

CHARACTERISTICS OF U.S. HARDWOOD WOOD COMPONENT MANUFACTURERS

RICHARD P. VLOSKY

ABSTRACT

A number of states and regions in the United States are actively pursuing rural economic development initiatives to add value to their hardwood resources. One common challenge in these efforts is to attract new industry or to expand an existing hardwood manufacturing industry base. Beyond the production of hardwood lumber, a logical next step in the value-added chain is the production of wood components. This research, based on a comprehensive analysis of the U.S. wood components industry, had two objectives: 1) to understand the wood components industry and; 2) to provide information to people who are interested in using wood components manufacturing for rural development purposes. Respondent companies on average purchased 27 percent of their raw materials needs (by volume) from out-of-state suppliers, representing a potential opportunity for adding value to the hardwood resource. The most cited reasons for out-of-state raw material purchases were product availability, better prices, and better quality. The study also examined factors that foster or hinder wood components industry development. Highest rated factors that contribute to wood components company success were the ability to supply quality products to customers, development of long-term customer relationships, offering a high level of customer service, and company reputation. The foremost impediments to company success were acquiring quality raw material, developing a consistent raw material supply, and volatile pricing. With regard to location decision factors that influence corporate expansion or location, wood components manufacturers identified productivity of labor, labor costs, taxes, and a skilled labor supply as the most important factors.

Wood components such as dimension parts are dried and processed to a point where the maximum waste is left at the mill, and the maximum utility is delivered to the customer. Most hardwood wood component products are used for household and office furniture, kitchen and bath cabinets, decorative building materials, millwork, and a wide variety of other types of specialty wood products. Included among the typical wood products produced by wood components manufacturers are cut-to-size blanks, edge-glued panels, solid or laminated squares, mouldings, turnings, bendings, upholstered frame stock, interior trim, millwork, stair treads and risers, and a wide variety of component parts for the

kitchen and bath cabinet industry, such as cabinet doors, face frames, and drawer sides and fronts (14). Lawser (13) believes that in the hardwood industry, which includes products such as these, there will be accelerated movement toward producing more value-added products as a way to diversify and increase profit margins. These industries are also often the focus of economic development

initiatives, particularly in rural resource-based areas.

Attracting value-added wood product companies to rural areas is a complex problem that deserves special consideration because of its social and economic significance. In particular, community action groups and development agencies working to attract wood industries need to know what factors most influence location decisions by potential immigrant firms and expansion decisions by established companies. In order to encourage growth of their secondary forest products industries, several states sponsor corporate location incentives. Examples are programs such as Pennsylvania's "Hardwood Initiative," Wisconsin's "Forward Wisconsin," and Oregon's "Secondary Manufacturing Expansion," which aim to capture more value-added processing of their local timber to boost local economies (12).

A number of empirical studies have examined industrial location decisions. Generally, these studies found that access to markets (including cost and logistics of transportation), labor supply factors, and raw material supply are dominant determinants (3,6,9,19). It has also been suggested that firms may seek competitive advantage and profit-maximizing locations rather than those that minimize costs (10). For example, a firm supplying components to a major cus-

The author is an Assistant Professor, Forest Products Marketing, Louisiana Forest Products Lab., Louisiana State Univ. Agri. Center, Baton Rouge, LA 70803-6202. The author wishes to acknowledge William Luppold, Project Leader, USDA Forest Serv., Princeton, WV for an insightful review of this paper, and JoAnn Doucet, Staff Assistant, and Pat Lefeaux, Secretary, Louisiana Forest Products Lab. for their help on this project. This paper was received for publication in March 1995. Reprint No. 8338.

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tomers may choose a location that does not minimize production costs but that gains a competitive advantage over other firms and thus allows maximization of profits (4).

Traditional economic considerations are markets, transportation, labor, and raw materials; but other factors of both an economic and non-economic nature can become important when there is little difference in these traditional considerations between alternative locations (4).

Beyond a purely economic rationale for company location decision making, non-economic variables need to be addressed. McKee (16) identified empirical support for a behavioral approach to industrial location decisions. He cited a study conducted by Mueller et al. (17) that found evidence of a difference between normative and observed decision making. Managers in that study examined economic considerations as important factors in making industrial location decisions, but they actually ranked behaviorally oriented factors (such as personal considerations, change, and opportunity) as more important.

Behavioral factors seem to be particularly important when economic differences among decision alternatives are minimal and/or when the decision maker lacks the resources necessary to conduct a thorough analysis. For example, McKee (16) cites a study by Nason et al. (18) that describes a two-stage process: economic factors dominate in choosing broad regions, while behavioral factors dominate in choosing locations within the selected region.

METHODOLOGY

The sample frame for the study consisted of U.S. wood products manufacturing firms in Standard Industrial Classification (SIC) 2426: hardwood dimension and flooring mills. A database listing of 1,872 companies was purchased from Harris Publishing Company. This list was augmented by 31 hardwood dimension producers from a National Hardwood Lumber Association member list, for a total of 1,903 companies.

In general, survey procedures were conducted in accordance with the Total

Design Method (7). This procedure consisted of a pre-notification postcard, an initial survey mailing, a post-mailing reminder, and a second survey mailing.

RESULTS

PROFILE OF RESPONDENTS

Of the 1,903 surveys mailed, 82 were undeliverable or out of business, reduc-

ing the sample to 1,821. The total study response rate was 36 percent (650/1,821). Of the 650 returned surveys, 400 were from companies that indicated they were not in the hardwood dimension business. The balance of returned surveys were all usable, resulting in an adjusted usable response rate of 14 percent (250/1,821).

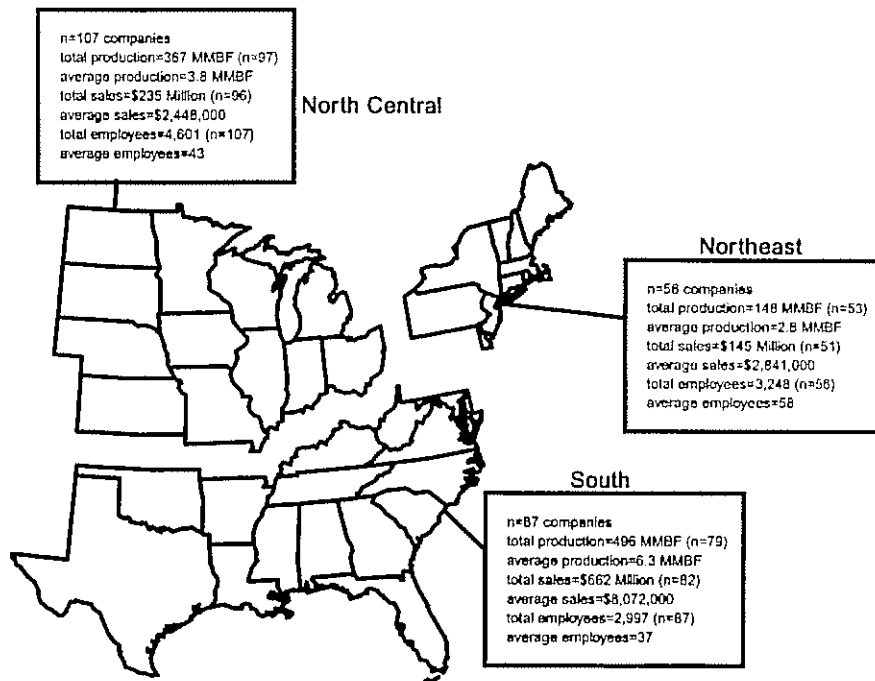


Figure 1. — Respondent data by region ($n = 250$ companies).

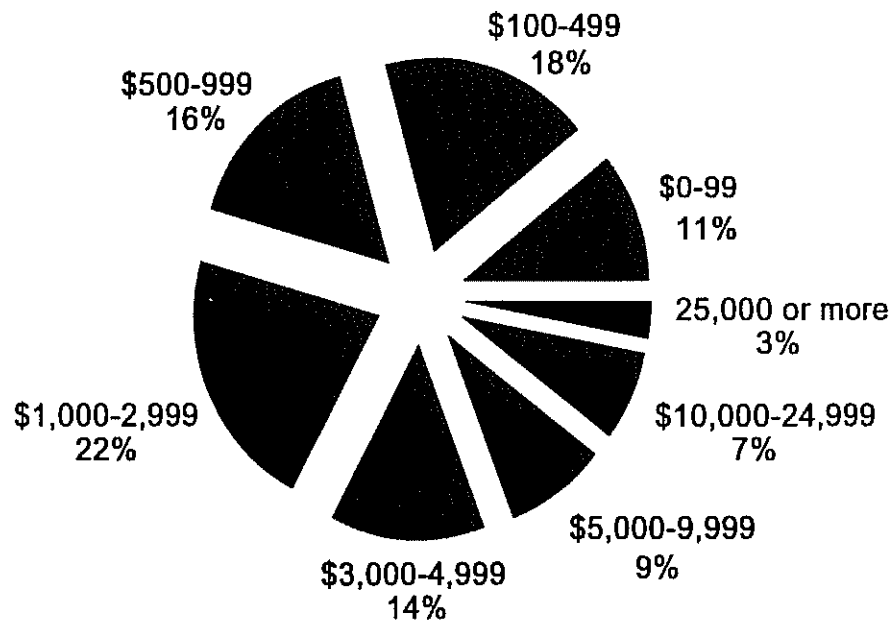


Figure 2. — Sales in 1993. Units are \$1,000 and percent of companies ($n = 231$ companies).

¹ Note that respondent companies likely produce many products, including hardwood dimension. The data in Figure 1 are for total production, not just the hardwood dimension component.

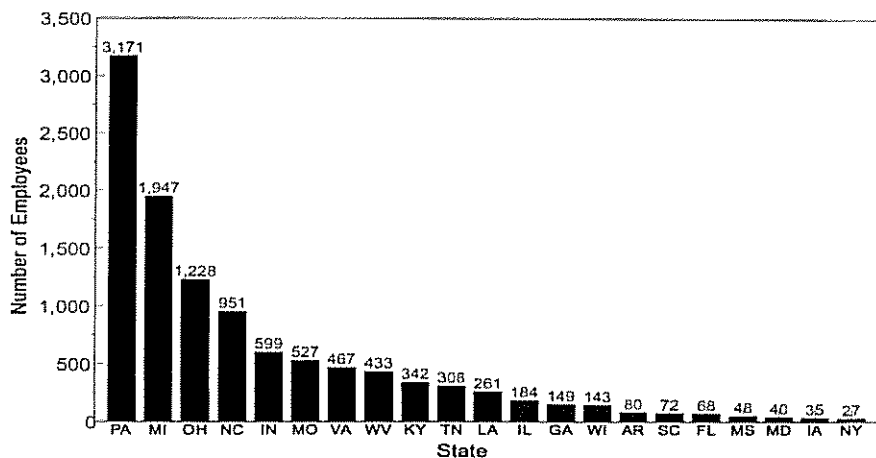
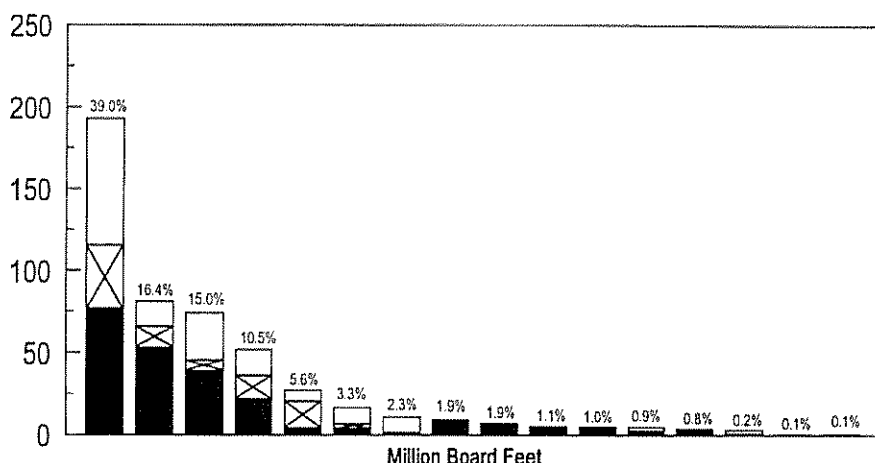


Figure 3. — Hardwood wood component employees by state; total = 11,080 employees; average = 45 per company ($n = 245$ companies).



	Red Oak	Poplar	White Oak	Maple	Cherry	Ash	Walnut	Gum	Birch	Sycamore	Hickory	Basswood	Cypress	Beech	Hackberry	Mahogany
North Central <input type="checkbox"/>	77.68	15.18	28.87	15.72	6.92	9.70	9.70	0.81	0.00	1.30	1.64	2.02	0.00	2.41	0.13	0.01
North-east <input checked="" type="checkbox"/>	38.58	12.89	6.06	14.30	16.28	3.16	0.25	0.07	0.83	0.00	1.03	0.05	0.00	0.54	0.00	0.05
South <input type="checkbox"/>	76.72	53.05	39.04	21.90	4.32	3.66	1.27	8.37	6.41	3.90	2.37	2.56	3.80	0.10	0.32	0.30
Total	192.98	81.12	73.97	51.92	27.52	16.52	11.22	9.25	7.24	5.20	5.04	4.63	3.60	3.05	0.45	0.36

Figure 4. — Species used as raw materials inputs in 1993, total volume and volume by region in million board feet, and percent of total respondent volume.percent of total respondent volume.

Although only SIC 2426 was used as a sample frame, given the responses, it is clear that there are many industry sectors besides hardwood dimension manufacturers represented in the sample frame. Many indicators were found that respondents define "hardwood dimension" in a much broader context than the U.S. Department of Commerce definition. For example, the number of employees known to actually exist in the hardwood dimension industry in a number of states

was disparate with respondent employee figures (15). This was also found to be the case with production figures. As a result, the data are presented in the broader context of wood components.

Demographic data for respondent companies can be found in Figure 1.¹ All respondent companies were from one of three U.S. census regions: North Central, Northeast, or South. Total 1993 respondent corporate sales revenue was \$1.042 billion, with an average of \$4.2

million. The South represented 64 percent of total respondent sales revenue, followed by the North Central (23%) and the Northeast (14%). Total 1993 production for respondents was 1.011 billion board feet (BBF) or an average of 4 million board feet (MMBF). The South dominated in production footage with 49 percent of the total, followed by the North Central (36%) and the Northeast (15%).

Figure 2 shows that 81 percent of respondent companies had less than \$5 million in sales in 1993. Respondent companies reported 11,080 employees, with 45 percent in the North Central region, 30 percent in the Northeast and 28 percent in the South. However, Pennsylvania respondent companies employed the greatest number of wood component employees in 1993 (Fig. 3).

NON-RESPONSE BIAS

Non-response bias was measured in two ways. First, the percentage of respondent employees in predetermined stratified groups was compared to percentages for companies that fell into the non-response/undeliverable category, which were known *a priori*. Using a two-tailed t-test, no difference was found at $\alpha = .05$. Second, a two-tailed t-test was conducted on percent of companies by state, comparing respondents and companies that fell into the non-response/undeliverable category. Again, no difference was detected at $\alpha = .05$.

SPECIES USED AS RAW MATERIALS

Study results indicated that red oak was the dominant species used by study respondents in 1993, with 39 percent (192.98 MMBF) of total respondent raw material volume (Fig. 4). Although hardwood dimension was not the only product represented, this is consistent with National Dimension Manufacturers Association (NDMA) figures that report that red oak remains the dominant species used in the production of hardwood dimension stock, accounting for 32.7 percent of all wood used in 1990 (12).

After red oak, the most used species (by volume) by study respondents were: poplar (16.4%), white oak (15%), maple (10.5%), and cherry (5.6%). Poplar's ranking is consistent with NDMA figures indicating that from 1987 through 1990 there was a significant increase in the use of yellow-poplar as a substitute

for softwoods in the production of interior trim, mouldings, and millwork (12).

Figure 4 shows that for the top five species used by study respondents in 1993, the North Central region dominated in red oak (77.68 MMBF), while the Northeast was the largest user of cherry (16.28 MMBF), and the South led in use of poplar (53.05 MMBF), white oak (39.04 MMBF), and maple (21.90 MMBF).

MARKETS AND MARKETING

Study respondents reported that they sold 59 percent of their 1993 production (by sales revenue dollars) to in-state customers, 36 percent to customers in other states, and 5 percent to export customers. Analysis of variance (ANOVA) using company size categories as treatments resulted in significant differences within "in-state" and "other states" markets at $\alpha = .05$. Larger companies have a lower percentage of sales to in-state customers and greater sales to other states than smaller companies. There were no significant differences found for sales to export markets between large and small companies.

A recent NDMA survey indicated that furniture dimension stock in 1991 accounted for 42.2 percent of total shipments, with kitchen and bath cabinet components accounting for 32.9 percent of the total (12). That survey showed a significant increase in hardwood components being used in various building and remodeling products, such as interior trim, mouldings, millwork, staircase parts, and flooring. This category accounted for 15.7 percent of all hardwood dimension products produced in 1991, up 40 percent from the previous year. A variety of decorative products and specialty type wood components products, such as wall plaques, picture frames, toys and gift items, accounted for 4.7 percent of the total business (12).

Our study results are somewhat different from the NDMA 1991 findings. Figure 5 shows that millwork was the most cited customer type for study respondents, followed by household furniture and kitchen cabinets. Although respondents did not report volumes to each customer segment, the relative importance of each segment in the total respondent customer mix is suggested by the relative frequencies shown. Figure 5 also gives a sense of which regions dominate as sources of origin for each of the customer segments listed. For example, respondent

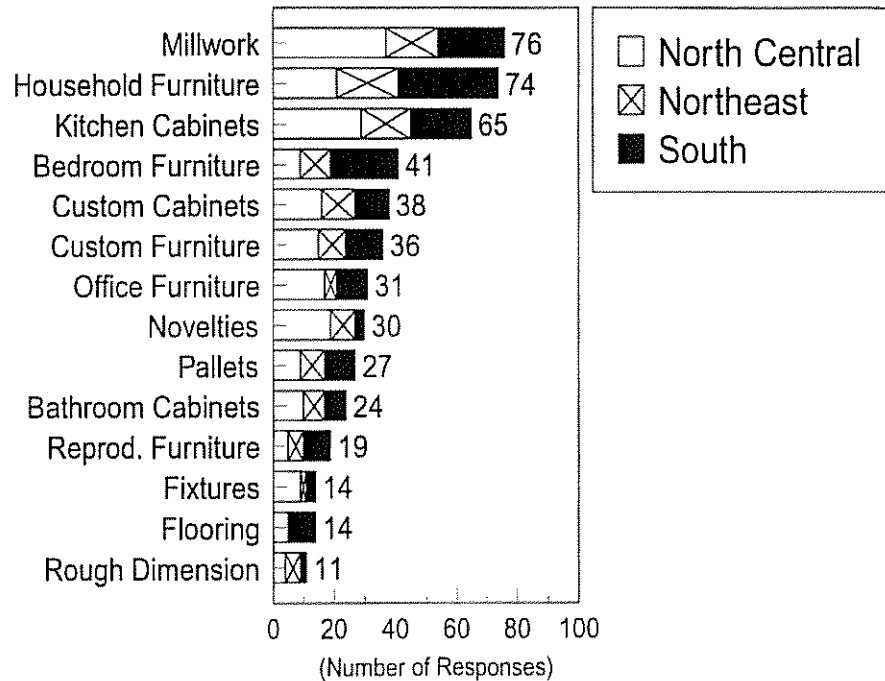


Figure 5. — Customer segments in 1993.

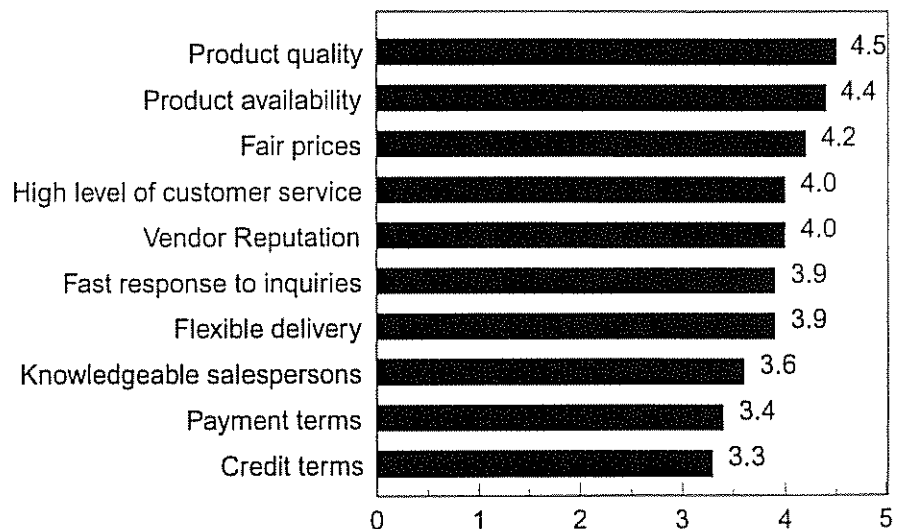


Figure 6. — Hardwood lumber supplier selection criteria ($n = 250$ companies). Scale: 1 = very unimportant; 5 = very important.

companies in the North Central region had the most responses with regard to selling to millwork customers, while the South dominated the household furniture category.

Two-thirds of respondent 1993 sales (by revenue) were shipped directly to customers, followed by wholesalers (26%), stocking distributors (6%), and others (2%). ANOVA using company size categories as treatments resulted in

significant differences in sales to wholesalers at $\alpha = .05$. Larger companies had a lower percentage of sales to wholesalers than smaller companies. There were no significant differences found for other distribution channels between large and small companies.

Word-of-mouth was the promotional method most cited by study respondents, followed by, in ranked order, networking, the use of company sales representatives,

membership in industry associations, and magazine advertising. This is consistent with studies conducted on the secondary wood products industry in Louisiana, the U.S. South furniture industry, and the U.S. South household cabinet industry, which found that word-of-mouth was the most cited promotional method (20-22). This suggests that industries characterized by small, geographically dispersed companies rely on relationship-oriented means of promotion rather than electronic or print media.

SELECTION CRITERIA

In the quest to add value to hardwood resources, important questions to ask are: "What do hardwood lumber suppliers

need to do to get wood component manufacturer business?" and "Why do wood component manufacturers purchase raw materials from out-of-state suppliers when in-state suppliers exist?"

These questions were answered by responding wood component manufacturers. Using 5-point scaled questions indicating level of importance (1 = very unimportant; 5 = very important), respondents evaluated 11 hardwood lumber supplier selection factors. **Figure 6** shows that product-oriented criteria (product quality, product availability, and fair pricing) were the most important. The next five factors were relationship and capability oriented and included customer service, vendor

reputation, responsiveness, flexible delivery, and knowledgeable salespersons. The lowest ranked criteria had to do with credit and payment terms offered by suppliers.

The literature contains a number of studies that examine criteria for selecting hardwood lumber suppliers. For example, in a study conducted by Bush et al. (5), hardwood lumber buyers were asked to indicate the importance of a variety of supplier characteristics. They found that competitive pricing, supplier's reputation, and rapid delivery were important.

A study of major U.S. furniture and cabinet manufacturers found that wood component buyers identified price and product quality as the two leading factors for choosing a supplier. Other factors included: on-time delivery, dependability of supply, required lead time, and species availability (1).

In another study, Canadian hardwood lumber purchasers ranked reliability of supply at the top of the list (2). This same study asked lumber purchasers to rank attributes; overall product quality, overall service quality, and competitive pricing ranked highest.

Forbes et al. (8), in a study examining furniture manufacturer supplier criteria, found that product-oriented factors such as load-to-load consistency, accurate grading, absence of warp, crook, and bow, and accurate moisture content were most significant, followed by a set of service- and relationship-oriented factors.

Responses to the second question regarding out-of-state raw materials purchases are summarized in **Figure 7**. The most frequently cited reason that respondents purchase raw materials from out-of-state suppliers is product availability. The other two reasons of any consequence are that out-of-state suppliers offer better prices and better quality.

SUCCESS AND IMPEDIMENT FACTORS

Using 5-point scaled questions indicating level of importance (1 = very unimportant; 5 = very important), responding wood component manufacturers were asked to rank factors that contribute to the success of their business as well as those factors that impede success in the marketplace. The two most important and equally ranked success criteria for respondent companies are product quality and development of long-term cus-

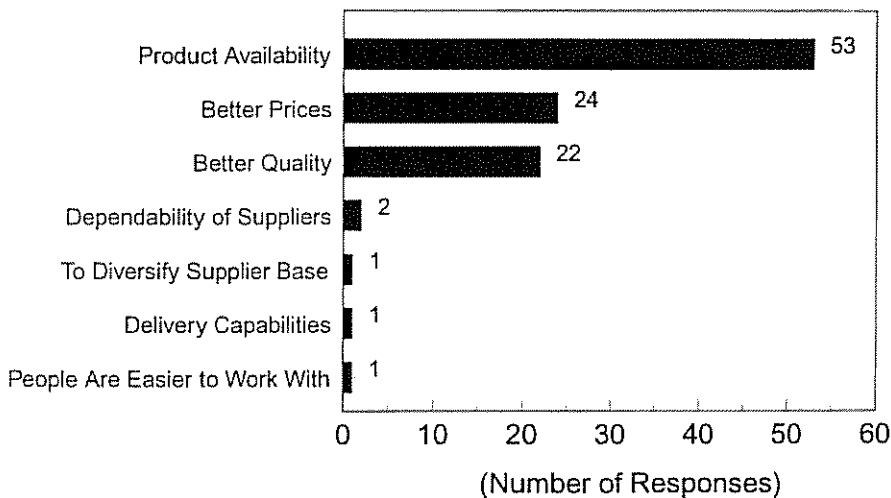


Figure 7. — Reasons for purchasing raw materials from out-of-state suppliers ($n = 97$ companies.)

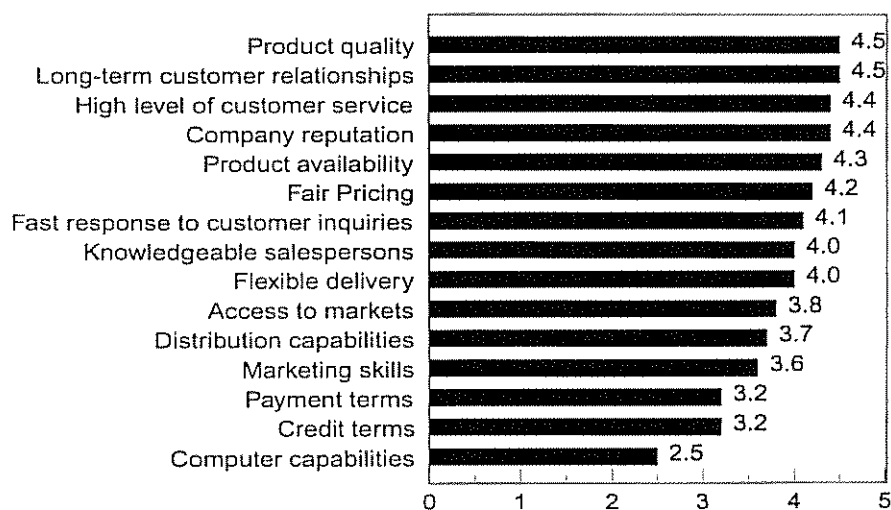


Figure 8. — Company success factors ($n = 250$ companies). Scale: 1 = very unimportant; 5 = very important.

customer relationships (Fig. 8). The importance of relationship factors to company success is further indicated by the next highest ranked factors: offering high levels of customer service and overall company reputation. An understanding of the customer base and development of long-term relationships can be significant factors in building or maintaining market share.

On the other side of the equation, respondents were asked to evaluate factors that are a hindrance to their success in the wood components business (Fig. 9). The foremost impediment is acquisition of quality raw materials, followed closely by development of consistent raw material supply. These factors can be mitigated if wood components companies focus on the factors that they themselves identified as contributors to success, particularly those that are relationship oriented. However, in this case, rather than these factors being applied to wood component manufacturer relationships with customers, an upstream perspective needs to be developed with raw material suppliers.

The success and impediment responses can identify important issues for existing companies as well as individuals that are considering entering the wood component business.

LOCATION DECISION FACTORS

As part of the evaluation process that identifies high potential value-added industries, information about factors that encourage or deter industry location is required. Nineteen factors that influence hardwood wood components industry expansion for existing companies or location decision criteria for companies considering immigration were analyzed. Five-point scaled questions indicating level of importance (1 = very unimportant; 5 = very important) were used. Labor issues (productivity and costs) are deemed most important by study respondents (Fig. 10). Subsequent factors, in order of importance, are: proximity to an adequate and sustainable raw material supply, a favorable tax structure, the availability of skilled labor, and an amenable community industrial climate.

These results are in contrast to results found by Jones et al. (11) in a study that included an examination of location factors for selected hardwood manufacturing industries. The 36 hardwood wood components and flooring manufacturers

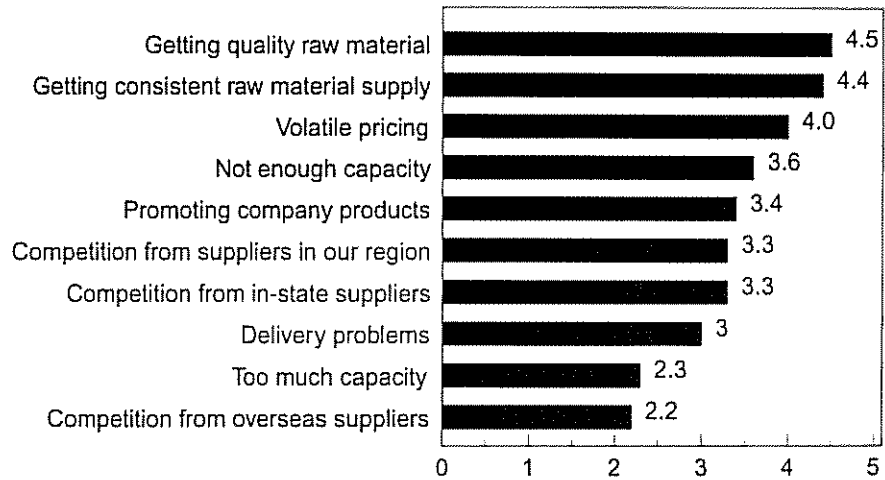


Figure 9. — Impediments to company success ($n = 250$ companies). Scale: 1 = strongly disagree; 5 = strongly agree.

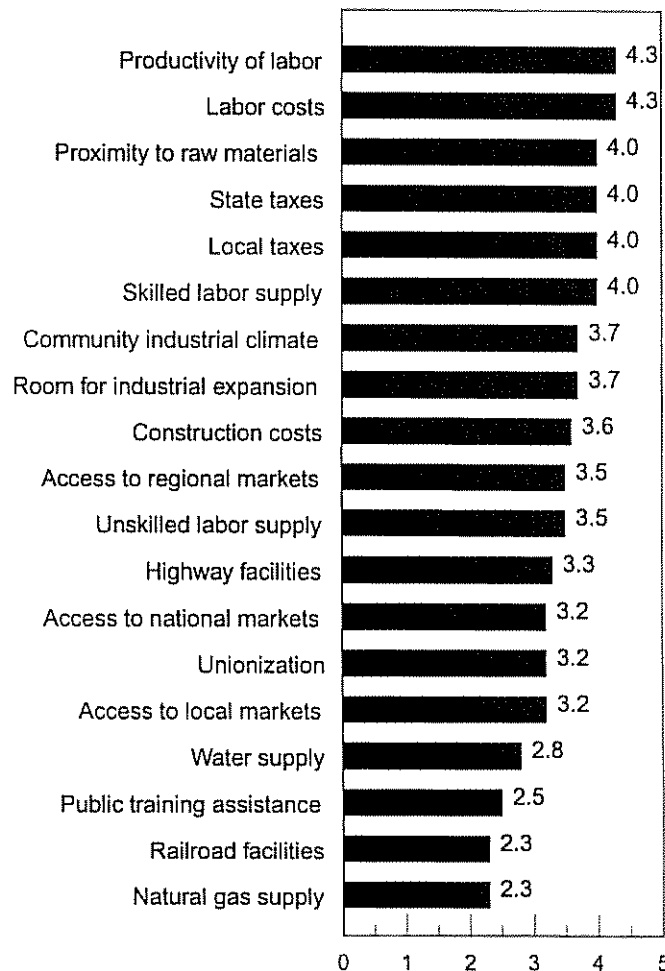


Figure 10. — Factors influencing expansion or building new facilities ($n = 250$ companies). Scale: 1 = very unimportant; 5 = very important.

queried said that the most important location decision factor was securing an adequate wood raw material supply followed by access to markets, personal considerations (attitudes toward industry and personal ties to the area), labor costs and availability (low wages, high productivity, and adequately skilled labor), service utilities, and taxes and regulations.

SUMMARY

Economic development planners involved in secondary wood products industry development can use this information as one input in the planning process. The data suggest that there are a number of issues that need to be addressed if wood components is a targeted industry.

The responses to questions regarding lumber supplier selection criteria and reasons that wood component manufacturers purchase out-of-state raw materials can be used as a guide to keeping more resources in a state to be processed further, thus adding value. Specific factors that wood components manufacturers identified as being critical to success as well as those factors that are impediments can help wood components manufacturers be more competitive in the marketplace. All of these factors can also be inputs to the economic planning process, with the goal of maximizing wood component industry growth and development potential.

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