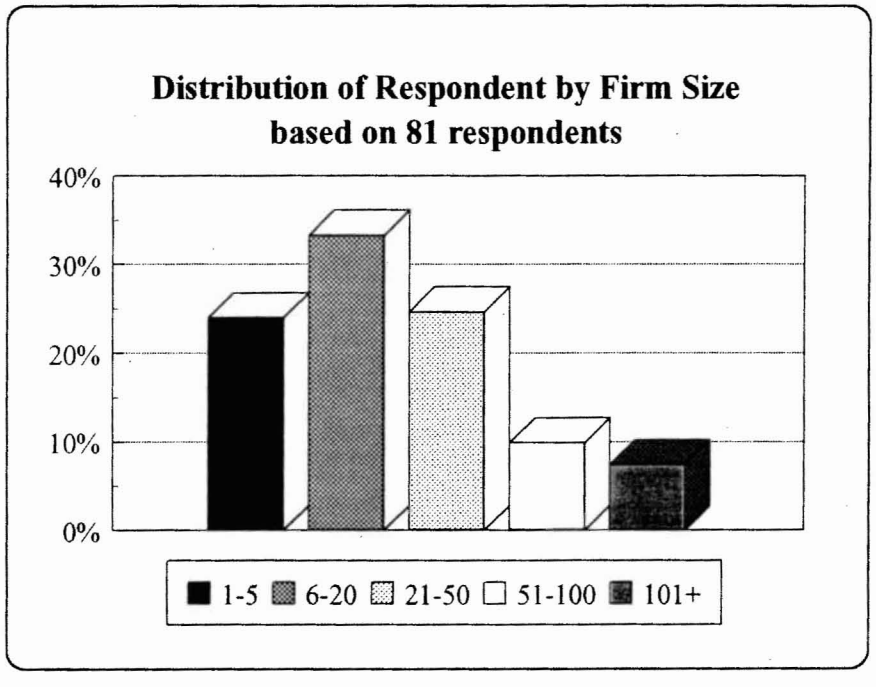

Figure 3: Respondent Firm Size

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 6 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 8: Year Company was Formed

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 PRODUCT PROFILE

5.41 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. Results are shown in Table 9.

Overall, about half of the respondents produced living room furniture and upholstered furniture, a third produced dining room furniture and 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 respondents production, living room furniture, 18.7%, dining room furniture, 12.6%, and office furniture, 12.3%.

Table 9: Product Groups Produced By Respondents.

Product Group	Number of Firms (% of respondents)	Average % of Production
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 not 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; firms with between six and twenty employees produced an average of 2.88 product groups; firms with between 21 and 50 employees produced 2.3 groups and firms with between 51 and 100 employees produced 1.1 groups. The trend was reversed among firms with more than 100 employees which produced an average of 2.8 groups.

5.42 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 most frequently produced styles were Contemporary and American; together, these style groups represented 85% of respondents furniture production (see Table 10). No relationship was found between firm size and the number of style categories produced, or between the number of product and style categories.

Table 10: Style Groups Produced By Respondents.

Style group	Number of Firms Producing.	Average % of Production
American	31 (38.3)	38
Contemporary	38 (46.9)	47
Formal European	8 (09.9)	4
European Country	3 (03.7)	10
Other	1 (01.2)	1

5.5 RAW-MATERIAL USE

5.51 Solid Wood Materials

Respondents estimated their 1992 expenditures on different types of solid wood raw materials including lumber, semi-finished and fully machined components, but excluding veneers and wood composites such as particleboard, hardboard and laminated veneer lumber. Almost half of the companies spent less than $50,000 on solid wood in 1992. Companies who spent between $50,000 and $100,000 made up 12.5%; between $100,000 and $200,000, 16.3 percent; and between $200,000 and $500,000, about five percent. Somewhat surprisingly, companies who spent more than $500,000 on solid wood represent 20 percent of the sample (see Table 11).

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 percent 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.

Table 11: Respondents 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 (02.5)
$300,001 - $500,000	1 (01.3)
more than $500,000	16 (20.0)
Total	80[6] (100)

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% expected to be using less wood in 1995, 46.9% expected no change, and almost half, 49.4% expected their volume purchases of solid wood to increase.

A summary of respondents percentage of total expenditures represented by solid wood is provided in Table 12. The largest proportion of respondents, 40.7 percent, spent 20 percent, or less, of their total expenditures on solid wood.

Table 12: Proportion Of Material Expenditures Represented By Solid Wood

Percent of expenditures 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)

[6] Not all respondents answered all questions. Only 80 respondents answered this question.

5.52 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 raw materials and few, if any other types of materials were used in the fabrication of furniture (8). As lumber became a more scarce resource, technology was developed which allowed the industry to make more efficient use of lumber. Typical of these developments are the veneers and particleboard 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 that also used solid wood was investigated. The majority of these companies spent less than $25,000 on wood composites in 1992 (Table 13).

Table 13: Respondents expenditures on wood composite raw materials

	Hardboard number (%)	Particleboard number (%)	Veneer number (%)	LVL number (%)
$0	45 (55.6)	57 (70.4)	49 (60.5)	76 (93.8)
$0 - $25,000	19 (23.5)	11 (13.6)	11 (13.6	2 (02.5)
$25,000 - $50,000	7 (8.6)	10 (12.4)	10 (12.4)	2 (02.5)
$50,000 - $100,000	3 (3.7)	0 (00.0)	3 (03.7)	1 (01.2)
$100,000 - $200,000	4 (4.9)	1 (01.2)	1 (01.2)	0 (00.0)
more than $200,000	3 (3.7)	2 (02.5)	7 (08.6)	0 (00.0)
total	81 (100)	81 (100)	81 (100)	81 (100)

5.53 Lumber and Component Use

Wood and Wood Products, in its annual national survey of furniture and fixture manufacturers reported that, in 1990, an average of 14.7 percent of the components used to manufacture furniture

production were purchased from component manufacturers. Very little regional variation was reported (27). The California furniture industry is heavily concentrated around Los Angeles, an area deficient in supplies of wood and wood products. In addition, land and labour costs are characteristically high (relative to the Southern United States and offshore Asian furniture manufacturing regions), and waste disposal problematic. For these reasons, it was anticipated that the tendency to 'job-out' production would be higher among California furniture manufacturers. This was found to be the case. As is shown in Table 14, almost two thirds of respondents' expenditures on solid wood materials in 1992 went to lumber, and the remaining 34.4 percent 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 14: Respondents 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%
Total	100%	100%

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. In companies with less than five employees; lumber accounted for over 80% of expenditures. Among firms employing between six and twenty people, lumber accounted for 61.4 percent of expenditures and among firms employing between 21 and 50 people, an average of 68.2 percent 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 percent.

5.6 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 percent, and softwoods for 21.5 percent, of total purchases. This is similar to national averages which indicated 75 percent hardwoods and 25 percent softwoods (11).

5.61 Hardwood Use by Species

As previously noted oak is the most frequently used species among furniture manufacturers accounting for 46% of total hardwood lumber consumption for furniture in the United States. Although the choice of species for solid wood raw materials is driven, to a large degree by consumer demand, regional availability and inbound transport costs also play a large part. It is not surprising, then, that as is shown in Table 15, oak is less popular among California manufacturers, representing only 28 percent of hardwood consumption.

Table 15: Hardwood Species Use.

Species	number. reporting use	hardwood consumption in %
Alder	45	40.6
Oak	44	27.9
Maple	26	8.9
Birch	11	4.9
Other	7	4.9
Ash	10	3.6
Cherry	13	3.1
Walnut	17	2.8
Poplar	8	2.6

Species	number. reporting use	hardwood consumption in %
Mahogany	11	0.9

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 percent 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.

5.62 Softwood Use by Species

A similar discrepancy between species used nationally and in California exist for softwoods. Southern yellow pine was by far the most frequently used species nationally, accounting for more than 58 percent of total consumption (11). However, in California this species averaged less than three percent of consumption (Table 16). Conversely, the use of Ponderosa Pine was so low as not to be reported nationally; but in California, this species accounted for nearly 50 percent of softwood consumed. None of the respondents to the survey 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 percent of total softwood consumption.

Table 16 Softwood Species Use in California.

Species	number reporting use	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

Species	number reporting use	softwood consumption (%)
Ponderosa pine	21	48.9
Hemlock	0	0
Western red cedar	3	3.0
Other	3	5.7

5.7 SUPPLY CHARACTERISTICS

5.71 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 17, the greatest proportion 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 17: Wood Material Supply Sources.

	Proportion (in %) of material from			
Product Type	Wholesaler	Mill	Broker	Component Producer.
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	0.7	57.6
sub-assemblies	23.1	0.0	0.0	76.9

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.

The fact that 75.6 percent of lumber is supplied by wholesalers and only 17.6 percent is obtained directly from the sawmill is related to regional timber supply characteristics and to the large number of small furniture manufacturers located in the Los Angeles area. It is clearly not in the sawmillers interest to fill large numbers of relatively small orders from a great distance. Wholesalers, located in the Los Angeles area, purchase in volume from the mills, and are thus able to meet the furniture manufacturers needs in a timely fashion.

5.72 Number of Suppliers

Respondents were asked to indicate the number of suppliers they used for each raw material category. As is shown in Table 18, the majority of respondents preferred to deal with between two and four suppliers, regardless of the product type being considered. Respondents were also asked to indicate whether they preferred to keep the number of suppliers they deal with to a minimum; 22.3 percent said yes and 77.6 percent said no.

Table 18: Number of Suppliers, by Product Group

	Respondents Reporting for Each Product Group: number (%)			
Number of suppliers	lumber	semi-finished components	fully-machined 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 (08.7)	1 (06.7)
8 or more	2 (03.2)	0 (00.0)	0 (00.0)	1 (06.7)
	63 (100)	24 (100)	23 (100)	15 (100)

5.73 Inbound Transport

Respondents indicated that the preferred mode of transport by which they received their raw materials; for all product categories, was by truck. Only five respondents indicated they received goods by rail and no other mode was mentioned. 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.

6.0 SUMMARY AND CONCLUSION

Economic and societal changes are providing impetus for the wood products sector in British Columbia, other parts of Canada, and the United States to shift production focus from commodity to value-added or specialty products A critical ingredient in this successful evolution is to understand markets willing to pay premiums for higher valued, more finished wood products. The California furniture industry is a potential target for more finished lumber and components manufactured from high quality BC timber resources. This paper presents the results of a survey sent to members of the California furniture industry to asses market potential for value-added BC lumber products. Results were scientifically representative of the entire California furniture industry and can be inferred to this population.

The vast majority of furniture companies in California are single plant companies geographically centered around Los Angeles and, to a somewhat lesser degree, San Francisco. The industry is characterized by a predominance of small, relatively new businesses. Most of the firms employ less than 20 employees and have been in business less than 20 years.

California furniture manufacturers focus on living room, upholstered, and dining room furniture. Solid wood is used in all 3 categories and high value, appearance grade lumber is used in both living room and dining room furniture. Similar to national averages, approximately 75% of all species used were hardwoods. American and contemporary styles represented over 85% of furniture manufactured in California.

About half of the firms spent less than $100,000 per year on solid wood purchases with 20% spending more than $500,000 per year. The majority spent more than 20% of their purchasing budgets on solid wood and a quarter of the firms spent over 60% of their material purchases on solid wood. About two thirds of the volume of wood use was for lumber and a third was for components or sub-assemblies. This percentage was not expected to change in the next few years.

While California furniture industries used similar proportions of softwood and hardwood species, the composition of each category differed dramatically from general U.S. industry use patterns in terms of species used in production. Of the hardwood species, the California industry favoured Alder which represented over 40% of all hardwood species used compared to less than 1% of overall U.S. consumption in furniture manufacturing. This suggest a potential opportunity for Alder specialty production in British Columbia, if the raw resource is available in sufficient quantity and quality.

In terms of softwood species, the California industry favoured Ponderosa Pine compared to Southern Yellow Pine, which was the nationally favoured softwood species. This presents an interesting opportunity since available supplies of Ponderosa Pine from the Pacific North West are expected to continue to decline. This may create an opportunity for substitute species from BC such as Lodgepole Pine or Interior Spruce.

Most California furniture manufacturers purchase small quantities for each order from existing wholesalers. Few use brokers or purchase direct from the mill. The best opportunity for BC producers is to manufacture and develop sales in component parts since most components and sub-assemblies used by California furniture manufacturers are purchased direct from the producer. However volumes are small and deliveries erratic.

Recent events including the riots, fire, floods, and earthquakes have drastically altered the manufacturing infrastructure of Southern California. Establishing new sources of supply with different species may be difficult when the entire region is attempting to rebuild from infrastructure devastation.

However, recent disruption of traditional sources of supply also create opportunities for new sources of supply. Opportunities that do exist will require a tremendous time commitment due to

the fragmented nature of the industry and the apparent predominance of small producers unable to purchase large quantities direct from the mill. The BC industry has the opportunity to replace traditional sources of supply which may be disrupted due to riots, fire, flood, and earthquakes in order to introduce products made from what would be considered new species in Southern California. Disruption of tradition creates windows of opportunities for new product introductions.

The small size of most California furniture manufacturers leads to typically small order quantities which indicates that it is not feasible to ship direct from production facilities in British Columbia to furniture manufacturers around Los Angeles. It is necessary to either develop warehouse depots near Los Angeles or establish a strategic alliance with key distributors that can inventory components and sub-assemblies close to the Los Angeles market. It is necessary to be able to deliver small order volumes quickly to the single plant companies that typify the California furniture industry.

Market opportunities in the California furniture industry do exist for value-added wood components from British Columbia. However the structure of the California industry creates impediments due to lack of scale economies. Opportunities will tend to be of the niche variety and most suitable for small, custom component producers willing to commit the resources necessary to develop relationships and alliances with existing segments of the California industry.

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