

Characteristics of U.S. Hardwood Wood Component Manufacturers

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Abstract

A number of U.S. states and regions 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 oriented 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.

Introduction

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). These industries are 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 are most important in making location decisions by potential immigrant firms and expansion decisions by established companies. Several state economic development agencies, in efforts to encourage growth of their secondary forest product industries, include corporate location incentives. Examples are programs such as Pennsylvania's "Hardwood Initiative," Wisconsin's "Forward Wisconsin" and Oregon's "Secondary Manufacturing Expansion" that aim to capture more value-added processing of their local timber to boost local economies (12).

A number of empirical studies have been done on 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 customer 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).

In addition to traditional economic considerations such as markets, transportation, labor and raw materials, other factors of both an economic and non-economic nature can be particularly important when the differences in labor, raw material and transportation costs between alternative locations are insignificant (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 ranked economic considerations as the factors that should be most important in making an industrial location decisions, but they actually ranked behaviorally oriented factors (such as personal considerations, change and opportunity) as the most 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 Nason et al. (18) who describe a two-stage process: economic factors dominate in choosing broad regions, while behavioral factors predominate in choosing locations within the selected region.

Methodology

The sample frame for the study consisted of U.S. wood products manufacturing firms in SIC (Standard Industrial Classifications) 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 National Hardwood Lumber Association member companies, not on the Harris listing, that indicated they were hardwood dimension producers, 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, reducing 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 useable, resulting in an adjusted usable response rate of 13 percent (250/1,903).

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. In addition fully 400 of the 650 returned surveys were not in the dimension industry. As a result, the data is 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 the three U.S. census regions indicated. For the balance of the paper, these regions will be referred to as North Central, Northeast and South. Total 1993 respondent corporate sales 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 percent) and the Northeast (14 percent). 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 percent) and the Northeast (15 percent).

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

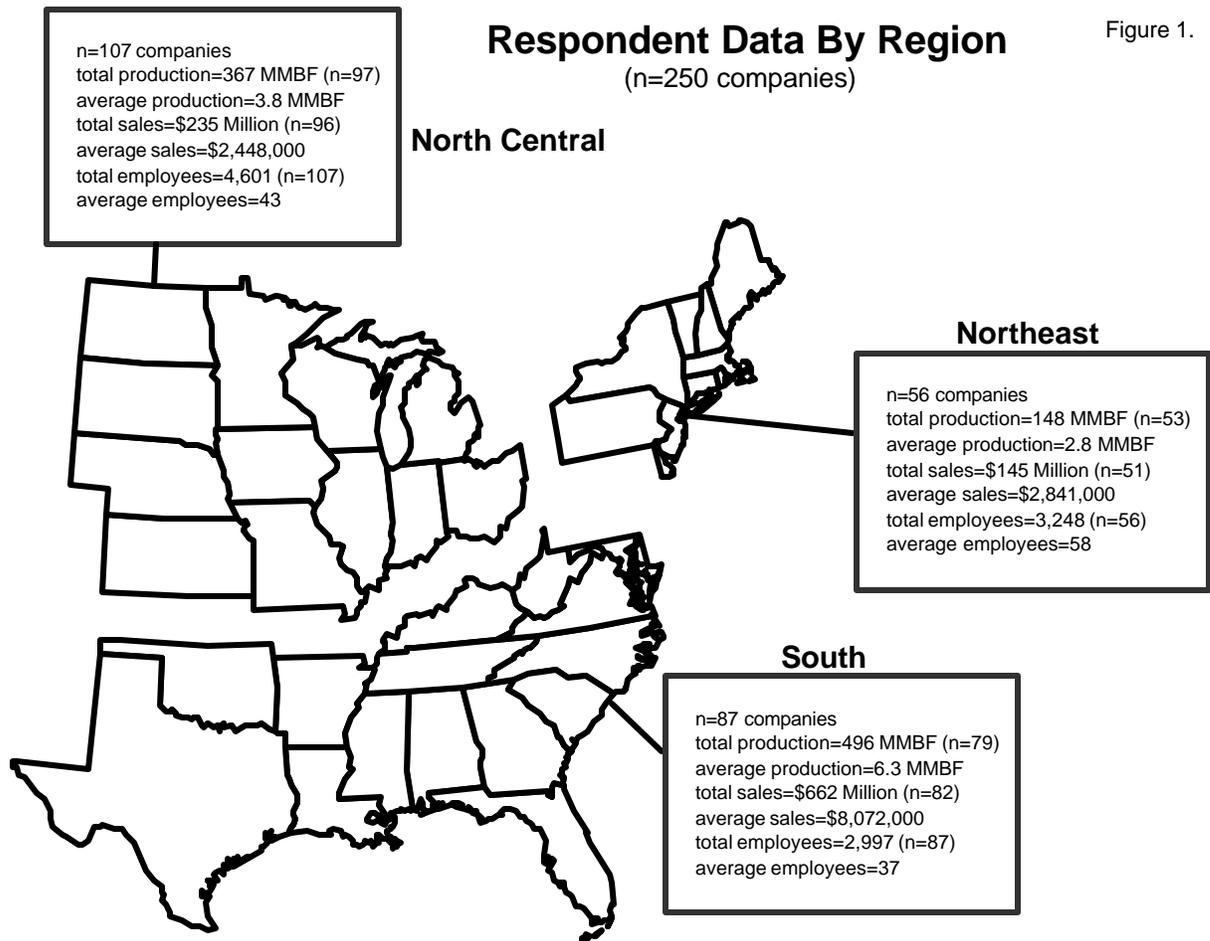


Figure 1.

Figure 2 shows that eighty-one 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, as seen in Figure 3, Pennsylvania employed the greatest number of wood component respondent employees in 1993.

Figure 2.

1993 Sales
 Percent of Companies in Each Sales Category
 (\$1,000)
 (n=231 respondent companies)

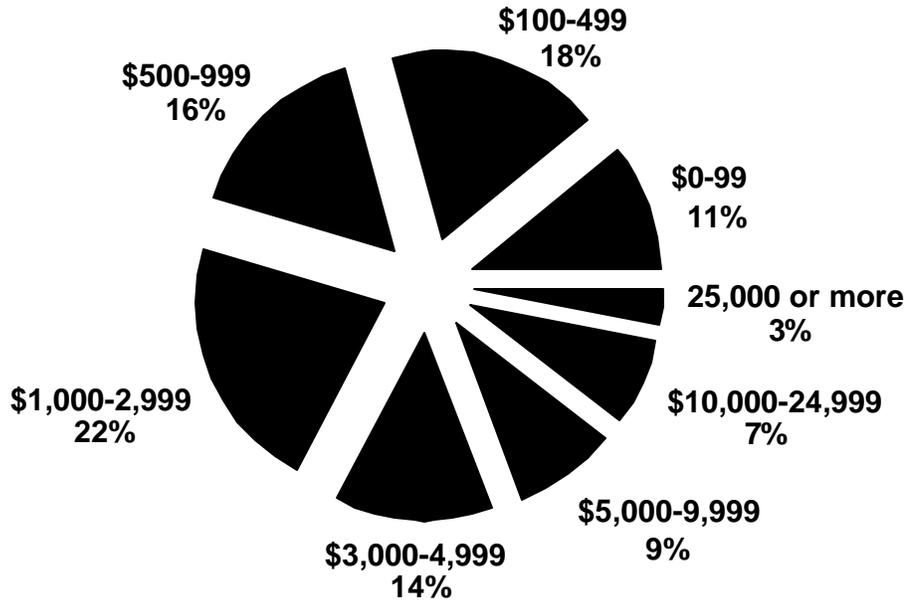
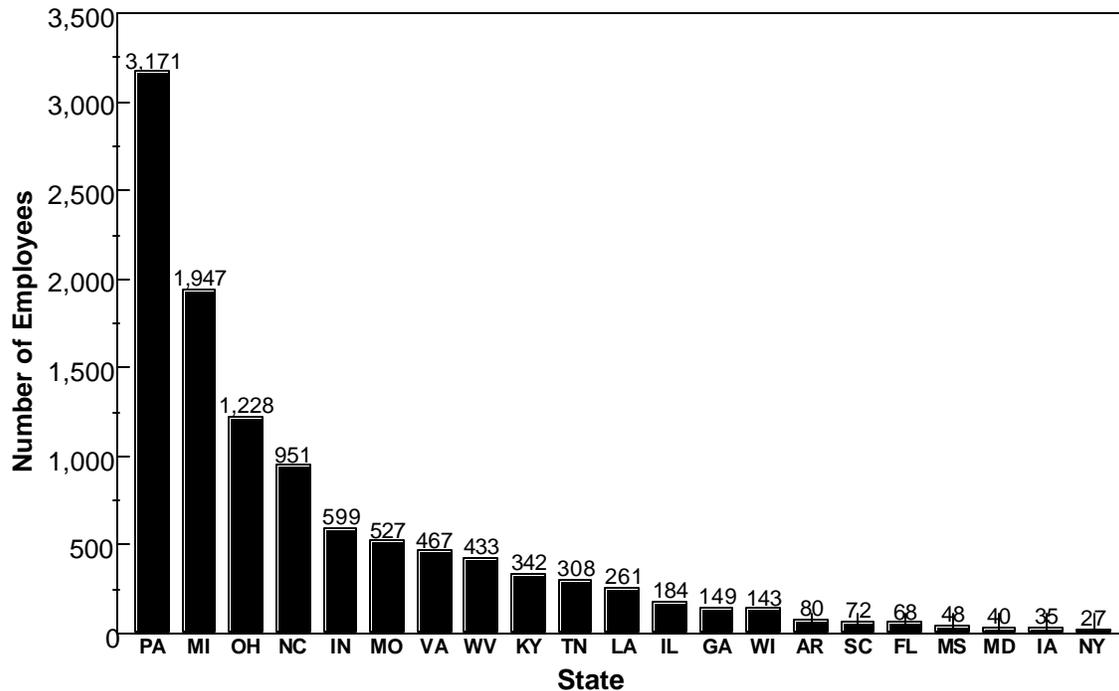


Figure 3.

Hardwood Wood Component Employees By State
 (n=245 respondent companies)
 Total=11,080 employees Average=45/company



Non-response bias

Non-response bias was measured in two ways. First, the percentage of respondent employees in pre-determined 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. 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).

The most used species (by volume) by study respondents after red oak in order were poplar (16.4 percent), white oak (15 percent), maple (10.5 percent) and cherry (5.6 percent). Poplar's number two 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).

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

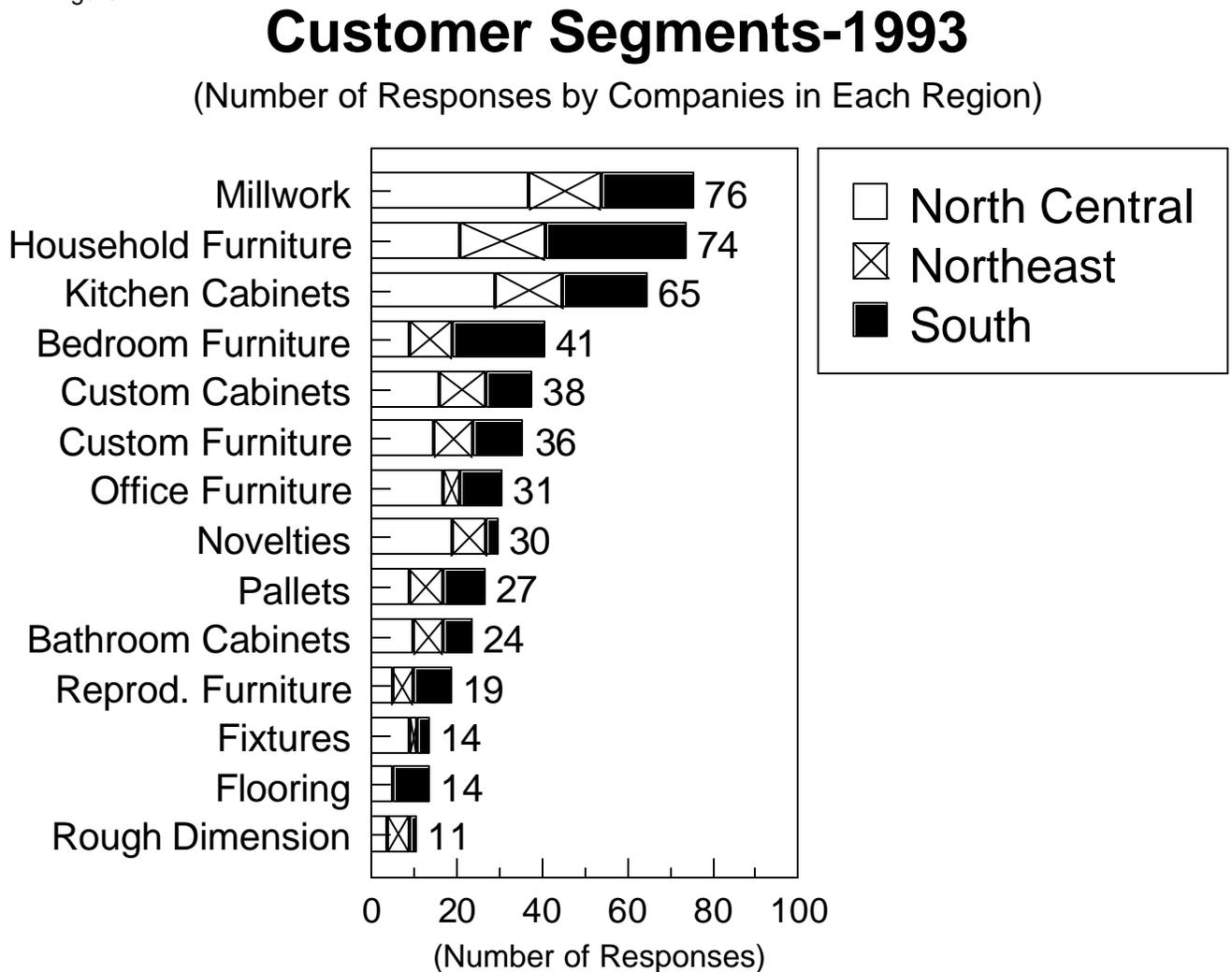
Study respondents reported that they sold 59 percent of their 1993 production (by sales revenue dollars) to in-state customers with 36 percent going to customers in other U.S. states and 5 percent to export customers. Analysis of variance (ANOVA) using company size categories as treatments resulted in significant differences within “in-state” and “other U.S. states” markets at $\alpha = .05$. Larger companies have a lower percentage of sales to in-state customers and greater sales to other U.S. 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).

Study results are somewhat different than the NDMA 1991 findings. Figure 4 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 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.

Figure 4.



Two-thirds of respondent 1993 sales (by revenue) were shipped directly to customers, followed by wholesalers (26 percent), stocking distributors (6 percent) and other (2 percent).

Analysis of variance (ANOVA) using company size categories as treatments resulted in significant difference 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 U.S. South household cabinet industry that found that word-of-mouth was the most cited promotional method (20,21,22) suggesting that industries characterized by small, geographically dispersed companies rely on relationship-oriented means of promotion rather than electronic or print media.

Hardwood lumber supplier selection criteria for wood components manufacturers

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?”

Study respondents answered these questions. Using 5-point scaled questions indicating level of importance (1=very unimportant to 5=very important), respondents evaluated 11 hardwood lumber supplier selection factors. Product oriented criteria (product quality, product availability and fair pricing) were the most important. The next 5 were relationship and

capability oriented and included customer service, supplier reputation, responsiveness to customers and flexibility in delivery. 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 to be important.

A study of major U.S. furniture and cabinet manufacturers found that price and product quality were identified as the two leading factors for choosing a supplier by wood component buyers. Other factors include: 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 in ranking the importance of a supplier's ability to provide products and services (2). This same study asked lumber purchasers to rank the importance of product and service quality with overall product quality, overall service quality and competitive pricing ranking 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.

The second question also regarded out-of-state raw material purchases. Once again, 5-point scaled questions indicated level of importance were used (1=very unimportant to

5=very important). The most frequently cited reason that respondents purchase raw material 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 higher product quality. These findings suggest that if in-state suppliers can increase development of the wood components customer base and offer quality products at competitive prices, more raw materials will be processed in-state, thereby increasing the value-added to the resource.

Wood component manufacturer success and impediment factors

Using 5-point scaled questions indicating level of importance (1=very unimportant to 5=very important), study respondents were asked to rank factors that contribute to the success of their business as well as those factors that impede success in the marketplace. As seen in Figure 5, the two most important and equally ranked success criteria for respondent companies are product quality and development of long-term customer relationships. The importance of relationship factors to company success is further indicated by the subsequent highest ranked factors, offering high levels of customer service and overall company reputation. An understanding of the customer base and development of a long-term orientation can be a significant factor in building or maintaining market share.

Figure 5.

Company Success Factors (n=250 companies)



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. The foremost impediment is acquisition of quality raw material 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 help existing companies improve their core capabilities and market position as well as identify important issues for individuals that are considering entering the wood component business.

Wood component industry 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 to 5=very important) were used. Labor issues (productivity and costs) are deemed most important by study respondents. Subsequent factors, in order of importance are proximity to an adequate and sustainable raw material supply, a favorable tax structure, the availability of a skilled labor pool and an amenable community industrial climate.

These results 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 queried said that the most important location decision factor was securing and adequate wood raw material supply followed by access to markets, personal considerations (attitudes towards industry and personal ties to the area), labor costs and availability (low wages, high productivity, and adequately skilled labor), service utilities and last, 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 information contained in the sections on 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 resource in-state to be further processed, 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 are more competitive in the marketplace. All of these factors can also be inputs to economic planning process with the goal of maximizing wood component industry growth and development potential.

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