Determinant product and supplier attributes in domestic markets for hardwood lumber

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Abstract

Product and supplier attributes that are critical in hardwood lumber purchase decisions (i.e., determinant) were investigated in four segments of the domestic market for hardwood lumber: millwork producers (Standard Industrial Classification (SIC) 2431), hardwood dimension and flooring producers (SIC 2426), wood household furniture producers (SIC 251 1), and wood kitchen cabinet producers (SIC 2434). A total of 252 companies provided information. Determinant attributes were identified using the direct dual questioning technique. Attributes with the highest determinant scores were: grading accuracy, supplier's reputation, freedom from surface checks, competitive pricing, and lumber thickness consistency. The least determinant attribute was the presence of the supplier's logotype or trademark. Lumber users reported being least satisfied with the quality of the lumber they purchased. Lumber producers perceived that users were least satisfied with the availability of certain species. Differences in attribute determinance among the market segments were identified.

Hardwood lumber producers who utilize business strategies that involve concentrating on specific segments of the market for hardwood lumber may be hindered by a lack of information. Specifically, producers may not have information that allows them to identify which of a variety of product and supplier attributes (characteristics) are most important to companies in the target market segment. Information concerning attributes that are critical in a lumber buyer's choice of supplier (i.e., determinant) may also be unavailable. This lack of marketing information is noted by McLintock (16) who states:

> Hardwood industries just do not maintain forward-looking, effective marketing programs based on an understanding of consumer needs and expectations. The dilemma facing any company that wants to do a better job in this regard is that the information it requires is not available, and the mechanisms for obtaining it are not in place.

The research presented in this paper sought to identify these critical product and supplier attributes in four segments of the market for hardwood lumber millwork producers (Standard Industrial Classification (SIC) 2431), hardwood dimension and flooring manufacturers (SIC 2426), wood household furniture manufacturers (SIC 251 1), and wood kitchen cabinet manufacturers (SIC 2434). The perceptions held by large hardwood lumber producers concerning the needs of the four market segments were also investigated.

Background

Porter (21,22) identified three generic business-level strategies for successfully competing within an industry.[1] The first of these, Overall Cost Leadership, is commonly associated with commodity-producing industries and has been shown to be the most common corporate-level strategy among large forest products based companies (23). However, among the companies he studied, Rich (23) docu-

[1] Porter (21) defines the strategies as follows: Overall Cost Leadership requires that the firm seek to become the industry's low-cost producer, while not ignoring quality and service. A firm pursuing a Differentiation strategy seeks to produce a product or service that is perceived industry-wide as unique. Finally, a Focus strategy requires that the firm concentrate on a particular market segment and, in doing so, serve the segment more effectively or efficiently than other less specialized competitors.

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Forest Prod. J. 41(2):33-40.

mented a shift toward the implementation of Porter's remaining two generic strategies, Differentiation and Focus, or a combination of these strategies. Levitt (14) provides rationale for this shift away from strategies based on cost leadership. He states: "In short, meaningful differentiation is competitively more effective and enduring than low-cost production alone."

Evidence of the apparent adoption of business-level Differentiation and Focus strategies can be found within wood-based industries. Some companies in the structural panel industry, for example, have attempted to differentiate their products by developing positive brand images through brand naming and promotional activities (25). Brand naming (generally in the form of a company trademark painted on lumber bundles) is also widely used in an apparent effort to develop brand images in export markets for hardwood lumber.

Focus strategies may underlie the decisions of companies in the paper products industry to concentrate on particular segments of the market for their products. Westvaco Corporation, for example, has a stated intention of focusing on segments of the paper products market where technological and marketing skills provide a competitive advantage (30).

All three generic strategies offer advantages and entail certain problems for producers of hardwood lumber. A successful Overall Cost Leadership strategy can provide significant competitive advantage but may require favorable access to raw materials, high relative market share, and/or the presence of economies of scale (21). Some hardwood lumber producers may have favorable access to timber by virtue of their location, landownership, or relationships with landowners. However, the industry's low production concentration (percentage of total production produced by the industry's largest producers (29)) indicates that few companies have gained relatively high market share. In addition, economies of scale are probably weak in the industry (8).

A Differentiation strategy requires that the company's product be perceived, industry-wide, as unique (21). This may be difficult for smaller hardwood lumber producers to accomplish with limited resources for promotion, advertising, extensive customer service, or other activities that may be needed to differentiate a product industry-wide.

Since Overall Cost Leadership and Differentiation strategies may not be appropriate for small firms (32), a Focus strategy is the logical choice. Successful Focus strategies can create customer loyalty and switching costs that allow increased profit margins. However, companies may find it difficult to implement a Focus strategy due to a lack of knowledge concerning the target market segment. In particular, knowledge of the attitudes and attributes that are determinant in the purchase decisions of customers in the target segment is a key factor in the development of marketing strategy (20) and is often unavailable.

Methodology

Sample

The nature of the study required that two distinct populations be sampled: companies that purchase hardwood lumber (users) and companies that produce hardwood lumber (producers).

Hardwood lumber users. — A purposive (judgment) sample consisting of the largest companies that could be identified in each of the four market segments was utilized in this portion of the study. Sample companies were identified via a review of published listings such as the *Furniture Design and Manufacturing Top 300* (3), *Who's Who in Kitchen Cabinets* (10), and trade association membership listings. In addition, input from individuals familiar with the market segments was used to help identify sample companies. The sample included 124 cabinet companies, 100 furniture companies, 55 millwork companies, and 124 dimension/flooring companies.

The sample was not considered a definitive list of the largest companies in each market segment for several reasons. These included the dynamic nature of the industries represented by the market segments (e.g., frequent mergers and acquisitions in the wood household furniture industry), the delay in publishing production information, and the fact that companies often participate in more than one industry. However, it was felt that the sample included the major, and perhaps most influential, companies in each segment.

A purposive, rather than probabilistic sampling scheme was used since a probabilistic sample would likely be skewed toward smaller, less influential companies. Nonprobability sampling is common in marketing research (11) and has been used in studying wood-based industries (9). In addition, Karmel and Jain (13) have demonstrated that a purposive sample of large companies in an industry can outperform randomized sampling schemes in terms of estimating population parameters.

Hardwood lumber producers. – A purposive sample consisting of the 100 largest (by production volume) hardwood lumber producers in the United States was utilized in this section of the study. Companies were chosen based on information from industry fact books (17,18), trade association membership directories, the *Weekly Hardwood Review* (4), and telephone conversations with company personnel. Knowledgeable Forest Service and university personnel were also consulted to aid in the identification of sample companies.

As with lumber users, the sample of producers was not considered a definitive list of the largest companies. Rather, it was thought to include many of the largest and most influential companies in the hardwood lumber industry.

Data collection

Hardwood lumber users. – A mail questionnaire was used to collect data from the sample of hardwood lumber users. Prior to administering the questionnaire, each company was contacted via telephone to identify the person responsible for purchasing hardwood lumber. Questionnaires were directed to these individuals.

The questionnaire was divided into 2 sections, the first of which used rating scales to gather data concerning the importance of 15 product attributes and 18 supplier attributes (Table 1). Recipients were also asked to indicate how hardwood lumber suppliers differed and how the lumber from various suppliers differed using the same attribute sets.

TABLE 1. – *Attributes assessed in the study.*

Product attributes:[a]
Absence of chipped grain
Absence of surface checks
Absence of end splits
Absence of wane
Presence of end coating
Presence of square edges
Presence of end trimming
Presence of supplier's trademark
Accuracy of grading
Accuracy of moisture content
Within-load consistency of moisture content
Within-load consistency of thickness
Within-load consistency of length
Lumber straightness
General cleanliness
Service attributes
Supplier's ability to provide rapid delivery
Supplier's ability to provide technical information
Supplier's ability to provide kiln-dried lumber
Supplier's ability to provide planed lumber
Supplier's ability to provide protective packaging
Supplier's ability to provide a variety of species
Supplier's ability to provide both dimension stock and lumber
Supplier's ability to provide set width lumber
Supplier's ability to fill large orders
Supplier's ability to arrange credit
Supplier's ability to arrange shipping
Supplier's ability to fill small orders
Personal relationship with supplier
Supplier's reputation
Willingness to quote firm prices
Previous business with supplier
Competitive pricing
Nearby location

[a] Categorizations are for convenience. Some attributes might, arguably, be placed in either category.

TABLE 2. – *Characteristics of lumber user respondent groups.*

Market segment	No. of respondents[a]	Mean hardwood lumber purchased[b,c]	Mean production employees[b]	Mean nonproduction employees[b]
		(MBF)		
All segments	252	5,616.7	336.3	53.2
	(62.5)	(1,466.5)	(112.5)	(25.0)
Millwork	34	2,610.1	76.5	22.5
	(61.8)	(500.0)	(62.5)	(15.0)
Dimension	35	3,526.1	107.8	16.4
	(51.5)	(1,620.7)	(66.0)	(10.0)
Flooring	28	12,948.8	168.3	27.4
	(50.0)	(4,725.0)	(81.5)	(15.0)
Furniture	69	8,426.5	821.4	105.8
	(69.0)	(3,000.0)	(300.0)	(50.0)
Cabinets	73	1,649.3	210.0	49.0
	(58.9)	(475.0)	(100.0)	(26.0)

[a] Response rate is in parentheses. Thirteen companies did not report their primary area of business.
[b] The median value is in parentheses.
[c] Twenty-four companies provided insufficient information to compute this statistic.

The second section of the questionnaire gathered data concerning the nature of the company. In particular, companies were asked to indicate their primary (by value of sales) type of business (e.g., millwork, flooring, furniture, cabinets). This allowed the verification of *a priori* market segment classifications. Data concerning the company's location, lumber purchases, number of employees, and annual sales were also gathered in this section.

The questionnaire was reviewed by knowledgeable Forest Service, trade association, and university personnel to evaluate its face validity and clarity. A pretest was then conducted by administering the questionnaire to 92 companies that purchased hardwood lumber. The results of the pretest were used to clarify question wording and refine the product and supplier attribute sets.

The revised questionnaire was mailed to 403 companies in May 1989. A total of 299 surveys were returned by the time data analysis began, 252 of which were found to be usable. This resulted in an overall response rate of approximately 63 percent. Industry-specific response rates are provided in Table 2. All respondents remained anonymous.

To test for possible trends in survey response (and, by extrapolation, nonresponse bias), questionnaires were split into early and late respondent categories. Each category accounted for approximately 50 percent of the total number of responses. Nonparametric statistical tests (Mann-Whitney U and Chi-square) were used to compare the groups based on annual sales, geographic location, primary product, and volume of lumber purchased. In no case could the hypothesis of no difference between early and late respondents be rejected = .10). This result suggests that nonresponse bias (which could not be directly assessed due to respondent anonymity) was not a problem.

Hardwood lumber producers. – A questionnaire was also used to assess lumber producers' perceptions of the needs of hardwood lumber users. The questions were similar to those used in the first section of the study (utilizing the same attribute sets and rating scales), but producers were asked to indicate only the importance of each attribute to hardwood lumber users.

The questionnaire was mailed to 80 of the sample companies during June 1989. An additional 19 surveys were delivered in person (1 sample company declined to participate). A total of 72 surveys were returned by the time the data were analyzed. As was the case with the survey of hardwood lumber users, early and late respondents could not be shown to differ based on available data.

Determinant attributes

Anderson et al. (2) described determinant attribute analysis as: "... a technique that is applicable in a wide variety of marketing research situations where the objective is to ascertain the critical factors in consumer decision making." Determinant attribute analysis has been applied in several studies and a variety of situations (6,15,19,26).

Underlying the technique is the concept that a product offering consists of a bundle of attributes, some tangible and some, such as a supplier's reputation, intangible (14). Attributes are thought to be two dimensional. One dimension consists of the importance of the attribute to the buyer and the other represents the perceived differences between suppliers with respect to the attribute (31).

Several approaches have been developed to assess these dimensions (20). Since the effectiveness of the direct dual questioning technique has been well demonstrated (l), this is the approach that was used in this study.

Recipients were asked to rate attributes as to their importance in lumber purchase decisions and as to how the attribute differed among suppliers. Importance and difference ratings were then combined to produce a de-

terminant score using the following model (6):

$$D_{ij} = I_{ij} Y_{ij}$$

where:

D_{ij} = determinant score for attribute i and respondent j
I_{ij} = importance rating for attribute i and respondent j
Y_{ij} = difference rating for attribute i and respondent j

Determinant scores (D_{ij}) resulting from this calculation were potentially biased since respondents may differ in the intrinsic importance and difference scales they utilize (5,19,24). Consequently, determinant scores were standardized (across attributes and within respondents) to T-scores (mean of 50 and a standard deviation of 10) using the following formula:

$$TD_{ij} = 10\ ((D_{ij} - X_j) / S_j) + 50$$

where:

TD_{ij} = standardized determinant score for attribute i and respondent j
X_j = mean value of D_{ij} for all i of respondent j
S_j = standard deviation of X_j

Results

Respondents

Since the samples were intentionally limited to large companies, the respondents do not represent cross sections of their respective industries. However, the respondents were considered representative of large companies in their industries.

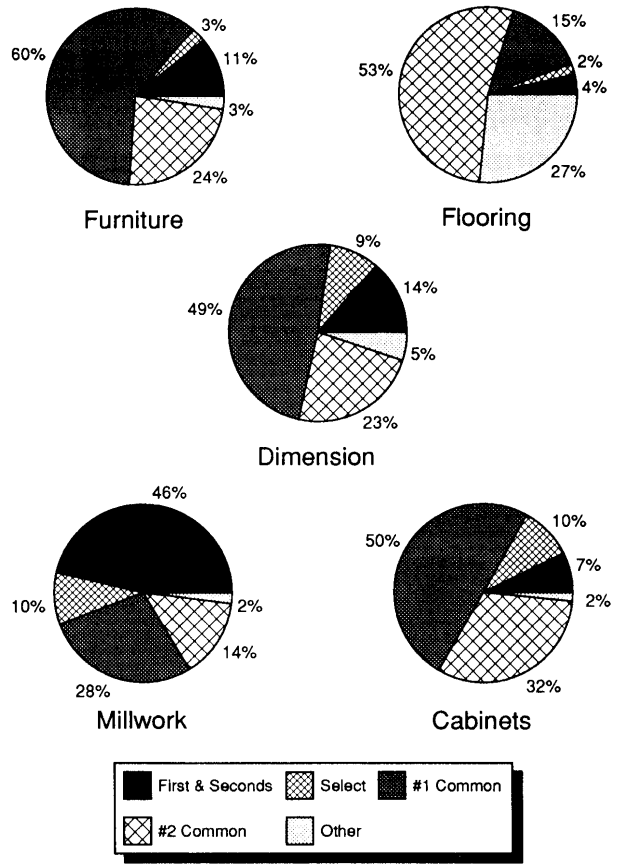

Figure 1. — Lumber purchases by market segment and grade.

Hardwood lumber users. – Table 2 provides a breakdown of respondents by market segment and other key characteristics. The relatively large number of respondents in the SIC 2426 (dimension and flooring) category allowed dimension manufacturers and flooring manufacturers to be analyzed separately.

Respondents used a total of 1.39 billion board feet (BBF) of hardwood lumber annually. Ninety-two percent (1.28 BBF) of this lumber was purchased from outside the respondents' companies. Flooring companies had the largest mean annual hardwood lumber purchases (Table 2) and purchases were concentrated in lower grades when compared to the other market segments (Fig. 1). Lumber purchases by millwork companies were concentrated in higher lumber grades, but the mean annual volume was lower than all but cabinet manufacturers.

Responding companies reported purchasing the largest percentage of their hardwood lumber directly from sawmills (67.7% of total volume purchased). Brokers (16%) and wholesalers (13%) were also important sources. However, the possibility that lumber was purchased from sawmills acting as wholesalers or brokers is not reflected in these figures.

The most important species was red oak, which represented 37 percent of total purchases (by volume). White oak accounted for 17 percent of purchases, and yellow-poplar accounted for 15 percent. The remaining domestic species each accounted for less than 10 percent of purchases. Imported species made up approximately 3 percent of purchases.

Hardwood lumber producers. – Responding producers reported annual hardwood lumber production figures that totaled approximately 1.6 BBF. Mean annual production was approximately 22.2 million board feet per company. Respondents reported selling the largest portion of this production directly to end users (47% of production was marketed in this manner). Twenty-six percent of lumber production was sold in the rough, green state; 23 percent was sold rough, kiln-dried; and 19 percent of production consisted of cants or pallet lumber. Smaller amounts were sold in other forms.

Primary species produced by the responding companies were red and white oak (34% and 16% of total annual production, respectively). Approximately 54 percent of the respondents were located in the Bureau of the Census (28) southern region, 26 percent were located in the midwest region, and 17 percent were in the northeast region. A small number of respondents were located in the western region and some respondents did not disclose their location.

Annual hardwood lumber sales ranged from less than $10 million to over $100 million. However, the majority of the companies (52%) reported sales of less than $10 million annually.

Reasons for purchase dissatisfaction

Both hardwood lumber users and producers were questioned concerning the general factor that caused the most dissatisfaction in hardwood lumber purchasing situations

(quality, delivery time, price, credit terms, species availability, other). Eleven percent of responding lumber users reported being satisfied with all aspects of their lumber purchasing. The most common reason for dissatisfaction (64% of dissatisfied respondents) was lumber quality, followed by price (11%), and delivery time (10%). In contrast, hardwood lumber producers perceived that their customers were least satisfied with the availability of certain species, price, and lumber quality – in that order.

This finding suggests two conclusions. First, lumber producers have overestimated customer satisfaction with the quality of their lumber. Second, the desire for better quality lumber may provide the opportunity for tailoring a product to better meet this need. Such a product could form the basis of a Differentiation strategy or, if a particular market segment is targeted, a Focus strategy.

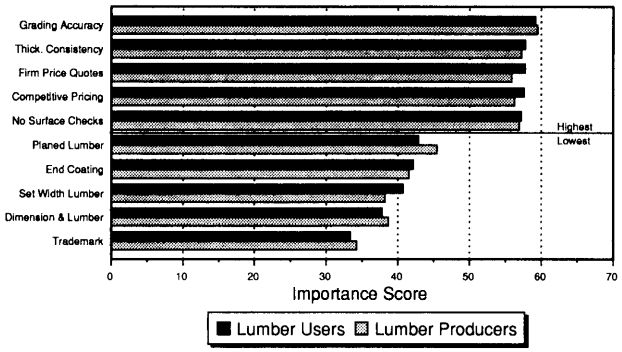

Figure 2. — Highest and lowest importance ratings for lumber users and lumber producers (Mean = 50, Standard Deviation = 10.)

Attribute importance

Figure 2 shows the attributes with the highest and lowest mean standardized importance ratings for lumber users (all market segments) and lumber producers. Both groups indicated that grading accuracy is the most important attribute and the presence of a supplier's logo or trademark is least important.

In general, producers seem well attuned to the relative importance of the various attributes to their customers. The greatest difference between users and producers occurred on the importance of square end trimming. Lumber producers gave this attribute a mean standardized rating of 51.7 and lumber users gave the attribute a mean rating of 43.3 — suggesting that producers perceive square end trimming to be more important than it actually is to their customers.

Relative importance of the attributes was generally consistent across the lumber user segments (Table 3). Grading accuracy and willingness to quote firm prices were among the five most important attributes for all of the market segments. However, some differences in the relative importance of attributes among segments were noted. Cabinet manufacturers ranked attributes related to moisture content (MC) (MC accuracy and consistency) high relative to the other segments. Cabinet manufacturers also ranked a supplier's ability to provide kiln-dried and/or planed lumber higher than did companies in other

TABLE 3. – *Hardwood lumber users' mean standardized importance ratings for attributes.*

Attribute[a]	Mean standardized importance rating					
	Millwork (N=34)	Dimension (N=35)	Flooring (N=28)	Furniture (N=69)	Cabinets (N=73)	Total[b] (N=252)
Accurate grading	59.3	59.5	61.7	59.2	58.1	59.2
Price quotes	57.8	57.4	57.6	58.3	57.3	57.8
Consistent thickness	56.6	58.7	58.6	59.5	55.9	57.8
Comp. pricing	56.1	57.8	58.9	58.7	56.7	57.6
Surface checks	57.8	60.0	57.7	56.3	56.2	57.2
Reputation	55.8	56.4	57.1	57.9	55.8	56.7
Straightness	57.2	56.9	56.2	56.6	56.3	56.6
MC accuracy	57.0	55.5	55.0	53.6	58.2	56.0
MC consistency	56.0	55.9	55.4	54.9	57.8	56.0
Cleanliness	53.9	53.2	54.7	53.4	53.4	53.5
Relationship	52.9	53.0	55.4	53.7	50.5	52.8
End splits	51.5	54.6	54.2	53.5	50.8	52.7
Rapid delivery	52.7	54.2	52.7	53.8	50.9	52.7
Wane	51.8	52.5	54.5	52.3	52.2	52.7
Previous business	53.1	53.9	52.8	52.8	49.8	52.3
Chipped grain	46.4	52.5	50.7	49.8	54.4	51.8
KD lumber	53.9	47.9	48.5	47.4	56.5	51.3
Arrange shipping	50.6	51.4	48.4	52.6	51.0	51.1
Large orders	51.5	50.9	52.1	49.9	50.7	50.9
Consistent length	50.9	49.2	50.8	51.7	47.0	49.7
Location	44.8	51.1	52.7	49.1	45.1	48.0
Packaging	48.0	45.1	42.5	47.5	48.2	47.0
Small orders	46.9	46.4	41.3	46.8	46.8	46.2
Species variety	46.1	45.6	42.9	46.6	46.4	46.0
Technical info.	45.6	44.4	40.7	45.5	48.9	45.7
Square edges	46.2	48.7	47.6	44.4	42.7	45.2
Arrange credit	44.1	46.5	42.4	42.5	46.7	44.6
End trimming	44.8	45.6	46.1	43.2	40.4	43.3
Planed lumber	39.6	36.0	38.9	40.7	52.2	42.9
End coating	42.6	43.5	40.2	44.2	40.5	42.1
Set width lumber	41.3	37.0	44.4	40.6	40.8	40.7
Dimension and lumber	39.3	34.1	38.1	38.2	38.5	37.8
Trademark	32.8	34.2	36.5	33.6	32.3	33.4

[a] Abbreviated names, refer to Table 1 for a more complete description of the attributes.
[b] Thirteen respondents could not be classified by market segment.

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Surface checks	57.8	60.2	56.0	54.2	57.8	56.8
Comp. pricing	57.0	55.8	54.5	56.6	54.5	55.8
Consistent thickness	54.3	57.4	56.9	57.3	52.8	55.4
Rapid delivery	55.8	56.1	53.3	57.8	53.0	55.2
Straightness	56.4	54.4	53.8	53.0	56.2	54.7
MC accuracy	53.5	53.7	53.1	51.6	55.7	53.4
Price quotes	53.6	51.6	55.6	54.2	51.6	53.4
Relationship	54.8	52.2	55.4	53.3	50.8	53.2
MC consistency	52.9	53.3	53.0	53.1	54.3	52.9
Large orders .	51.4	53.8	53.9	52.9	51.4	52.8
End splits	51.5	53.5	53.0	52.9	52.5	52.6
Cleanliness	53.8	51.8	52.1	51.7	52.9	52.3
Wane	51.9	51.7	53.1	51.2	53.6	52.2
Previous business	51.2	52.5	52.4	51.2	47.6	50.6
Chipped grain	46.4	49.1	47.0	48.4	55.5	50.1
Consistent length	50.8	48.7	49.2	51.5	46.7	49.3
Location	46.7	51.2	51.7	51.5	46.7	49.3
KD lumber	49.4	47.5	49.0	47.2	48.8	48.4
Arrange shipping	47.3	47.4	46.4	49.2	46.5	47.6
Species variety	47.3	46.7	44.4	48.1	47.9	47.4
Technical info.	46.2	46.2	42.3	46.8	50.9	47.2
Small orders	47.9	44.0	42.5	46.5	47.8	46.4
Square edges	47.3	48.6	47.0	44.9	44.1	46.0
Packaging	45.5	45.1	43.2	45.9	46.5	45.8
End coating	44.7	47.6	41.8	47.1	45.2	45.4
End trimming	46.9	47.2	48.0	44.6	43.0	45.4
Arrange credit	42.0	45.6	43.1	43.2	45.3	44.0
Set width lumber	45.0	39.8	47.4	43.8	43.1	43.8
Planed lumber	42.6	37.7	41.6	40.6	47.3	42.6
Dimension and lumber	42.7	37.3	41.3	42.4	42.0	41.4
Trademark	36.6	38.0	39.2	37.8	37.2	37.4

[a]Abbreviated names, refer to Table 1 for a more complete description of the attributes.
[b]Thirteen respondents could not be classified by market segment.

segments. Millwork and dimension manufacturers placed greater importance on freedom from surface checks, and furniture manufacturers rated lumber thickness consistency as the most important lumber attribute.

Attribute determinance

Previous studies using the determinant attribute concept (1,15) have endorsed the use of a one-tailed Z-test (where the grand mean and standard deviation are used as estimates of the population mean and standard deviation) to identify attributes that are determinant. This technique is of limited use, however, since the concept of absolute determinance has little utility in the formulation of marketing strategy.

Instead, the approach taken in this paper was similar to that of Moriarty and Reibstein (19) and Heeler et al. (12), in that analysis focused on the relative rankings of attributes. Since the cost of creating more of an attribute in a company's marketing mix[2] is likely to vary among attributes, all attributes that are found to be determinant via Z-tests are not equal in their utility to marketing strategy. Rankings provide a guide that can be useful in cost-to-benefit estimations when formulating marketing strategy.

Attribute determinance across market segments. – Figure 3 depicts the attributes with the highest and lowest

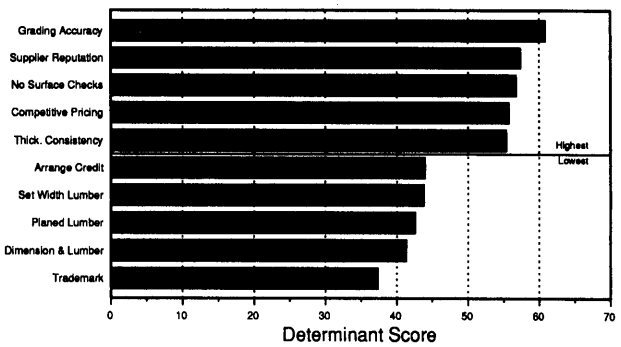

Figure 3. — Highest and lowest determinant scores for lumber users (Mean = 50, Standard Deviation = 10.)

determinant scores across all market segments. The concept of determinance is well illustrated by the service attribute of willingness to quote firm prices. This attribute had a high importance rating (Table 3) but dropped to ninth based on determinant score (Table 4). This suggests that, while firm price quotations are important, most suppliers provide this service. Firm price quotations are requisite for entry into the market but appear to have little impact on the buyer's choice of a supplier. Similarly, lumber thickness consistency dropped from tied for second in importance (Table 3) to fifth in determinance (Table 4), which suggests that it varies less between suppliers than other important attributes.

Clearly, grading accuracy is a critical factor to hard-

[2]A marketing mix consists of the combination of marketing variables (product, price, promotional programs, distribution, etc.) that a company uses to satisfy a particular customer group.

wood lumber users. Respondents indicated that this attribute was highest in importance and it varied considerably between suppliers, therefore it received the highest determinant score (across all market segments). Supplier reputation had the second highest determinant score. The high scores exhibited by these attributes support the contention that selecting a known vendor or brand is more an act of risk reduction on the part of the buyer than an expression of vendor or brand preference Two ways in which buyers can reduce risk in purchasing hardwood lumber are to deal with established suppliers with strong reputations and/or suppliers that provide a product of known quality (i.e., accurately graded).

It is interesting to note that pricing, which is traditionally thought of as the critical factor in commodity markets, received neither the highest importance rating nor the highest determinant scorn Pricing was also not reported to be the most common reason for purchase dissatisfaction among lumber users. In light of this finding, it may be useful to view hardwood grade lumber as a pseudocommodity (27) rather than the hypothetical true commodity. Unlike true commodities, pseudocommodities have the potential for some level of differentiation. In the case of grade hardwood lumber, differentiation could be based on lumber grading and may result in price differentials or increased customer loyalty.

Attributes that received low determinant scores were, in general, those that would be provided by a supplier with a full product line and the ability to provide services such as arranging credit. The large companies included in this study do not, on average, appear to value this type of supplier. Emphasizing these attributes (full service and/or full product line) is a strategy that may be more appropriate when serving smaller buyers.

Attribute determinance by market segment. – Table 4 provides attribute determinant scores for each of the market segments. The least determinant attribute for all segments except dimension producers was the presence of the supplier's logotype or trademark. The critical nature of grading accuracy is reemphasized by the fact that each of the individual market segments ranked this attribute as the most determinant.

Cabinet producers appeared to differ most from the remaining segments in terms of determinant scores. These companies placed less emphasis on lumber thickness consistency and more emphasis on chipped grain, technical information, and MC accuracy when compared to the remaining market segments. These differences may reflect the tendency for cabinet producers to purchase planed lumber.

Summary and discussion

This paper identified the product and supplier attributes that are most determinant in hardwood lumber purchase decisions and, consequently, are the logical attributes to optimize in an effort to improve a company's marketing mix. These attributes include: grading accuracy, freedom from surface checks, lumber thickness consistency, supplier reputation, and competitive pricing. The first three of these attributes suggest quality in the product aspect of the company's marketing mix — the importance of which lumber producers may have underestimated.

The latter two attributes are supplier related and, in the case of competitive pricing, maybe directly manipulated. Supplier reputation may be more difficult to manipulate but can be a long-term company goal.

Lumber producers wishing to optimize their marketing mix for a particular market segment should consider determinant attribute differences among the segments. For example, cabinet producers placed increased emphasis on chipped grain, technical information, and MC accuracy when compared to the other segments studied. Such differences, while generally small, may provide the opportunity for a successful Focus strategy in a competitive market such as hardwood lumber.

When interpreting the results of the study, it is important to recognize its limitations. First, both the lumber producers and users included in the study were (by design) the largest companies in their respective industries. Extrapolation of the results of the study to smaller companies may be inappropriate. For example, credit terms and the ability to provide lumber in various stages of processing may be more determinant in the purchase decisions of small companies that lack the resources of the large companies included in the study.

While the study sought to describe differences between market segments that were based on industry membership (SIC code), this method of segmentation may not be the most appropriate for the formulation of marketing strategy. Moriarty and Reibstein (19) have shown that segmentation by SIC code or company size may not result in market segments with homogeneous needs. Alternatively, benefit segmentation, perhaps based on a cluster analytic analysis of the data, could be utilized. The drawback to this approach is that the resulting segmentation scheme may be difficult to operationalize.

While not an objective of this research, cluster analytic solutions were investigated as the basis for segmentation. The results showed little improvement in discriminating or interpretive ability as compared to SIC-based segmentation. Consequently, the SIC-based approach was retained.

Finally, the industrial purchasing decision is a complex process, involving not only the product offering, but also interpersonal, organizational, and societal influences (7). The focus of this study is on those attributes over which the lumber producer has some control. However, successful marketing strategies must also consider the uncontrollable factors that can influence the purchase decision.

[3] This idea is attributed to Raymond A. Bauer by Levitt (14).

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