

AN INVESTIGATION OF HARDWOOD PLYWOOD MARKETS. PART 2. FIXTURE MANUFACTURERS

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ABSTRACT

This is the second part of a two-part study investigating markets for hardwood plywood. Part 1 dealt with architectural woodworkers. North American fixture manufacturers were surveyed to better understand the structure and use of wood-based panels in the industry. A questionnaire was mailed to a sample of U.S. and Canadian fixture manufacturers. The sample consisted of members of the National Association of Store Fixture Manufacturers (NASFM). The response rate, adjusted for bad addresses, was 20 percent. The average fixture manufacturer purchased \$1.2 million of panel materials in 1997, and \$244,000 of hardwood plywood. Of total panel purchases, medium density fiberboard (MDF) represented 28 percent, hardwood plywood (including all substrates covered with a hardwood veneer) represented 20 percent, melamine-coated board was 20 percent, raw particleboard was 15 percent, and high-pressure laminate was 11 percent. Of the hardwood plywood purchased, 47 percent was MDF core, 34 percent was particleboard, and 14 percent was veneer core. Sixty-four percent of total hardwood plywood was premium grade, followed by custom (27%), and paint grade (5%). Red oak was the predominant face species used (31%), followed by maple (24%), cherry (11%), birch (10%), and white oak (5%). Fifty-two percent of the faces were constructed of sliced veneer. Over 6 percent of the total hardwood plywood purchases was of pre-finished plywood. This number was expected to increase to 12 percent by the year 2000. The most important hardwood plywood attribute as perceived by fixture manufacturers was absence of delamination of veneers, followed by on-time delivery, orders shipped correctly, and shipment arrives in good condition.

The fixtures industry may be defined as a fragmented industry. The industry is comprised of approximately 2,200 firms throughout the United States, with no single firm holding a large share of the market (15). Generally, firms are small, family-held businesses consisting of 20 employees or less. Firms specializing in fixtures manufacturing employ approximately 75,400 workers and have a payroll of \$2 billion (15). Jobs are typically generated by bidding against competing firms, a process that encourages strong competition between firms. Recent trends in the industry include increased price competition, lower profit margins, and shrinking lead times. These factors create a highly competitive environment for fixture manufacturers.

As the business environment becomes more and more competitive, it is increasingly important that fixture manufacturers develop and implement business strategies. Successful strategy development requires current knowledge about the industry in which a firm competes (13,16). Such information allows the firm to position itself relative to

its competitors, and assists in strategy development and managerial decision making. Also important to manufacturers is that the quality of materials and services they receive from suppliers meet their manufacturing needs. With the current influx of new products and innovative technologies, there is tremendous opportunity for suppliers to

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the industry to offer better products and services to the fixtures industry. However, without adequate understanding of the needs and desires of the fixture manufacturer, suppliers cannot competently serve their customers. This type of information could eventually lead to better products and services designed specifically for the fixture manufacturer.

In spite of the importance of such information, few data exist about the fixture manufacturing industry. The purpose of this study was to provide such information. The specific objectives were to: 1) investigate the structure of the fixture manufacturing industry; 2) determine the relative importance of hardwood plywood product and supplier attributes as perceived by fixture manufacturers; and 3) investigate plywood use trends. This is the second part of a two-part study investigating markets for hardwood plywood. Part 1 dealt with architectural woodworkers (6).

METHODS

North American fixture manufacturers were surveyed to investigate the structure of the fixture manufacturing industry and plywood use trends, and to determine the relative importance of hardwood plywood product and supplier attributes as perceived by fixture manufacturers. Data were collected via a mail survey over a 6-week time frame.

POPULATION SURVEYED

The population of interest to this study was North American fixture manufacturers. The mailing list for fixture manufacturers was obtained from the National Association of Store Fixture Manufacturers (NASFM). Association membership lists were believed to be the best source given the fragmented nature of the subject industry. To test for bias in these lists (i.e., are association members different from non-members with regard to the data collected?), comparisons were made between firms that were association members and a sample of non-member firms. The entire membership of NASFM was surveyed. A random sample of 75 non-member firms was also surveyed. The final survey sample frame consisted of 479 fixture manufacturers.

DATA COLLECTION

Data were collected via a structured questionnaire. The survey instrument was designed with the assistance of a panel of experts comprised of hardwood

plywood distributors, fixture manufacturers, association executives, and others knowledgeable of the fixture manufacturing industry. The survey addressed the structure of the industry and collected data related to wood panel product and service attributes. Before administering the survey, the questionnaire was evaluated by this panel for content validity. Content validity refers to the adequacy with which the instrument measures what it is intended to measure (5). After adjustments, the questionnaire was pretested on a random sample of firms ($n = 20$). Appropriate changes were made to the questionnaire before mailing.

RESPONSE RATE AND NON-RESPONSE BIAS

When collecting data via a survey, subjects have the option to refuse to provide information. A lack of sufficient data due to non-response is potentially problematic. To reduce the likelihood of non-response, NASFM mailed pre-notification letters to subjects explaining the purpose of the study and asking for cooperation. This letter not only served as a pre-notification, but also added credibility to the study from the perspective of the manufacturers. Within 2 weeks of the pre-notification letter, a questionnaire was mailed, followed a week later by a postcard reminding firms to respond. Two weeks after mailing the postcard, a second survey was mailed to non-respondents. Such methods have been shown to improve response rates (8,9). The final response rate, adjusted for bad addresses, was 20 percent.

When the response rate of a survey is less than 100 percent, the potential for non-response bias exists. The lower the response rate, the greater the potential. Since the response rate for this study was 20 percent, non-response was a concern. To test for non-response bias, telephone calls were made to a random sample of non-respondents and subjects were asked to answer a few of the most pertinent questions on the questionnaire. Variables included in the non-response bias survey included values of sales, number of employees, percent of total sales represented by hardwood plywood, and attribute ratings of the most important attributes. Mean scores of the responses to these questions were compared to determine if biases existed between association member firms and non-member firms, and between re-

sponding firms and non-responding firms. Although no bias was detected ($\alpha = 0.05$) in perceptions between member and non-member firms, it was found that member firms tended to be larger than non-member firms (based on square footage of manufacturing facilities and number of employees) and member firms had higher annual sales. The presence of such bias could cause averages presented in this paper to be slightly inflated and could indicate the presence of slight error in other figures. No bias was detected ($\alpha = 0.05$) between respondents and non-respondents.

DATA ANALYSIS

Attribute importance was determined by asking fixture manufacturers to rate on a scale of 1 (not at all important) to 7 (extremely important) how important certain hardwood plywood product and service attributes were to their companies. Fixture manufacturers were then asked to rate on a scale of 1 (poor) to 7 (excellent) how their suppliers performed with respect to these attributes. Average importance and performance scores were then calculated for each attribute. Similar methods have been utilized in previous marketing research to assess importance of attributes (1-4,7,11,14).

Multivariate analysis of variance (MANOVA) was used to test for differences in importance and performance scores. Three comparisons were used: 1) suppliers with different ratios of hardwood plywood sales to total sales; 2) suppliers with different levels of total sales volumes; and 3) suppliers selling to different price point categories. Where differences were detected ($\alpha = 0.05$), Tukey's multiple-range test was used to determine the source.

Tests for violations of assumptions were performed to assess the appropriateness of utilizing MANOVA for this data set (10,12). No evidence of violations was detected ($\alpha = 0.05$) by Bartlett's test for sphericity and Box's M. Examination of box plots and normality plots indicated no violations of multivariate normal distribution assumptions.

RESULTS

THE STRUCTURE OF THE FIXTURE MANUFACTURING INDUSTRY

The average responding fixture manufacturer had total sales in 1997 of \$11.2 million. The average facility was 110,200 ft.² and employed 116 full-time

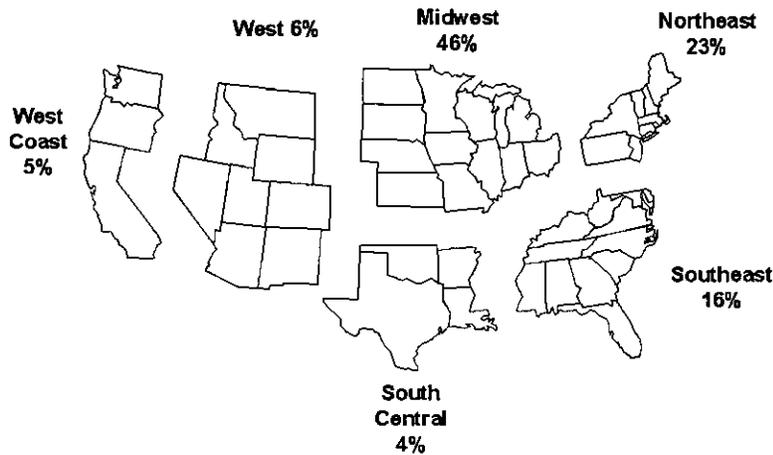


Figure 1.— Breakdown of 1997 North American fixture manufacturers' sales by geographic region.

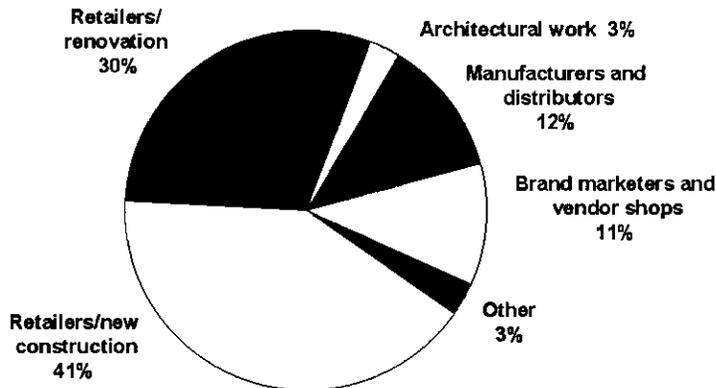


Figure 2.— Fixture manufacturers' 1997 sales by market segment category.

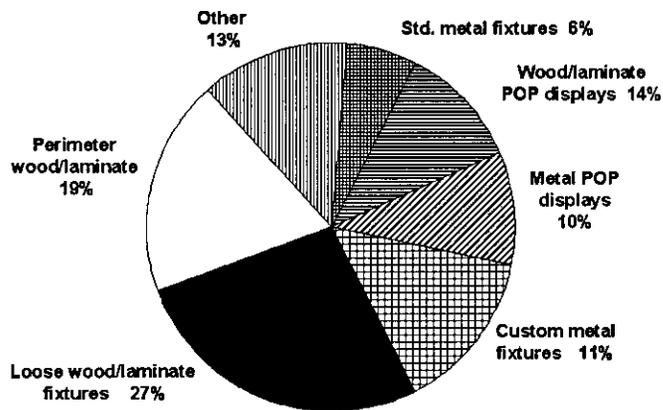


Figure 3.— Breakdown of total 1997 fixture manufacturer sales by product category.

¹ Loose wood/laminate fixtures are portable or moveable display units. Perimeter wood/laminate fixtures are fixtures applied to or abutting a store's walls, which aid in the selling of merchandise. Point-of-purchase displays are moveable displays with a short life span usually placed in impulse areas near checkouts in a store.

employees. The average firm purchased \$1.2 million of panel materials; \$244,400 of this was hardwood plywood. As was mentioned in the methods section of this report, statistical tests indicated potential sampling bias resulting from sam-

pling the NASFM membership. Tests indicated that non-members had smaller facilities, employed fewer workers, and had lower annual sales. The effect of this bias is a ballooning of the figures presented. In actuality, it is believed that for the fixtures manufacturing industry in general, these figures are slightly lower.

Figure 1 provides a breakdown of fixture manufacturer sales by geographic region. As shown, the Midwest was the largest region representing 46 percent of total sales. Next were the Northeast (23%), the Southeast (16%), the West (6%), the West Coast (5%), and the South Central (4%). Ninety-three percent of responding firms expected sales to increase by the year 2000, 3 percent expected a decrease, and 4 percent expected no change.

Figure 2 provides a breakdown of fixture manufacturer sales by market category. The largest market category for fixture manufacturers was new construction to retail stores, representing 41 percent of total sales, followed by renovation to retailers (30%), sales to other manufacturers and distributors (12%), and brand marketers and vendor shops (11%).

Figure 3 provides a breakdown of 1997 fixture manufacturer sales by product category.¹ The largest product category was loose wood/laminate fixtures representing 27 percent of total sales. Other important product categories included perimeter wood/laminate (19%), wood/laminate point-of-purchase (POP) display (14%), custom metal fixtures (11%), and metal POP displays (10%). Sixty-one percent of these product categories are significant users of wood-based materials.

Fifty-nine percent of 1997 fixture manufacturer sales exhibited a non-wood finish, 28 percent exhibited a wood finish (transparent or stained wood finish), and 13 percent exhibited an opaque or painted finish. The non-wood finish category includes all plastic laminate work and some metal fixture products. The opaque/painted category includes both wood-based and metal products. The wood finish category is the predominant user of hardwood plywood.

HARDWOOD PLYWOOD USE IN THE FIXTURE MANUFACTURING INDUSTRY

The fixture manufacturing industry is a significant user of wood panel

products. **Figure 4** shows a breakdown of 1997 panel purchases by fixture manufacturers. MDF represents 28 percent of total panel purchases. Other significant panel purchases include hardwood plywood (20%), melamine-coated board (20%), particleboard (15%), and high-pressure laminate covered board (11%). Wood-based panels and panels utilizing wood-based cores represented 96 percent of total panel purchases. Use of MDF and hardwood plywood were predicted to increase by the year 2000 to 31 percent and 23 percent, respectively, while melamine-coated board and particleboard use were predicted to decrease to 16 percent and 13 percent, respectively.

Of the hardwood plywood purchased by fixture manufacturers in 1997, 47 percent was MDF core (**Fig. 5**). Particleboard (34%) and veneer core (14%) were also significant substrates. Fixture manufacturers predicted an increase in the use of MDF, veneer core, and combination core by the year 2000, to 51, 15, and 5 percent, respectively. Particleboard core was predicted to decrease to 28 percent of total purchases, while lumber core was predicted to decrease to 1 percent. Seventy-nine percent of all 1997 hardwood plywood purchased by fixture manufacturers was 3/4 inch, 7 percent was 1/2 inch, and 10 percent was 1/4 inch. Fifty-two percent of 1997 hardwood plywood purchased by fixture manufacturers possessed sliced face veneers; 48 percent possessed rotary faces.

Figure 6 provides a breakdown of fixture manufacturers' 1997 hardwood plywood purchases by face veneer grade. As shown, 64 percent of the hardwood plywood purchased possessed premium (AA)² grade face veneer, 27 percent custom grade (A), 4 percent economy grade (B), and 5 percent paint grade.

Figure 7 depicts a breakdown of fixture manufacturers' 1997 hardwood plywood purchases by face veneer species. Red oak was the predominant species used, representing 31 percent of hardwood plywood purchases. Other impor-

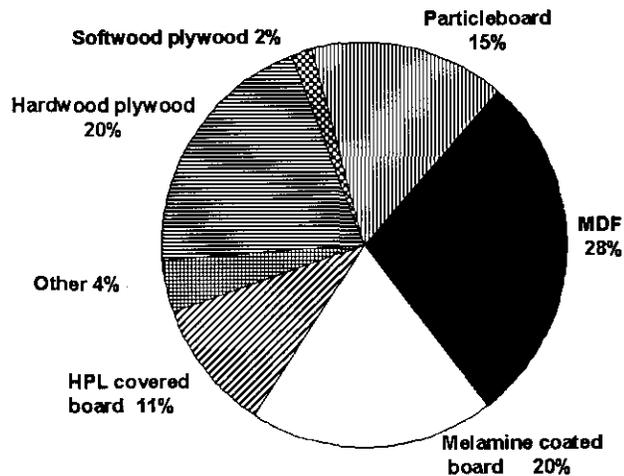


Figure 4. — Breakdown of fixture manufacturers' 1997 panel purchases by panel type.

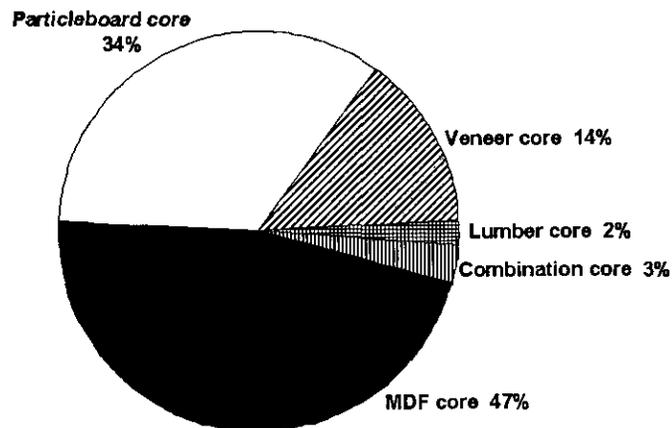


Figure 5. — Fixture manufacturers' 1997 purchases of hardwood plywood by core type.

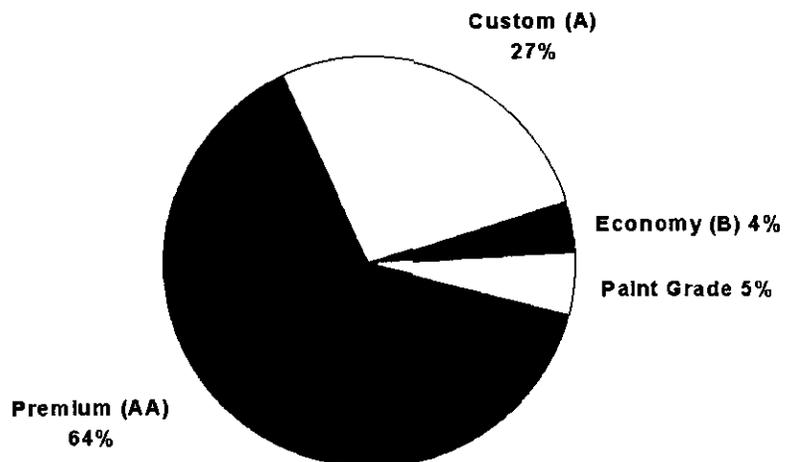


Figure 6. — Fixture manufacturers' 1997 hardwood plywood purchases by face veneer grade.

² Premium, custom, economy, and paint grade refer to Architectural Woodwork Institute (AWI) face veneer grades and are the nomenclature most often used between architectural woodworkers and distributors. AA, A, and B grades refer to Hardwood Plywood and Veneer Association (HPVA) face veneer grades and are used between manufacturers and distributors.

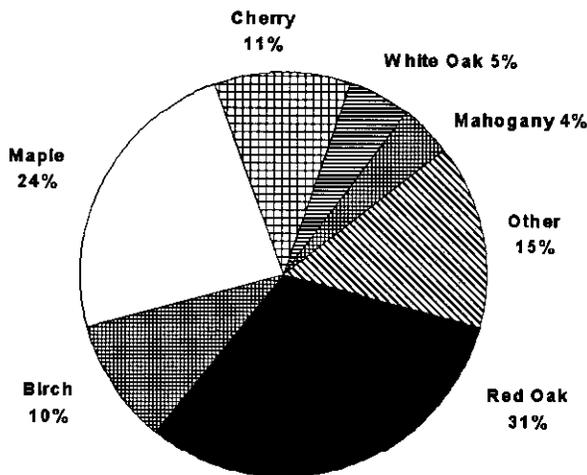


Figure 7. — Breakdown of fixture manufacturers' 1997 hardwood plywood purchases by face veneer species.

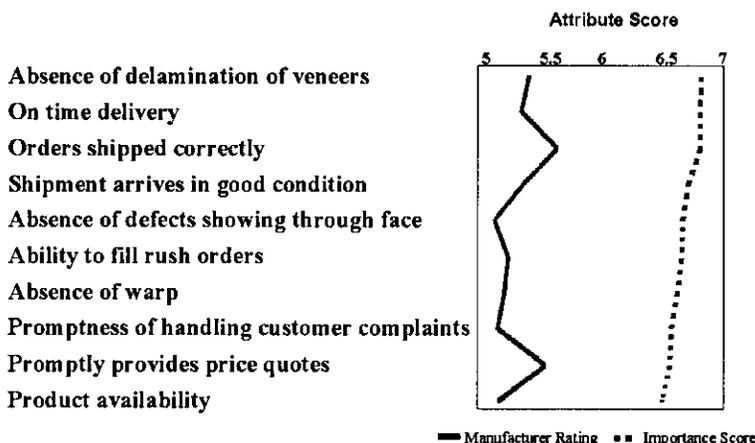


Figure 8. — Importance and supplier performance ratings of the most important hardwood plywood product and service attributes.

tant face veneer species included maple (24%), cherry (11%), birch (10%), and white oak (5%). Use of red oak was predicted to increase by the year 2000 to 38 percent, while maple, cherry, and white oak were predicted to decrease to 23, 9, and 4 percent, respectively.

Thirty-one percent of 1997 hardwood plywood purchased by fixture manufacturers was made-to-order (custom face veneer, lay-up, panel size, or thickness). This percentage was predicted to increase to 35 percent by the year 2000. Over 6 percent of 1997 hardwood plywood purchases was pre-finished plywood. Purchases of pre-finished plywood were predicted by fixture manufacturers to increase to 12 percent of total purchases by the year 2000.

ANALYSIS OF HARDWOOD PLYWOOD PRODUCT AND SERVICE ATTRIBUTES

An effective marketing strategy begins with understanding the needs and desires of the customer (13,15). The purpose of this portion of the study was to communicate to hardwood plywood manufacturers and distributors the needs and desires of fixture manufacturers. To accomplish this, a list of important hardwood plywood product and service attributes was developed. Fixture manufacturers were asked to rate how important these attributes were to their companies. They were also asked to rate how well suppliers (distributors) performed with respect to these attributes. The fixture manufacturers' responses were com-

binated to calculate average importance scores and their ratings of suppliers for each of the attributes. An importance score is simply a measure of the relative importance of an attribute while a suppliers' rating is a relative measure of how well distributors (and in some instances, manufacturers) in general are performing with respect to that attribute.

Importance scores for the attributes ranged from 2.9 to 6.8 (based on a scale from 1 to 7 with 7 being most important). This is not surprising since the list of attributes was designed to include only the most important attributes. What is important is the relative rank of attributes; higher ranked attributes are more crucial in the purchase decision than lower ranked attributes. However, since all attributes were high in importance, manufacturers should not ignore attributes with lower rankings.

Average suppliers' performance ratings ranged from 3.7 to 5.6 (based on a scale of 1 to 7 with 7 representing the best performance). This indicates that fixture manufacturers overall rate suppliers relatively high with respect to these attributes. However, in a marketing sense, the supplier that consistently receives the highest performance ratings (relative to competitors) for the attributes most important to the fixture manufacturer will eventually become the supplier of choice for those firms. In other words, suppliers should strive for excellence in the areas most important to fixture manufacturers.

Figure 8 shows the top 10 attributes ranked by importance, and their respective importance and supplier performance ratings. Absence of veneer delamination was the most important attribute, followed by on-time delivery, orders shipped correctly, shipment arrives in good condition, and absence of defects showing through face. Although the order of importance is different, the five attributes perceived by fixture manufacturers to be most important were also the five most important to architectural woodworkers (6). This emphasizes the need for manufacturers and distributors to perform well with respect to these top attributes.

Table 1 provides the complete attribute list along with the corresponding importance and supplier rating scores. The list of importance scores appears in descending rank order. It is interesting to

TABLE 1. — Importance and supplier rating scores for hardwood plywood attributes.

Attribute	Importance score ^a	Manufacturer rating ^b
Absence of delamination of veneers	6.84	5.40
On-time delivery	6.83	5.34
Orders shipped correctly	6.83	5.64
Shipment arrives in good condition	6.73	5.35
Absence of defects showing through face	6.69	5.12
Ability to fill rush orders	6.68	5.23
Absence of warp	6.64	5.20
Promptness of handling customer complaints	6.59	5.14
Promptly provides price quotes	6.58	5.54
Product availability	6.51	5.14
Ease of contacting	6.48	5.64
Suppliers' knowledge of their products	6.48	5.44
Fairness of handling of customer complaints	6.44	5.34
Absence of glue bleed-through	6.42	5.39
Uniform thickness within panels	6.32	5.16
Sound core	6.31	5.23
Distributor's awareness of customer's needs	6.29	5.35
Consistency of panel quality between orders	6.27	4.77
Competitive price	6.25	5.20
Uniform thickness between panels	6.24	4.93
Uniformity of face veneers (color and grain)	6.23	4.75
Absence of visible splice lines	6.18	4.90
Machinability of panel	6.17	5.31
Quality of sanding on face and back	6.03	5.06
Screw-holding capability of panel	5.90	5.41
Thickness of face veneer	5.90	4.83
Plywood face "on-grade"	5.88	5.09
Strength of panel	5.83	5.58
Credit terms	5.77	5.61
Follows up to see product meets or exceeds expectations	5.71	4.53
Personal relationship	5.70	5.51
Reputation of distributor	5.68	5.61
Provides samples, literature, or other support material	5.63	5.15
Ease of unloading delivered products	5.57	5.48
Squareness of panel	5.54	5.33
Location of supplier	5.21	5.42
Plywood back "on-grade"	5.13	5.04
Provides specialty items	5.10	5.06
Stocks complimentary items	4.94	4.78
Provides product training	4.79	4.04
No odor from core stock	4.78	5.16
Warehouses specialty items	4.76	4.62
Weight of panel	4.70	4.84
Low formaldehyde content in panels	4.59	5.00
Pre-finished panels are offered	3.91	4.49
Presence of grade stamp	3.90	4.35
Provides inventory management services	3.66	4.24
Brand name of panel or core (e.g., manufacturer)	3.33	4.86
Supplier offers barcoding	2.93	3.77

^a Scale of 1 (not at all important) to 7 (extremely important).

^b Scale of 1 (poor) to 7 (excellent).

note that the lowest manufacturer performance ratings were mostly service-related attributes. These included: supplier offers barcoding, provides product training, provides inventory management services, presence of grade stamp, and pre-finished panels are offered.

CONCLUSIONS

The information presented in this paper is intended to assist fixture manufacturers and the suppliers and manufacturers of their raw materials. The results presented offer information about the structure of the fixture manufacturing industry, future trends in the industry, as well as insights regarding the needs and desires of the industry. Such knowledge helps suppliers and manufacturers to better understand their customers, and offers them the opportunity to better serve fixture manufacturers. In addition, this knowledge may be used by fixture manufacturers to better understand the industry in which they compete. Such information is useful in strategic planning and management decision making.

The next step for suppliers to the fixture manufacturers industry is to evaluate how well they are satisfying their customers' needs. In today's competitive environment, it is imperative that suppliers strive to be their customers' "first choice." To reach this goal, suppliers must identify their own strengths and weaknesses and adapt their manufacturing and marketing strategies accordingly. Fixture manufacturers can help by advising their suppliers as to how well they are meeting needs and discussing how fixture manufacturers and suppliers can work best together.

For fixture manufacturers, the next step is to determine where they fit relative to the fixture manufacturing industry and to evaluate their current and future position. Fixture manufacturers must identify their individual strengths and weaknesses and determine how to use their strengths to gain competitive advantage, while minimizing the negative influence of their weaknesses.

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