

ABSTRACT

GONZALEZ, RONALDS WILFREDO. Relationship Value in the Hardwood Lumber Industry in U.S. (Under the direction of Sudipta Dasmohapatra.)

This study explores the influence of relationship value in buyer's decision making in the hardwood lumber industry in the U.S. Results indicate that purchase decisions of hardwood lumber buyers are very sensitive to product quality, relationship with buyer-supplier, overall service and price (presented in order of importance). The dimension of relationship is ranked before overall service and price but it is ranked after that product quality. This sequence indicates that relationship with supplier is important only after quality product standards have been achieved.

Customer loyalty and commitment can be achieved in this price driven commodity industry. Customer loyalty and commitment are consequence of higher customer satisfaction, which in this study depends on the overall relationship value, dimension that is supported by: supplier know-how, product quality, personal interaction with supplier, and delivery performance/service. Suppliers in the hardwood lumber industry can use these findings to reinforce their relational marketing strategies. At the same time, managers need to pay more close attention and invest on these four attributes/variables to improve their buyer's overall perception of value in their relationship. The information obtained in this study is useful at the time of assigning scarce resource in marketing programs to improve buyer's perception.

A combination of high standards in the delivery of product quality, overall service, relationship value and supplier performance result in a higher satisfaction and loyalty in business relationships with the supplier. Overall increase in perceived relationship value will most likely help improve the hardwood lumber buyer's satisfaction with the supplier.

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Relationship Value in the Hardwood Lumber Industry in U.S.

by
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BIOGRAPHY

Ronalds W. Gonzalez was born in Acarigua, Portuguesa, Venezuela. He grew up in his grandparent's house with his sister Lorena and with lot of love from his grandmother, Carmen. At the age of 15 years he received a scholarship to study at a boarding school system sponsored by the Smurfit Group. While learning a new discipline- forestry and pulp and paper production, he spent 3 years trying to be the best which gave him the opportunity to go to Universidad de Los Andes Venezuela to study Forestry and Paper Production with another Scholarship from the Smurfit Kappa Group. Between the high school and University, Ronalds worked in several outsourcing companies with the Smurfit Kappa Group. At the second year of studying forestry, he began another career in Accounting and Business Administration. After 4 years he graduated in the two careers with honors. While completing his degree at the University, Ronalds visited forestry and pulp and paper operations in Mexico, Canada, U.S., Brazil, Colombia, Spain, France, Germany, Portugal and Australia.

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CHAPTER I

INTRODUCTION

The marketing mix model, integrated by: Product, Price, Place, and Promotion (the 4P's model) has been widely used to increase brand and company competitiveness. It has been the instructional guideline for most marketing courses and practices (Duncan and Moriarty, 1998; McCarthy, 1964). Another dimension in the preceding model has evolved to include effective communication to enhance better relationships and deliver higher value in buyer-seller transactions (Morgan and Hunt, 1994; Parvatiyar et al., 1992; Thorelli, 1986; Webster, 1991). Better relationships may lead to a commitment between buyers and sellers that may help to improve performance of the 4P's through increased access to valued resources and technologies (Walter, et al., 2002). In addition, if a relationship is highly valued by the customer, they may offer a bigger share of their business to the supplier, where customer share is considered to be one of the most cost-efficient means of increasing overall profitability (Griffin, 2002).

While relationships are important in most industries, it is critical in a traditional commoditized industry such as the hardwood lumber industry where price competition is intense and differentiation is low. Each customer has several suppliers, and the business environment is subjected to the whims of the residential construction sector (Lewin and Johnston, 1997; Simpson and Wren, 1997)

Manufacturers and distributors in the hardwood lumber industry exploit cost advantage or emphasize intensive price bargaining to achieve lower costs. However, empirical examples from studies in this industry show that these players would have to move to a higher level of strategic alliance with long term relationships to: (1.) avoid interruption in supplies, unreliable quality and delayed shipments-buyers and, (2.) gain a sustainable competitive advantage and avoid the risks of being readily duplicated- manufacturers (Lewin and Johnston, 1997).

In a study of perceived customer value in the hardwood lumber industry, Smith (2002) indicates that the buyer seller trust relationship, and brand image, play a pivotal role in determining the purchase behavior of hardwood lumber buyers.

Although the issue of relationship is recognized by researchers as important, it is also the least addressed in the literature (Smith, 2002). The hardwood lumber industry faces intensely competitive conditions in 2007, and in the future, because of a decline in the housing starts, slower growth in remodeling markets, and increased threat of foreign competition from China, Latin America, and other emerging countries (Bush, 1991; Snyder, 2008). Firms may be able to exploit their relationships with their suppliers and buyers for higher benefits, a better profitability, and a higher competitive advantage.

The purpose of this study is to explore the value of relationships between the buyer and seller in the hardwood lumber industry in the U.S. The importance of relationships vis-a-vis other quality and service attributes factoring in the purchase decisions of hardwood lumber buyers in the U.S. is examined. In addition, the hardwood lumber quality and supplier dimensions that lead to a perception of higher value in relationships is explored.

The study of relationship in the hardwood lumber industry is of vital importance due to the fact that this industry as a whole, is noted to not maintain forward-looking, effective marketing programs based of an understanding of customer needs and expectations (Bush, et al., 1991; Idassi, et al., 1994; McLintock, 1987). Once the attributes for a higher relationship delivery are identified, those attributes can be implemented for a higher profit and a competitive advantage (Storbacka, 1994).

PURPOSE OF THIS STUDY

The major objectives of this study are to:

1. Determine the role of relationships vis a vis other attributes, in buyer-seller transactions or purchase decisions in the hardwood lumber industry;
2. Provide insights about how buyers of hardwood lumber choose among suppliers as well as the costs associated with this choice;
3. Examine the product, service and supplier dimensions that contribute to a higher perceived overall value in relationships, and higher satisfaction in the hardwood lumber industry;
4. Examine the current level of technology used to communicate, or have a flow of information among buyers and suppliers.

Data for this study was gathered from a sample of major U.S. hardwood lumber buyers, including secondary manufacturers, retailers and wholesalers. The sample list for data collection was generated from the NHLA directory of hardwood lumber buyers in the U.S. in 2007.

SIGNIFICANCE OF THE STUDY

This research seeks to provide information and insights about the value of relationships in the hardwood lumber supply chains (i.e., whether relationships drive supplier-buyer transactions in the hardwood lumber industry in the U.S.). The results of this study would help key members in the supply chain in the hardwood lumber industry to examine the importance of relationships within other product and service dimensions of purchase.

Specifically the study will help provide strategic information about key benefits of relationships, including higher customer satisfaction, to hardwood lumber producers to motivate them to invest more resources on the variables that increase/improve relationship value.

LIMITATIONS OF THE STUDY

- a. The sample size consists of a representative sample taken from the current members of the National Hardwood Lumber Association (NHLA in the U.S. in 2007), so all analysis and statistical inference would be limited to the characteristics of current NHLA members. However it should be noted that most major hardwood lumber buyers in the U.S. are member of NHLA.
- b. The lack of sufficient responses from a single industry segment limits any analysis by respondent industry type (e.g., furniture vs. cabinet vs. retailers).
- c. Only one respondent from each company was contacted for the survey, which may create a single respondent bias (Blair, 1987). Future studies should focus on getting information from multiple respondents within the same organization to understand differences among buyer groups within an organization.

DEFINITION OF NOMINAL TERMS

NHLA: National Hardwood Lumber Association. With more than one thousand members in the U.S. and Canada, the National Hardwood Lumber Association provides support to manufacturers, retailers and buyers of hardwood lumber in North America with market information and business opportunities.

Sawnwood: this term includes: sawnwood, unplaned, planed, grooved, tongued, etc., sawn lengthwise, or produced by a profile-chipping process (e.g. planks, beams, joists, boards, rafters, scantlings, laths, boxboards, "lumber", sleepers, etc.) and planed wood which may also be finger jointed, tongued or grooved, chamfered, rabbeted, V-jointed, beaded, etc. Wood flooring is excluded. With few exceptions, sawnwood exceeds 5 mm. in thickness (FAO, 2008).

Relationship value: Relationship value can be defined as the trade-off between product, service, know-how, time-to-market and social benefits, as well as price and process costs in a supplier relationship, as perceived by key decision-makers in the customer's organization, and taking into consideration the available alternative supplier relationships (Ulaga and Eggert, 2003).

Supply chain: "Supply chain is an integrated process wherein raw materials are manufactured into final products, then delivered to customers (via distribution, retail, or both)" (Beamon, 1999).

Commitment: A kind of lasting to build and maintain a long term relationship (Anderson and Weitz, 1992) cited by (Walter et al., 2002).

Product value: The trade-off between perceived benefits and sacrifices by a customer, regarding his evaluation of the salient 'give' and 'get' components of a supplier's product (Walter et al., 2002; Zeithaml, 1988)

Product quality: Perceived superiority in a product as compared with competing alternatives forms the customers' intention to purchase and repurchase a product or service reflects the quality level of the performance of the product or service (Walter et al., 2002; Zeithaml, 1988)

CHAPTER II

REVIEW OF LITERATURE

The concept of relationships in business marketing: The concept of relationship in business marketing had its inception in the 1990's, in both theory and practice. Its importance was represented and considered as a fundamental reshaping of the marketing field and a genuine paradigm shift (Parvatiyar et al., 1992; Webster, 1991). The paradigm shift is toward relationship marketing a concept that covers several marketing concepts: relational contracting (Dwyer, 1987), working partnership (Anderson, 1990) and co-marketing alliances (Bucklin, 1993; Morgan and Hunt, 1994). Relationship marketing is part of the developing new paradigm, which recognizes that global competitions occur increasingly between networks of firms. These global dynamics have resulted in a paradoxical nature of relationship marketing: "To be an effective competitor (in the global economy) requires one to be a trusted cooperator" (Morgan and Hunt, 1994).

To better illustrate the importance of relationships in business, previous authors (Grönroos, 1990; Grönroos, 1994) have defined marketing in terms of relationship as: "Marketing is establishing, maintaining, and enhancing relationships with customers and other partners, at a profit, so that the objectives of the parties involved are met. This is achieved by a mutual exchange and fulfillment of promises." This is consistent with the statement that Hunt (1983) used to summarize 15 years of debate on the conceptual domain of marketing "... the primary focus of marketing is the exchange of relationships".

The core of relationship marketing is relations, a maintenance of relationships between the company and its actors in its micro-environment. These supply chain members (include suppliers, market intermediaries, the public and, of course, customers as the most important actor (Ravald and Gronroos, 1996). The idea is first and foremost to create customer loyalty so that a stable, mutually profitable and long-term relationship is enhanced.

A trend toward better relationships leads to the possibility of getting a higher customer share (Eggert, et al., 2006), taking into consideration that customer share is considered as a more cost-efficient means of increasing overall profitability (Griffin, 2002) it can be a very efficient (benefit/cost) tool for marketing.

The value of relationships: An ideal partner in a relationship is one who adds significant value to market offering, and at the same time offers a low risk (Ulaga and Eggert, 2003). Buyer-supplier relationship is also important in maintaining the supply chain, the focus of relationships today, and has moved beyond individual firms to value-creating networks formed by key firms in the value chain that deliver value to end use consumers (Kothandaraman, 2001).

Relationship value, a trade-off between product, service know-how, time-to-market and social benefits, as well as price and process costs in a supplier relationship, is perceived by key decision makers (in the customer's organization), as an important asset in current marketing strategies, when taking into consideration the available alternative supplier relationships (Ulaga and Eggert, 2003). The creation of value as stated by Wilson (1995) "is the process by which the competitive abilities of the hybrid and the partners are enhanced by being in the relationship".

There are several potential benefits from creating long term relationship value, such as lower cost, reliable service and a coordinated way to do business. Although a buyer can have several suppliers with formalized marketing programs, buyers do not consider all of them to be partners or in any way special. There is a mixture of service quality, reliability, honesty, and long term loyalty that help to develop higher value in a buyer-seller relationship (Simpson and Wren, 1997).

Relationship value, as seen by the buyers, likely has two components: product/service value and relationship value (Anderson and Weitz, 1992). Relationship value is influenced directly by product value or quality offered to customers and by trust.

Trust directly influences customer’s relationship value, which in turn creates strong commitment (separating relationship value from product value would help us better understand how total value is created in an alliance). A firm may deliver on the product value, but fail to address relationship value creation, resulting in lower commitment to remain in the relationship.” (Walter et al., 2002). In commodity markets there are a number of suppliers that provide almost equal product value, so one alternative that a firm may implement to increase the overall delivery value can be through increasing the relationship value that it provides to the customers.

Value creation in the sourcing process through service support and personal interaction appears as the main driver of purchase decision (Eggert et al., 2006). It is very interesting that relationship “benefit dimensions” play an intermediary role in overall value creation. Those “relationship benefit dimensions” are represented by attributes like: “Supplier know-how” and “Time-to-market”. A lower potential for value creation were framed by the supplier’s core offering such as product quality and delivery performance. The source of value creation and corresponding value dimension are presented in table 1:

Table 1. Source of creation of relationship value

		Source of Value Creation		
		Core Offering	Sourcing Process	Customer operations
Relationship value dimension	Product Quality	Service support	Supplier Know-how	
	Delivery Performance	Personal interaction	Time-to-market	

Source: (Eggert et al., 2005)

As stated by Duncan, et al., (1998) in their paper- “A communication-based marketing Model for Managing Relationships”, corporate focus should be on relationships rather than single transactions. This is because the authors believe that it is more cost-effective to sell to current customers, compared to selling to new ones, because of an associated costs to selling to and bring in new customers.

Relationship and commitment: One of the most important factors to build a successful long term relationship is through increased commitment. As stated by Walter et al., (2002) “developing a customer’s commitment in business relationships does pay off in increased profits, customer retention, willingness to refer and recommend.” Two variables identified as the major contributors for commitment are satisfaction and trust. More recently, customer value has been added to this formula.

Commitment is “a kind of lasting intention to build and maintain a long term relationship” (Anderson, 1992; Walter et al., 2002). It involves three different dimensions: affective, instrumental, and temporal (Gundlach et al., 1995). The dimensions are defined by Anderson, et al., (1992) and Garbarino et al., (1999) as follows:

- Affective commitment, describes an optimistic position towards long term relationships.
- Instrumental commitment is the result of any form of investment made in time, capital, share and other resources.
- Temporal commitment is the case when the relationship exists over a long period of time.

As stated by (Morgan and Hunt, 1994), the value of relationship through commitment encourages marketers to: (1) work at preserving relationship investments by cooperating with exchange partners, (2) resist short-term alternatives in favor of the expected long-term benefits of staying with existing partners, and (3) view potentially high risk actions as being prudent because of the belief that their partners will not act opportunistically.

Building mutually profitable relationships: Some empirical steps to build a mutually profitable relationship for suppliers and customers can be observed from Figure 1 (Ravald and Gronroos, 1996). A good start could be increasing benefits and reducing sacrifice (where sacrifice can also be related to associate risks when dealing with customers). The next step contains some kind of stimulation for “repurchasing activity”. There is an intermediate step in a kind of relation which may evolve to credibility (credibility is supported by safety and

security). The next steps are gaining of trust and loyalty, followed by a long term relationship, i.e. “Mutually profitable relationship for both supplier and customer”.

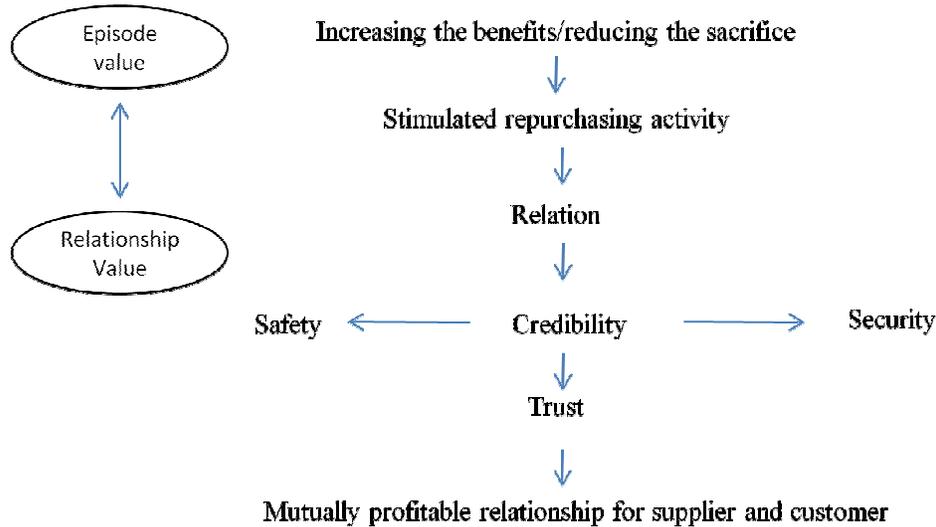


Figure 1. Building mutually profitable relationships (Adapted)
Source: (Ravald and Gronroos, 1996)

In order to follow these steps in building relationship, companies need to efficiently manage the internal partnership necessary to support the relationship (Kothandaraman et al, 2000). The author states that “managers need to create organization structure that supports the alliance as well as need to manage their own attitude toward cooperation with other internal partners and external alliance partners.”

Companies in the commoditized business-to-business forest product industry achieve a mutually profitable relationship with their suppliers and buyers. The following section presents a brief overview of relationships in the forest product industry.

Relationships in the forest products industry: The forest product industry is characterized by commodities products, where delivering relationship value could be a good strategy to increase customer share and market share (Smith, 2002). However, although many authors have indicated the importance of relationships in the hardwood lumber and other commodity wood industries (Dasmohapatra and Smith, 2008; Idassi et al., 1994; Simpson and Wren, 1997; Smith, 2002; Walthousen, 2007), the effect of relationships in

buyer-seller transactions in this industry has been vaguely studied. Especially, there is little evidence of how relationships affect purchase decisions and the dimensions of relationship value that may improve the overall level of purchase and satisfaction from buyers.

Most studies on value and purchase in the wood industry have focused on product attributes and improving these quality attributes. However, value from a customer’s point of view is a multidimensional concept that comprises other more important variables than product attributes (Idassi et al., 1994). In fact, it is emphasized that close personal relationships with each customer will be necessary to ensure the creation and delivery of a higher customer value (Bush et al., 1994).

A survey research study developed by Perera et al., (2008) presented the criteria used by buyers in the selection of wood products suppliers and the level of importance of this criteria or attributes. As it is illustrated in figure 2, product quality, fair price and consistent delivery were found in the study as the most important when selecting a supplier to do business with.

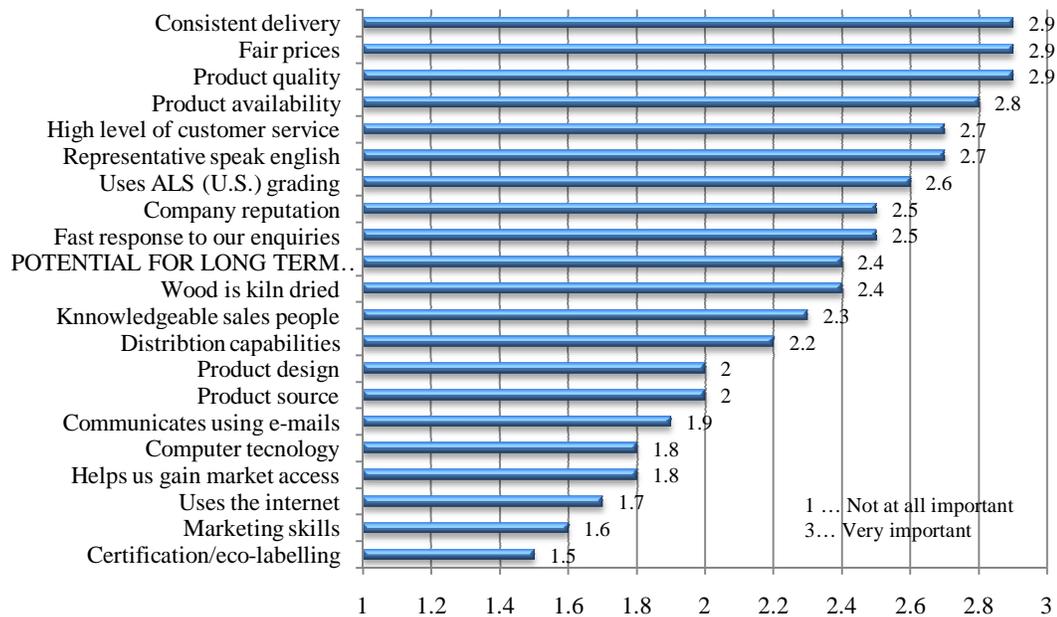


Figure 2. Criteria used in selecting wood product suppliers (level of importance (n=132). Source: (Perera et al., 2008).

Attributes in the relationship dimension such as potential for long-term relationships was somewhat important with an average of 2.4 in a scale of 1 to 3 (1 = not important at all and 3 = very important). Although the relationship dimension was found to be important after the product quality dimension, it was very close to the customer service dimension. These relational exchanges in wood industry range from relatively autonomous transactional exchanges to highly integrated relational partnerships (Simpson and Wren, 1997).

Previous research in wood products have mainly focused on product, price, placement and service attributes, while the dimension of relationship and its effects in transactions in the hardwood lumber industry has not been studied in detail. The section below presents the trends in the U.S. hardwood lumber industry.

Trends in the U.S. Hardwood Lumber industry: The hardwood lumber industry has experienced several changes in the last 50 years as a result of changes in hardwood saw timber inventory and in customer demand. In 1950, few sawmill produced a little more than 3 million board feet of lumber annually. However, 40 years after, the industry was literally dominated by sawmills producing almost double than the production in the fifty's (Luppold and Baumgras, 2000; Powell, et al., 1994). Most of the changes undergone by the industry are due to hardwood lumber markets and an increase in export market (Luppold and Baumgras, 2000). In the 80's low production values were experienced, with peak value in early 2001. In the mean time, imports and exports have been increasing, with higher exports than imports. The ratio of export to import of hardwood lumber in 1961 was 0.52, while in 2006 the ratio reached values of 1.92 (FAO, 2008).

As of April 2008, most of the U.S. logging and sawmills companies have been undergoing a string of problems from a combination of changing consumer tastes, construction downturns and global economic crisis (Snyder, 2008). Buyers of hardwood lumber such as large furniture makers are trying to set their operations in the emerging markets (where cheaper labor force and higher demand can represent high return on their investments) (Raymond, 2006). Added to this scenario changing in consumer tastes and

construction downturns that have slashed demand for hardwood flooring, trimming and red oak, one of the most dominant species in the hardwood industry (Snyder, 2008)

In order to compete more effectively with the rising imports and changing in customer preferences, domestic suppliers in the hardwood industry need to offer most value to their buyers and subsequent consumers. This value could take the shape of product service or relationship value (Dasmohapatra and Smith, 2008; Smith, 2002). Bush, et al., (1991) has reported that relationship value can help protect companies from competition and help them dominate the market. In these troubling economic times, lumber suppliers benefit to a large extent by keeping long term customers through creation of more value (Smith, 2002).

CHAPTER III

RESEARCH METHODOLOGY

The purpose of this research is to examine the value of buyer-seller relationships in the hardwood lumber industry and its affect on purchase decisions and supplier choice from the hardwood lumber buyer's perspective. The specific research objectives (RO) are presented as research statements in the following section:

RO1 Determine the value of relationship in buyer-seller transactions in the hardwood lumber industry vis-à-vis other product and supplier attributes.

RO2 Identify the different aspects or characteristics of suppliers that affects relationship value including:

- a. Product quality
- b. Price
- c. Service
- d. Communication
- e. Supplier know-how

RO3 Examine the effect of product, service and supplier dimensions that contribute to a higher perceived overall value in relationships and higher satisfaction in the hardwood lumber industry.

RO4 Examine the current level of technology used to communicate or have a flow of information among buyers and suppliers.

Figure 3 shows the flow diagram of the research methodology for the study. First, goals and objectives were determined followed by extensive literature review. When the sample

characteristics were determined, the contact list was generated followed by, survey design, data collection and analysis.

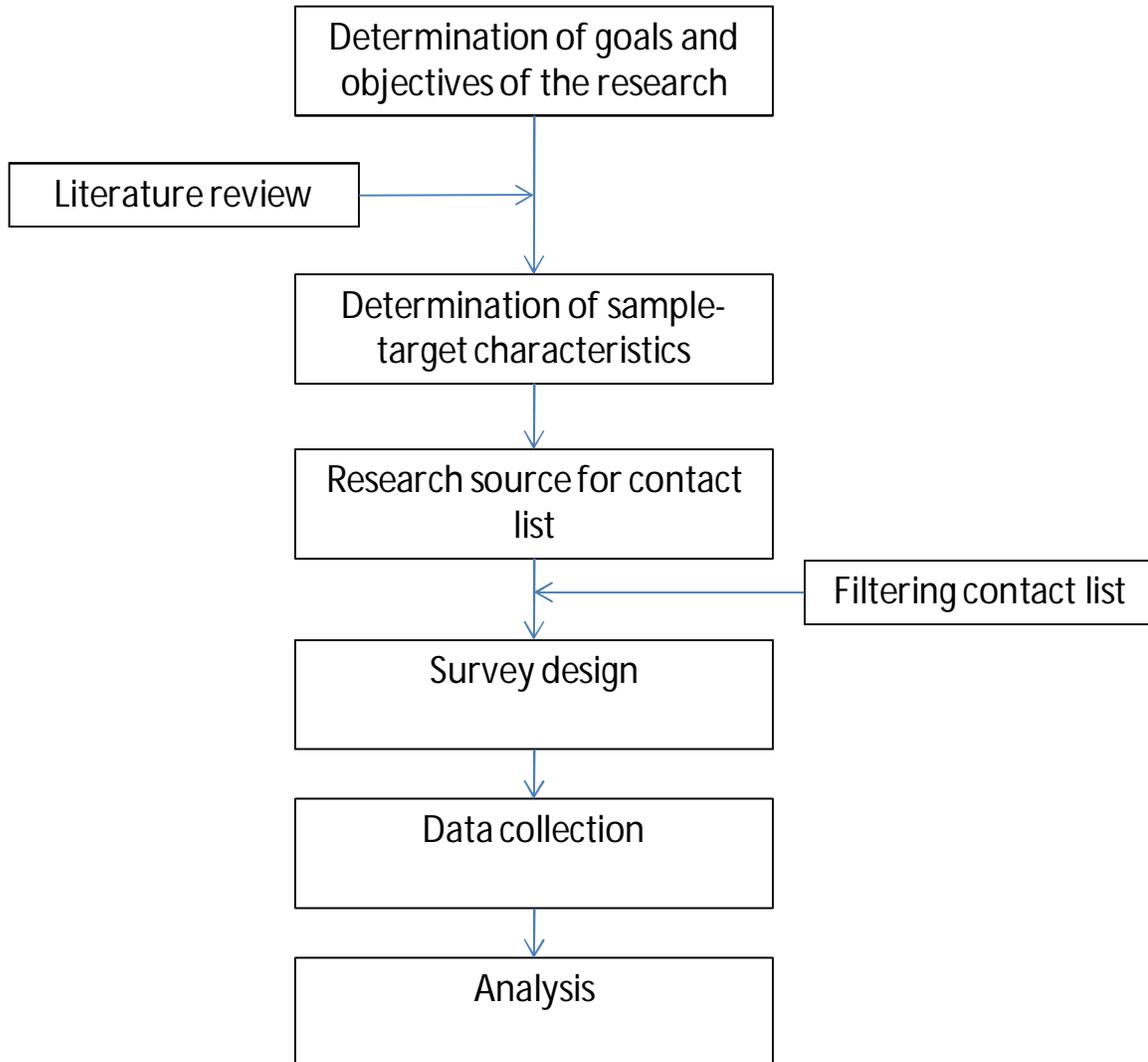


Figure 3. Flow diagram of research methodology

RESEARCH DESIGN

Data collection: Data for this research was collected using a survey instrument. An electronic survey was designed to gather information from buyers of hardwood lumber across the US. The first survey was sent in early December of 2007 with a cover letter describing the study. A copy of the cover letter is provided in appendix A. The survey was voluntary and respondents were assured of the confidentiality of their inputs.

Two weeks after the initial e-mail, a reminder e-mail was sent to all those who did not respond to the first e-mail. About 49 completed surveys were obtained after the first reminder. Three more reminders were sent to the non-respondents at approximately 3 weeks intervals to generate a higher response rate. A total of 78 completed responses were obtained at the end of the survey period (March 2008).

Survey design: A comprehensive literature review was conducted to identify attributes of relationship value. An electronic survey was designed taking in consideration previous surveys in relationship value, product value, service and supplier value and literature related to the hardwood lumber industry and purchase choice (Eggert, et al., 2005; Eggert, et al., 2006; Idassi et al., 1994; Simpson and Wren, 1997; Smith, 2002; Ulaga and Eggert, 2003; Wilson and Vlosky, 1997; Wilson, 1995). A total of 27 questions comprising scale, categorical and open ended questions were developed (see attached questionnaire in appendix B).

Sample: The national hardwood lumber buyer directory from the NHLA was used to generate the list of contact, for data collection. A total of 1,058 contacts was obtained from the National Hardwood Lumber Association containing e-mail, type of business activity, company name and contact person. The list was filtered for sawmills and companies and addresses located outside the U.S. ending up with a total of 711 contacts of hardwood lumber buyers in the U.S. as an initial population of contact.

Instrument: The survey was first pilot tested on several academics and industry personnel to test for its validity, reliability, questions wording and relevance. The modified final version of the survey was sent to the 711 contacts by e-mail. The electronic survey was developed using Survey Monkey Software® in Fall 2007. Research data was collected and recorded real time.

Response rate: From our initial contacts of 711 contacts, 169 e-mails were not delivered (closed business, e-mail errors, and contacts no longer available). A total of 78 valid responses out of the adjusted population of 542 (e-mail sent) were received accounting for a response rate of 14.4%. Table 2 shows the adjusted response rate.

Table 2. Response rate.

Description	Number
Population	1,058
Filtered contacts*	(347)
Initial contact list	711
Returned email**	(169)
Adjusted populations	542
Completed responses	78
Response rate	14.4%

* Sawmills and those located outside of U.S.

** Email errors, closed business, contacts no longer available

Figure 4 illustrates the distribution of responses across the U.S. From the North East region of the U.S. we received nearly 14.3% responses representing 11 responses. Approximately 55% of the responses were from South East region and 26% and 5.2% were from MidWest and West U.S., respectively. The distribution of potential respondents from the initial contact list was reviewed in order to understand how this distribution may affect the response share by region in the U.S. The distribution of potential response share per region is the U.S. is as follows: South 36.7%, MidWest 42.6%, North East 10.9% and West 9.8%.

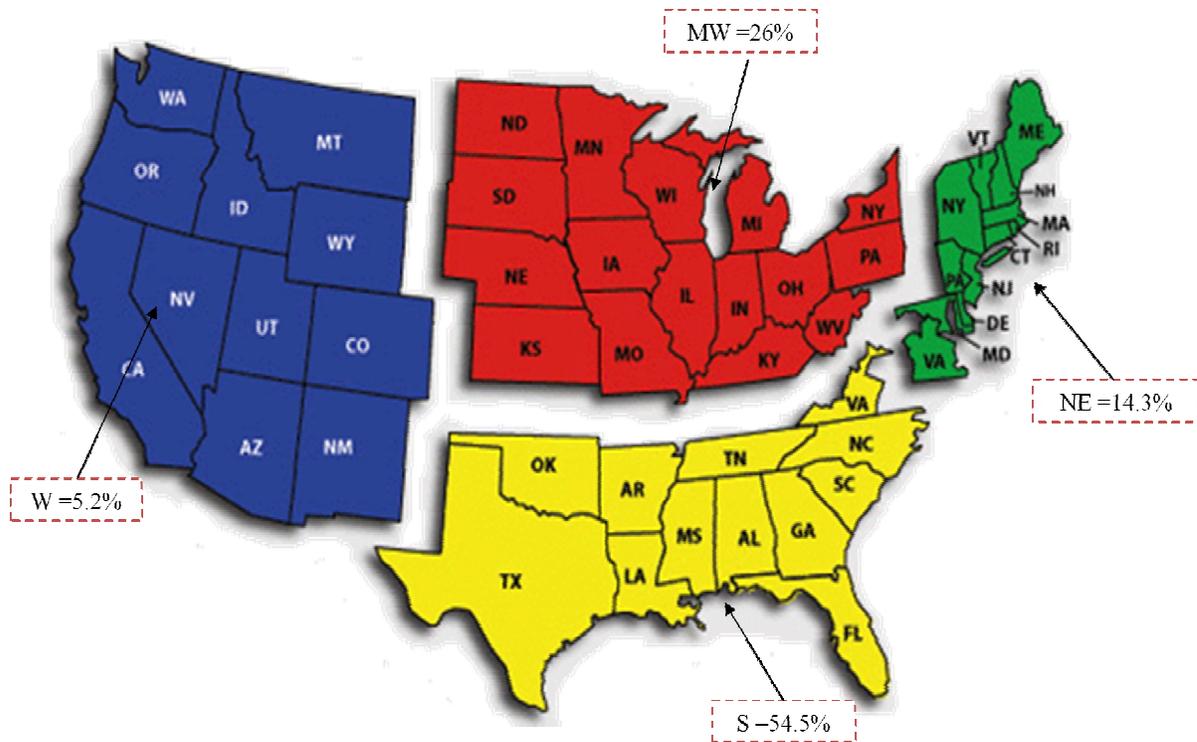


Figure 4. Response distribution by region in the U.S.

A separate NHLA list was generated that consisted of hardwood lumber buyers from Canada. Initially an attempt was made to examine relationship dimensions from hardwood lumber buyers from Canada; however we received only 8 responses from an overall sample of 120 buyers in Canada. Because of the small number of responses an accurate and representative analysis could not be completed for buyers from Canada. The answers from respondents from Canada have been aggregated and provided in appendix G. All other analysis has been represented for the U.S. respondents only.

Statistical analysis: All statistical analysis were performed using SPSS[®]16 and Microsoft Excel[®].

Non-response bias: In order to examine non responses bias, an independent sample t-test was performed to compare means between early respondents (n=49) and late responses (n=29) at 95% confidence. Early respondents were categorized as those that responded after the first reminder and late respondents were those who responded after the second reminder.

Variables such as number of years in relationship with supplier, purchase volume, satisfaction, attributes affecting purchase, etc, were used for non response bias comparison. No significance difference was found in responses (to the previous variables), except for two questions:

1. “How much should be the difference in unit price of hardwood lumber between your two largest suppliers that would motivate you to switch your first and second suppliers (make your second supplier as your largest supplier)”. In this case, the mean score for the early respondent was 5.89, while for late responses the mean was 4.14 with a p value of 0.011, at 95% confidence level (using t-test)
2. You are willing to invest time and other resources into the relationship with supplier 1, the mean scores were 4.87 and 4.50 respectively with a p value of 0.019.

LIMITATIONS OF THE STUDY

- a. The sample size consists of a representative sample taken from the current members of the National Hardwood Lumber Association (NHLA in U.S. in 2007), so all analysis and statistical inference would be limited to the characteristics of current NHLA members. However it should be noted that most major hardwood lumber buyers in the U.S. are member of NHLA.
- b. The lack of sufficient responses from a single industry limits any analysis by respondent industry type (e.g. furniture vs. cabinet vs. retailers).
- c. Only one respondent from each company was contacted for survey, which may create a single respondent bias (Blair, 1987). Future studies should focus on getting information from multiple respondents within the same organization to understand differences among buyer groups within an organization.

CHAPTER IV

RESULTS AND DISCUSSION

Respondent type: The following section provides a brief overview of the type of respondents to the survey:

Respondent job profile: Most of the respondents to the survey are either at the managerial level or a higher level. Respondents at this level are reported to have more access to information as well as a better and more complete view of the business needs (including factor affecting purchase decisions) (Smith, 2002). As shown in figure 5, approximately 49% of respondents were corporate personnel including CEO, owner, president, vice-president, about 15% of the respondents were purchasing and raw material managers, 14% were sales directors, 13% operation managers, and 9% general managers.



Figure 5. Percent of respondents by job profile (N=78)

Number of years in business: Respondents were asked to indicate the number of years their company has been in business as of 2007. The average length of years in business for the respondent companies in our study was reported as 31.6 years with a standard deviation of 16.8 years. More than 73% of the respondent companies indicated to be in business for more than 20 years. In addition, about 36% of respondents indicated that their companies had been in business for over 45 years (figure 6).

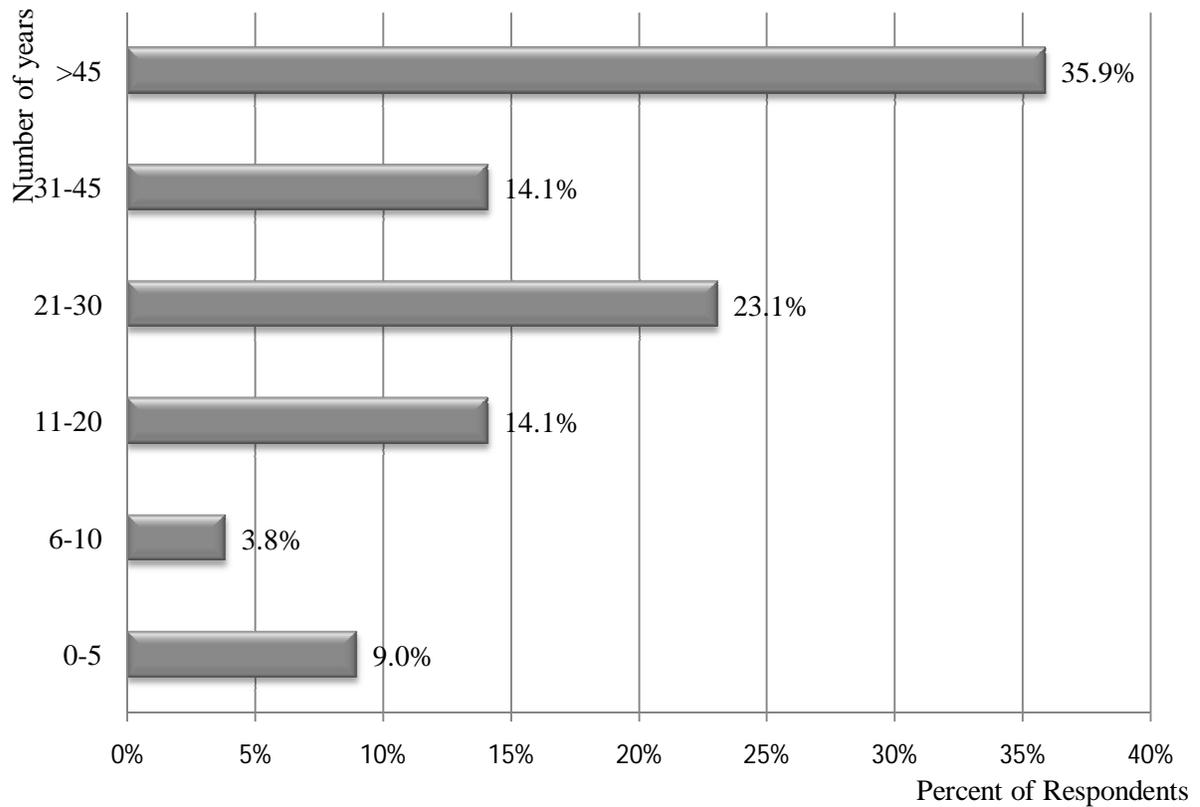


Figure 6. Percent of respondents by number of years in business as of 2006 (N=78)

Geographic location of firms: Figure 7 shows the geographic distribution of the firms across the U.S. based on U.S. census region. Most of the respondents to the study were located in the South U.S. (54.5%), followed by Midwest (26%), Western U.S. (5.2%) and North East (14.3%).

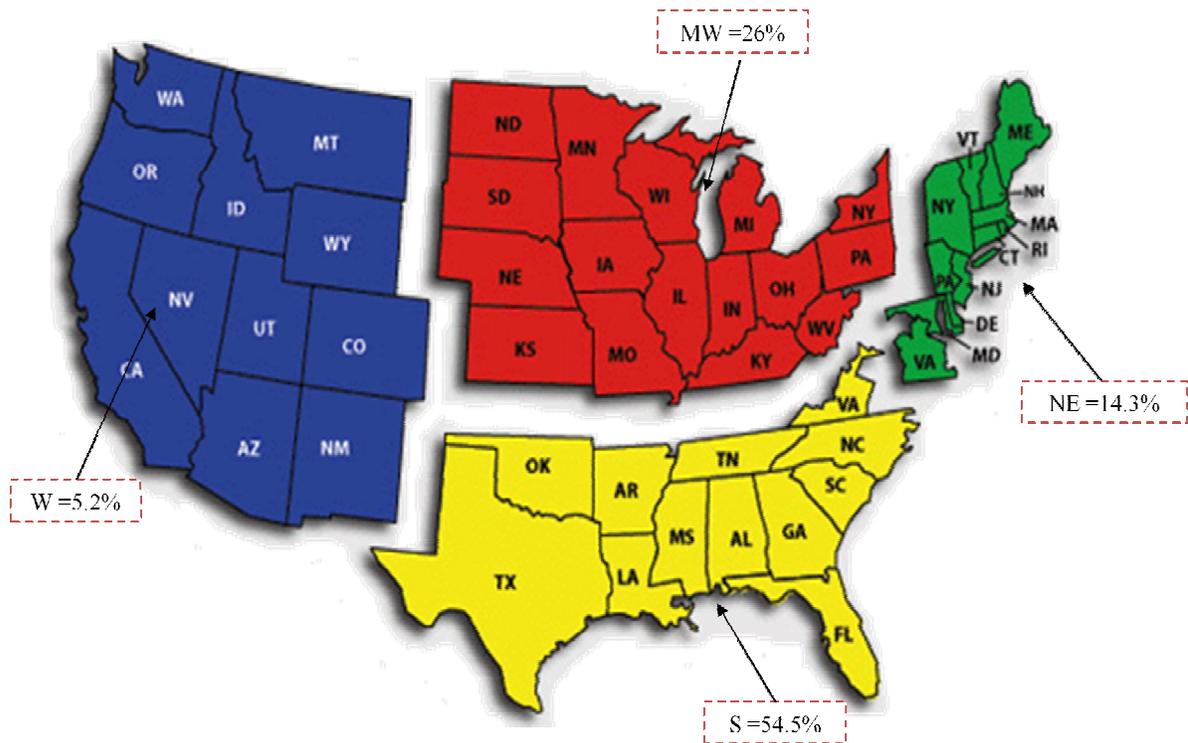
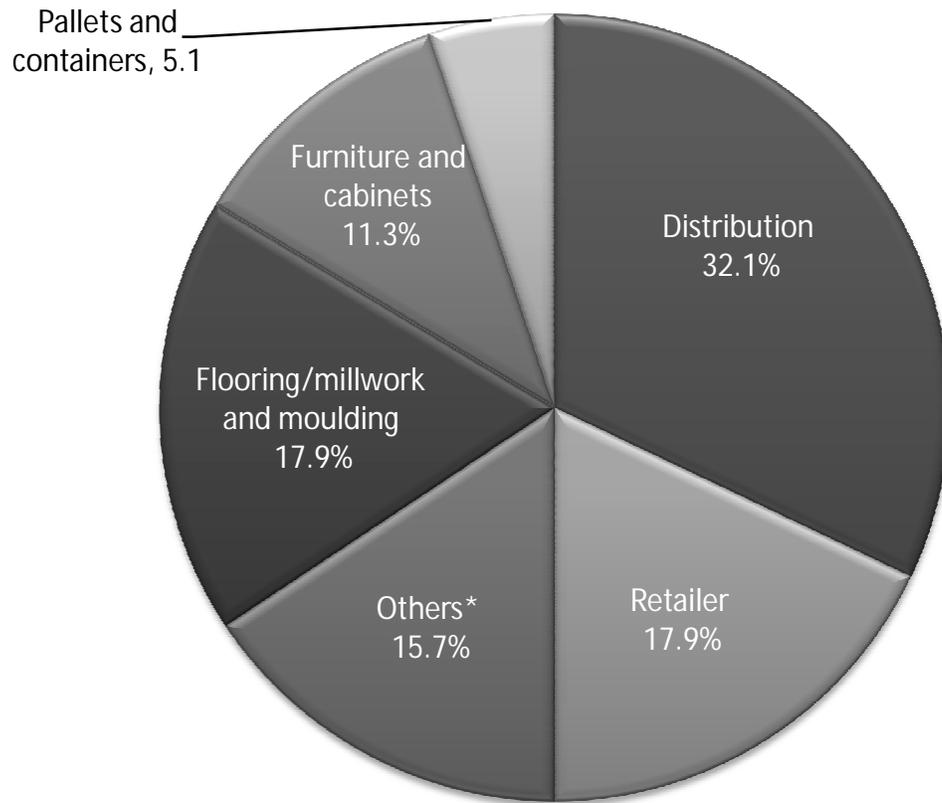


Figure 7. Respondent distribution by region in U.S. (N=77)

Most of the responding firms were located in North Carolina (13%), followed by Tennessee (9%), New York (8%), Virginia, Texas and Pennsylvania (6% from each state).

Primary line of business: Half of the respondents to the survey were either in the hardwood lumber distributor or retailing businesses (32% and 18%, respectively). Figure 8 shows that the other respondent lumber buyers were in the following business categories: flooring (9%), millwork and moulding (9%), furniture residential (6%), pallets and containers (5%), cabinets including kitchen, office and vanity (4%), furniture office (1%), and others, 15.7%, including dimension stocks, stair parts, musical instruments and other specialty wood work. Our result of the respondents profile is typical of the hardwood lumber industry (Smith, 2002).



*Others include: Dimension stocks, stair parts, musical instruments and specialty wood working.

Figure 8. Percent of respondents by primary line of business (N=76)

Study results:

On average the respondent firms employed about 168 employees. About 22% of respondents indicated that they had 51-100 employees, followed by 9% of respondents firms having 101-250 employees. About 14% of firms employed 251-500 employees and 6% reported having over 500 employees (figure 9).

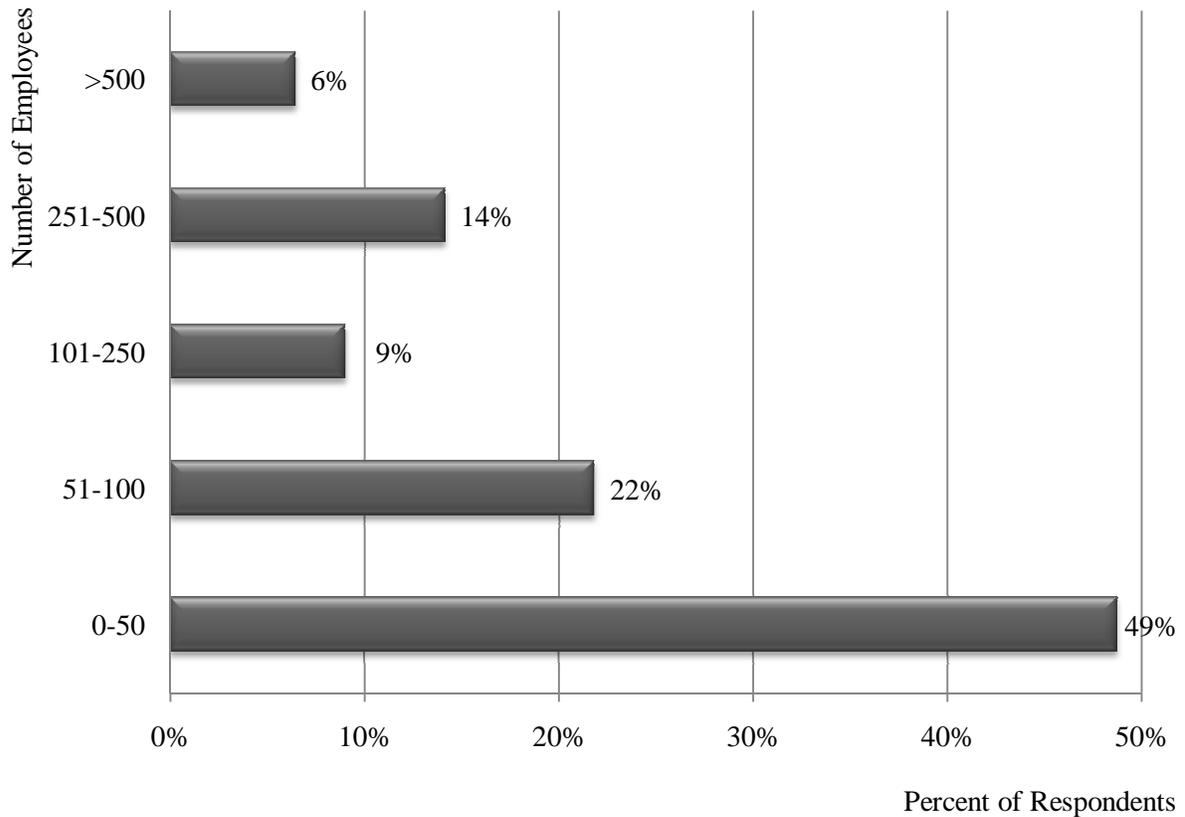
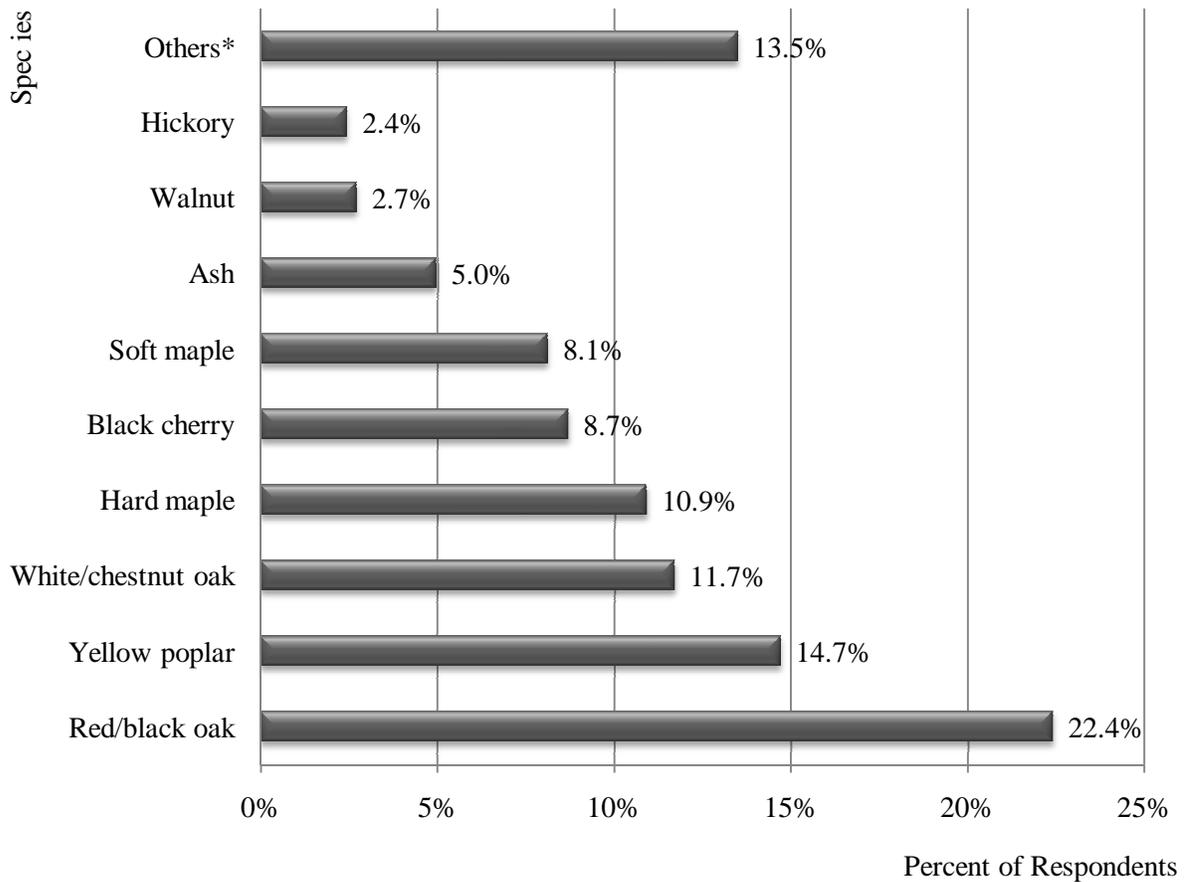


Figure 9. Percent of respondents by number of employees in 2006 (N=76)

Species use: Almost 68% of the respondents indicated that they purchased only hardwood while the rest (32%) reported purchasing both hardwood and softwood in 2006. Oak constituted nearly 34% of the species that respondent firms purchased, accounting for 22.4% red/black oak and 11.7% white/chestnut oak (figure 10). Approximately 14.7% of the lumber purchased by respondents in 2006 was yellow poplar, follow by hard maple (10.9%), black cherry (8.7%), soft maple (8.1%), ash (5%), walnut (2.7%), hickory (2.4%), beech (1%) and others (13.5%, alder, aspen, beech, willow, etc.).



*Others include: alder, aspen, beech, willow, etc.

Figure 10. Percent of respondents by relative composition of species purchased in 2006 (N=78)

Volume of lumber purchased: The average volume purchase by the respondents firms in 2006 was estimated to be 12.7 million board feet (with a large standard deviation of 25.8 million board feet). Most of the respondents firms in this study (52%) purchased less than 5 million board feet in 2006. Approximately 21% purchased between 5 and 20 million board feet and over 16% purchased more than 20 million board feet in 2006 (figure 11).

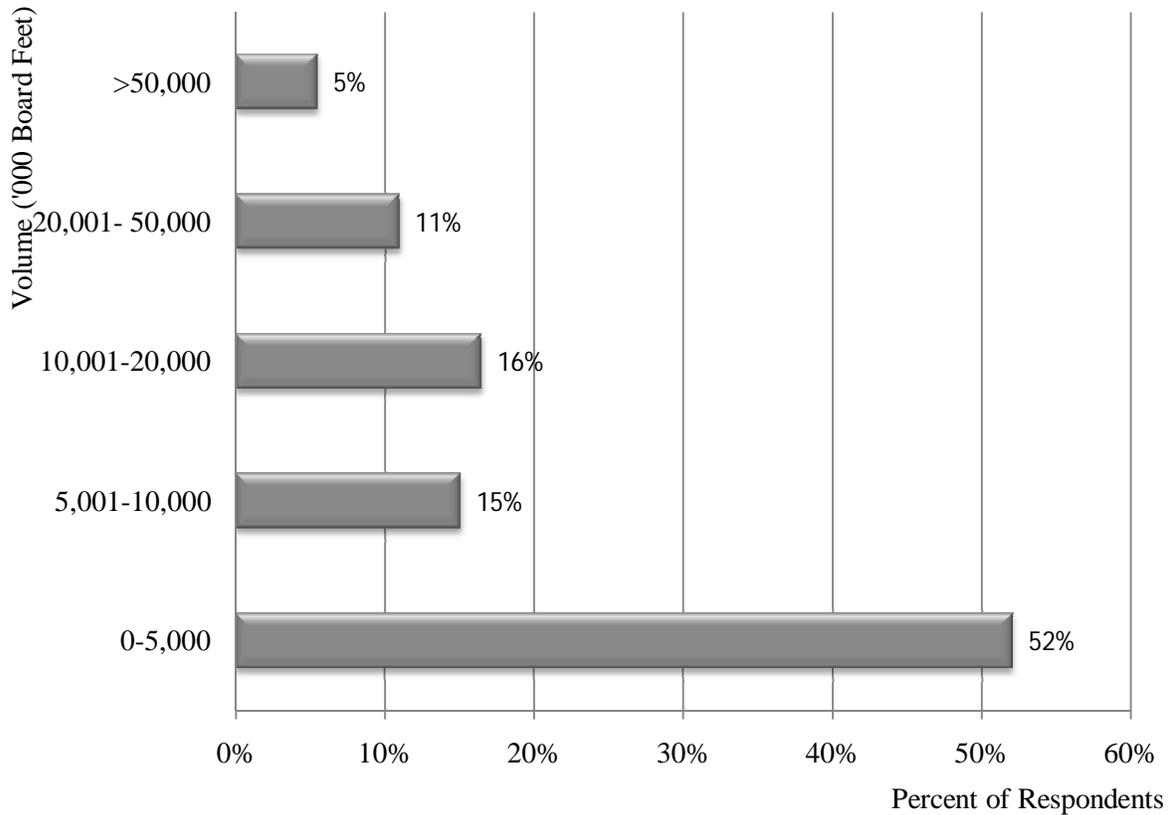


Figure 11. Percent of respondents by volume of lumber purchased in 2006 (N=73)

Customer share by hardwood lumber suppliers: The number of suppliers that the respondents firms purchased their hardwood lumber from varied greatly from 5 to 200. However, on average, over 50% of total respondent purchases of hardwood lumber came from their top two suppliers in terms of volume. The key (top) supplier held the highest share of the customer hardwood lumber purchase volume with a mean of 31.7% of the buyer's purchases in 2006. The respondent firms purchase 18.9% of their total hardwood lumber purchased in 2006 from their second supplier. About 47% of their hardwood lumber in 2006 came from the rest of the suppliers. This finding is consistent with other studies in the hardwood lumber industry. (Smith, 2002) showed that most hardwood products, and specifically hardwood lumber firms buy most of their lumber from top 2 or 3 suppliers.

A paired sample t-test determined mean difference in hardwood lumber by respondent purchase from the top two suppliers (performed at 0.05 level of significance). Table 3 shows that that the respondent firms purchase significantly higher volume of hardwood lumber from their top supplier as compared to their second supplier (p=0.000).

Table 3. Volume of hardwood lumber purchased by respondent firms from top two suppliers (N=74)

Paired Differences	Volume of purchase % **	t	Significance p-value*
Supplier 1	33.4%	6.04	0.000
Supplier 2	19.9%		

*Test of significance using paired sample t-test between supplier 1 and 2 at 0.05 significance level. (When p-value is lower than 0.05 there is statistical validity (in this case for the comparison between means). t-value is also used and it will be positive if the first mean is larger than the second, this is a reference value that will be used to determine significance difference. The most reference value used is p-value.) **All other suppliers 46.7%

Factors driving hardwood lumber purchase decision: Study respondents were asked to rate the factors that drives their purchase decisions of hardwood lumber (on a 7 point rating scale, with 1= not at all important and 7= most important). A list of potential factors driving hardwood lumber purchase decisions was compiled using previous research on hardwood lumber and several secondary sources of information (Aguilar and Vlosky, 2008; Idassi et al., 1994; Simpson and Wren, 1997; Smith, 2002; Ulaga and Eggert, 2003).

Table 4. Factors driving hardwood lumber purchase decision (N=78)

Attributes	Mean*	Standard deviation
Product quality	6.4	1.0
Relationship with supplier	5.8	1.0
Overall service	5.7	1.3
Prices	5.6	1.2
On-time delivery	5.6	1.4
Geographic closeness	4.7	1.7
Availability range grades	4.4	1.6
Availability range sizes	4.4	1.3
Availability range species	4.4	1.6
Volume discount	4.3	1.8
Warranty on product	4.3	2.0
Packaging	3.6	1.7
Environmental certification	2.5	1.7
Brand	2.1	1.5

*Note: 7 point importance scale where 1 = not at all important and 7 = most important.

From table 4, results indicate that the most important factor that respondents consider at the time of purchasing is product quality (mean rating 6.4). Relationship with supplier is second only to product quality with a mean rating of 5.8. This was followed by on-time delivery (5.6), price (5.6), geographic closeness to supply (4.7), availability of a range of sizes (4.4), availability of a range of grades of lumber (4.4), availability of a range of hardwood species (4.4), volume discounts (4.3), and warranty on product and packaging (4.3 and 3.6 respectively). The least important factors influencing purchase decisions were reported as environmental certification (2.5) and branding of product (2.1).

It is clear from the above results that a hardwood lumber customer is concerned foremost about the quality of the product that they receive from their suppliers. All other variables including relationship, service, price, and delivery comprise the next level of importance.

Length of relationship with suppliers: The respondents were asked to indicate the length of relationship with their first and their second best supplier. The hardwood lumber purchase buyers reported (table 5) that they had been purchasing from their first supplier, on average for 13.1 years, whereas they had been purchasing from their second supplier for about 11 years on average as of 2006.

A mean test of difference (using t-test) in the years in business between suppliers 1 and 2 shows that the duration of relationship with supplier 1 was significantly higher compared to that of supplier 2 ($p= 0.045$) as shown in table 5 at 95% significance level.

Table 5. Buyer’s mean years of relationship with their top two suppliers (N=78)

	Mean length of relationship with buyer (years)	t	Significance p-value*
Supplier 1	13.1	2.04	0.045
Supplier 2	11.5		

*Test of significance using paired sample t-test between supplier 1 and 2 at 0.05 significance level.

Satisfaction with suppliers and future relationship with suppliers: The respondents were asked to indicate their level of satisfaction with their top 2 suppliers (on 7 point rating scale, where 1 = strongly disagree and 7 = strongly agree). As shown on table on average, the respondents indicated a mean satisfaction score of 5.9 with supplier 1 and 5.7 with supplier 2.

A pair mean difference on satisfaction between supplier 1 and 2 shows that buyers are significantly more satisfied with their top supplier than that of the second supplier ($p=0.007$) at 95% confidence level (table 6).

When buyers were asked to indicate their intention to increase business in the future with both suppliers, they indicate that although supplier 1 is expected in the future to receive a larger share of business, they are considering expanding their business with supplier 2 and use supplier 2 more often (table 6). This supply chain strategy might be used by the customer in order to minimize the risk of relying on just one supplier.

Table 6 shows the pair mean difference for future share between first and second supplier based on three statements: 1. Supplier will receive larger share, 2. We expect to expand our business with this supplier, 3. This supplier will be used more than it is now. The mean test did not show any significant difference between supplier 1 and 2 for any of these three statements of future share allocation at 95% confidence.

Table 6. Buyer satisfaction level and future share to supplier 1 and 2 (N=78)

Attributes	Mean rating**		t	p-value*
	Supplier 1	Supplier 2		
Overall satisfaction	5.9	5.7	2.77	0.007
Supplier will receive larger share	4.8	4.7	1.05	0.295
We expect to expand our business with this supplier	4.5	4.7	-0.91	0.365
This supplier will be used more than it is now	4.4	4.6	-1.08	0.284

*Test of significance using paired sample t-test between supplier 1 and 2 at 0.05 significance level.

**Note: 7 point agreement scale where 1 = strongly disagree and 7 = strongly agree.

Relationship dimension between buyers and their two suppliers: The respondents were asked to rate and compare the top and second best supplier in terms of several attributes of relationship. This attributes represent the extent of commitment and trust in relationship (Eggert, et al., 2006). The following attributes were included in the study.

- Readily adjusts their inventories to meet your needs
- It would be disruptive to your company's operations to end the business with this partner
- The switching costs to another partner for this product would be large
- You focus on long-term goals in this relationship with this supplier
- You are willing to invest time and other resources into the relationship with the supplier
- You share costs with this supplier on common activities with this supplier

A seven point rating scale (with 1 = strongly disagree and 7 = strongly agree) was used to examine these relationship dimensions. The results indicate (table 7) that the buyers perceive that they will find it disruptive to end relationship with both suppliers (mean rating 5.1 and 4.1, respectively for suppliers 1 and 2). In addition the buyers focus on long term goals in the relationship (mean rating 5.2 and 4.8 respectively). Investing time and resources into the relationship with the supplier is probably the most important relationship dimension (mean rating 5.2 and 4.7 for supplier 1 and 2 respectively). On the other hand there is no difference in cost sharing on common activities between the buyers's main and their second supplier (mean rating 2.9 for supplier 1 and 2.7 for supplier 2).

Table 7. Relationship dimensions between buyers and their top two suppliers (N=78)

Attributes	Mean		t	Significance p-value*
	Supplier 1	Supplier 2		
Readily adjusts their inventories to meet your needs	4.2	4.0	1.41	0.162
It would be disruptive to your company's operations to end the business relationship with this partner	5.1	4.1	5.27	0.000
The switching costs to another partner for this product would be large	3.4	3.1	1.62	0.109
You focus on long-term goals in this relationship	5.2	4.8	2.27	0.026
You are willing to invest time and other resources into the relationship with this supplier	5.2	4.7	2.79	0.004
You share costs with this supplier on common activities (such as distribution, promotion, handling, others)	2.9	2.7	1.15	0.252

*Test of significance using paired sample t-test between supplier 1 and 2 at 0.05 significance level.

**Note: 7 point agreement scale where 1 = strongly disagree and 7 = strongly agree

Product, service, supplier attributes of 1st supplier vs. second supplier: Respondents were asked to indicate their agreement with the statements comparing 1st supplier with the secondbest supplier on several product, service and supplier attributes. An example of a question to the respondents is compared to supplier 2, your first supplier: provides you with more consistent product quality over time". Table 8 shows the mean rating and standard

deviation of the attribute statements of product quality, service and supplier included in the supplier comparisons. The most important attributes indicate by the buyers was reported as delivery of a more consistent quality over time (mean rating 4.6) followed by reliable products (4.3) and less rejection of products (4.3). These results are consistent with findings in previous studies (Aguilar and Vlosky, 2008; Perera et al., 2008; Smith, 2002). Product quality followed and personal interactions or relationships are most important for the buyers. A combination of these two dimensions (quality and relationships) are reported to be very important for delivering higher value to buyers. Other statements such as customer service, product development or improving product received rating of less than four (range of 3.5 to 3.8).

Table 8. Quality, service and supplier attributes rating of main (best) supplier compared to supplier 2 (N=78)

Quality service and supplier attributes question: Compared to supplier 2, supplier 1:	Mean rating*	Standard deviation
Provides you more consistent product quality over time	4.6	1.9
Products are more reliable	4.3	1.8
You reject less products from the main supplier	4.3	1.9
Provides you with better quality	4.3	1.9
Gives you a greater feeling of being treated as an important customer	4.2	1.8
It is easier to work with the main supplier	4.2	1.8
Responds faster when you need information	4.2	1.8
There is a better interaction between the main supplier's people and ours	4.1	1.8
Performs better in meeting delivery due dates	4.1	1.7
You have less delivery errors with the main supplier	4.1	1.8
Provides you with better services	4.1	1.6
You can address problems more easily with the main supplier	4.1	1.9
Provides you with better access to his know how	4.1	1.6
Helps you in getting your products to market faster	4.0	1.8
Knows better how to improve your existing products	3.8	1.6
Performs better at presenting you with new products	3.6	1.6
Performs better in helping you speed up product development	3.6	1.6
Knows better how to assist you in new product development	3.5	1.7

*Note: 7 point agreement scale where 1 = strongly disagree and 7 = strongly agree

What factors contributes to buyer’s overall value in relationship with suppliers?: The effect of factors or attributes on buyers perception of value in relationships with suppliers was studied using attributes (product, service and supply performance) included in table 8. Since there were over 20 attributes, they were first reduced to a few smaller underlying factors using principal components analysis. Principal component analysis is a statistical method used to convert a large number of items into a smaller set of easily workable factors for subsequent analysis (Hair et al., 1995). Each of the items or attributes included within the factors are then measured for reliability of the items within each factor (i.e., whether the items explain the factor).

The factors were extracted using a Varimax rotation method after normalizing the items included (Keiser Normalization) using SPSS®. Table 9 displays the results of the factor analysis with variables considered to build the factors, the factor scores and reliability of the items included in each factor.

Table 9. Factors analysis* of quality, service and supplier attributes, factor score and reliability (Cronbach’s alpha)

Attributes	Interaction w/supplier Factor 1	Supplier know-how Factor 2	Product quality Factor 3	Supplier performance Factor 4	Reliability (Cronbach's Alpha)
There is a better interaction between the main supplier’s people and ours	0.849	0.239	0.29	0.283	0.97
You can address problems more easily with the main supplier	0.819	0.192	0.329	0.308	
It is easier to work with the main supplier	0.809	0.358	0.317	0.242	
Gives you a greater feeling of being treated as an important customer	0.789	0.233	0.409	0.251	
Performs better in helping you speed up product development	0.322	0.831	0.206	0.242	0.94
Knows better how to assist you in new product development	0.172	0.822	0.242	0.356	
Performs better at presenting you with new products	0.124	0.779	0.326	0.292	
Helps you in getting your products to market faster	0.325	0.675	0.213	0.375	
Knows better how to improve your existing products	0.454	0.623	0.367	0.386	

Table 9. Continued

Attributes	Interaction w/supplier Factor 1	Supplier know-how Factor 2	Product quality Factor 3	Supplier performance Factor 4	Reliability (Cronbach's Alpha)
You reject less products from the main supplier	0.239	0.256	0.853	0.219	0.97
Products are more reliable	0.349	0.265	0.84	0.221	
Provides you with better quality	0.324	0.334	0.82	0.223	
Provides you more consistent product quality over time	0.419	0.207	0.783	0.286	
You have less delivery errors with the main supplier	0.229	0.311	0.19	0.836	0.96
Performs better in meeting delivery due dates	0.237	0.323	0.323	0.813	
Provides you with better services	0.339	0.381	0.242	0.786	
Responds faster when you need information	0.36	0.379	0.236	0.713	

*Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Four factors were identified in the above model: 1. interaction with supplier (with factor loading ranging from 0.79 to 0.85), 2. supplier know how (with factor loadings ranging from 0.62 to 0.83), 3. product quality (with factor loading ranging from 0.78 to 0.86), and 4. supplier performance (with factor loadings ranging from 0.71 to 0.84). All these factor loadings are above 0.5 which is the acceptable level for a factor (Hair, 1995). The four factor model shown in table 9 explains about 89.5% variance among the factors.

Reliability of the items (attributes) included within each factor was measured using Cronbach's alpha. Items within a factor need to reliably measure the underlying factor. Cronbach's alpha measures the correlation of items within the factor are highly correlated, they will increase the reliability of the factor (Hair, 1995). An alpha value over 0.70 is considered to show a strong reliability of the items included within the factor (Cohen and Swerdlik, 1999). Factors 1 to 4 were well above this level.

These four factors obtained from the factor score model were used to fit a regression model to explain how these factors affect overall relationship value delivery in the hardwood lumber industry. Overall relationship value is measured in the following section.

Overall relationship value: Buyers were asked to indicate their agreement on statements indicating the value of relationship with their supplier 1 compared to that of supplier 2. The following two statements were used based on previous studies (Eggert, et al., 2005; Ulaga and Eggert, 2003). The questions asked were compared to supplier 2, supplier 1:

1. Offers higher value when comparing all benefits and costs of this relationship
2. Adds more value to the relationship, overall

As shown in table 10 on an agreement scale where 1 = strongly disagree and 7 = strongly agree), the two statements received almost identical ratings from the buyers (4.0 and 3.9 respectively).

Table 10. Overall relationship value of main supplier versus second supplier (N=78)

Attributes	Mean rating*	Standard deviation
Offers higher value when comparing all benefits and costs of this relationship	4.0	1.8
Adds more value to the relationship, overall	3.9	1.8

*Note: 7 point agreement scale where 1 = strongly disagree and 7 = strongly agree

Regression model (Dependent variable= overall relationship value and independent variable= four factors from the factor analysis: product quality, interaction with supplier, supplier know how and supplier performance): A regression model was developed to study the affect of the product, service and supply factors on the overall value of relationships. This is important because if the supplier would want to offer a higher value in relationships, they could modify the performance of these factors (or attributes belonging to each factor).

The dependent variable used was overall value obtained by taking a mean of the two overall relationship value statements in table 10. The independent variable used were the factor scores of the four factors obtained from the factor analysis: product quality, interaction with supplier, supplier know how and supplier performance. The regression model fit is found to be significant ($p = 0.000$) with an r^2 value of 0.862. The relationship model based in the regression is presented in figure 12.

Table 11. Regression model fit for the prediction of relationship value using factors (Linear Regression-ANOVA)

Model	Sum of Squares	df	Mean square	F	p-value*
Regression ^a	201.8	4	50.5	112.6	0.000
Residual	32.3	72	0.4		
Total	234.1	76			

*Test of significance at 0.05 significance level. Predictors: (Constant), Regression factor score for: personal interaction with supplier, product quality, supplier know-how and delivery performance/service support. Dependent variable: overall relationship value

The β values for the four factors (table 11) were found to be significant as well as positive (table 12). As shown in table 11 from the β values, supplier know-how has the most significant affect on the relationship value. In order words, in order to improve relationship value higher supplier know-how has to be delivered (including helping buyer firms to speed up product development, assisting in new product development, getting products to market faster and improving existing products. Personal interaction and product quality are the next two important factors affecting the overall relationship value positively ($\beta=0.743$ and 0.733 respectively), followed by delivery performance (0.379)

Table 12. Regression coefficients and significance for the regression model. Dependent variable: overall relationship value. Independent variable-four factor: personal interaction, supplier know-how, product quality and delivery performance/service.

Model	B	Standard Error	t	p-value*
Constant	3.955	0.076	51.84	0.000
Regression factor score 1 Personal interaction w/supplier	0.743	0.077	9.68	0.000
Regression factor score 2 Supplier Know-how	1.193	0.077	15.53	0.000
Regression factor score 3 Product Quality	0.733	0.077	9.55	0.000
Regression factor score 4 Delivery performance/service	0.379	0.077	4.93	0.000

*Test of significance at 0.05 significance level.

The relationship model based on the regression is presented in figure 12. This model is an important tool of reference about the attributes to consider for investment during marketing practices (company-managerial practices).

For example if a supplier would like the hardwood lumber buyer to improve the perception of their value in relationships, they could improve the strength of their supplier know-how and attributes included in that factor (i.e., helping buyer's to speed up product development, perform better at presenting the buyer with new products, helping in getting the buyers products to market faster and helping to improve the buyer's existing products). This sort of commitment will help improve the value of relationship as perceived by the buyer.

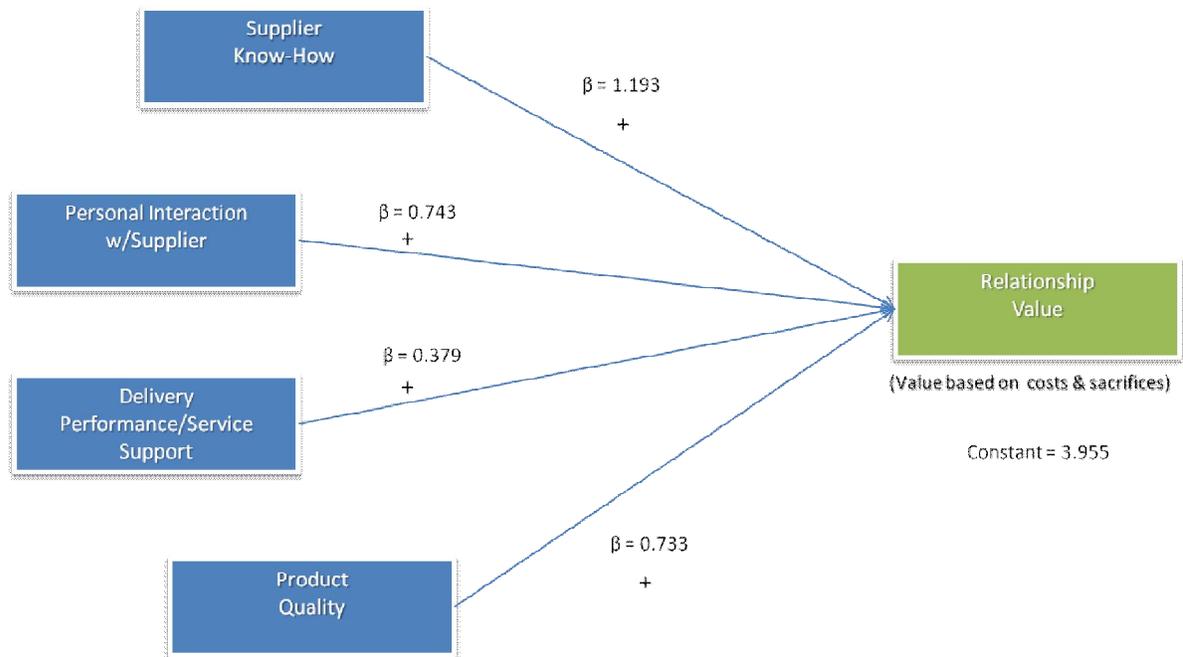


Figure 12. Relationship value model adjusted to the hardwood lumber industry

Note: Relationship value = 3.955 + 1.193 (Supplier know-how) + 0.743 (Personal interaction with supplier) + 0.379 (Delivery performance/service support) + 0.733 (Product quality).

Price was not included in the previous models as its contribution to the model per se was not significant ($p=0.100$, at 95% confidence). Also the question addressed in the questionnaire about price was oriented to measure loyalty with current suppliers (indicating

the margin of increase in price where customer would switch suppliers). As presented in previous studies, prices are determined by the market, in fact buyers and sellers use prices listed in market reports (such as Hardwood Market Report, and The Weekly Hardwood Review) as the starting point for negotiation (Bush et al., 1991). The author refers that “pricing takes the form of Hardwood Market Report plus or minus an allowance to account for factors such as local availability, weather, the relationship between buyers and seller, and other product specifications”. There also some considerations about the no flexibility of dealer/distributor to change price, as the owner of the resource benefit more and is the less affected by market price fluctuations. Luppold et al., states that “declines in hardwood lumber did not always result in continual declines in stumpage market price because the apparent price expectation of the stumpage owner.

Effect of overall relationship value on customer satisfaction with suppliers: If higher value in relationship was delivered to the buyers, will it improve customer satisfaction? In order to study this affect, a regression model was developed with independent variable = overall relationship value and dependent variable = satisfaction with suppliers. Since the dependent variable measure was developed based on comparison of suppliers 1 and 2, for consistency, the independent variable to be used in the model was calculated by subtracting the satisfaction score of supplier 2 from that of supplier 1.

Table 13. Regression model fit for relationship value-satisfaction model (Linear Regression-ANOVA)

Model**	B	Std. Error	t	Significance p-value*
Constant	-0.485	0.175	-2.766	0.007
Overall relationship value	0.180	0.041	4.410	0.000

*Test of significance at 0.05 significance level.

** Predictor= Overall relationship value and dependent variable=satisfaction with ssupplier.

The model fit is shown in table 13. The overall model was found to be significant with a regression coefficient value for relationship value on satisfaction = 0.180. This means

that an improvement in relationship value will lead to a higher customer satisfaction with the supplier. The relationship value model showed in figure 12 is further modified to include customer satisfaction (figure 13). The r^2 obtained for the overall model was found to be 0.45 showing that the strength of relationship between the two variables is still present but not too large. However at 95% confidence the affect is still significant as reflected by the p-value (0.000).

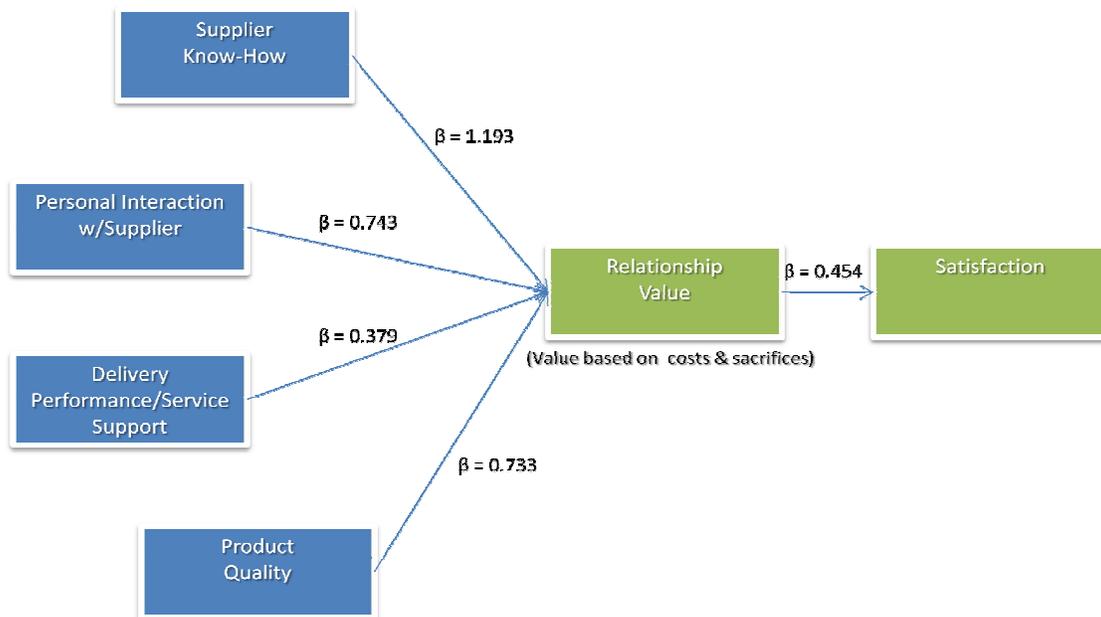


Figure 13. Relationship model including attributes and buyer satisfaction

Note: Relationship value = 3.955 + 1.193 (Supplier know-how) + 0.743 (Personal interaction with supplier) + 0.379 (Delivery performance/service support) + 0.733 (Product quality).

Importance of relationships in the hardwood lumber industry, managerial implications:

An email asking about practical examples and managerial implication of relationships in the hardwood lumber industry was sent to those that responded survey. A total of three statements were received, those are presented as follows:

- “This industry (hardwood lumber industry) relies on relationships”
- We purchase lumber as a commodity and anything a supplier can do to differentiate themselves as to service (delivery, invoicing issues, problem solving etc.) or quality (well edged, good widths and lengths, on grade, etc.) helps them stay on our vendor list”.

- “In 2005 when the maple market was going through its meteoric rise, and lumber was difficult to find, the supplier (s) we had long standing relationships with always made sure we had sufficient supplies before he would sell off the lumber to perhaps more profitable customer. Some suppliers built dry kilns and could no longer ship green lumber to us. They were going to where the quick bucks could be made. Now that the market has reversed, I still buy from those who took care of me when times were different. I could probably purchase material for a few dollars less, given the market conditions, but the tried and tested relationship with the longstanding suppliers are more valuable than a few dollars per load”.

Supplier loyalty and switching: Respondents were asked about the difference in unit price to switch between their first and second suppliers (i.e. making their second supplier as their first largest supplier). On average, more than 32% of the respondents were highly loyal to their supplier indicating that under no condition they would change their main supplier of hardwood lumber and switch to the second best supplier. Figure 14 illustrates that approximately 39% of respondents are not willing to switch their top supplier with their second best supplier until supplier 1 increase their price by 10% with respect with supplier 2. About 26 % of respondents were very price sensitive and indicated that they would make supplier 2 their best supplier (in terms of purchase volume) if supplier 1’s price is 1-5% more that of supplier 2.

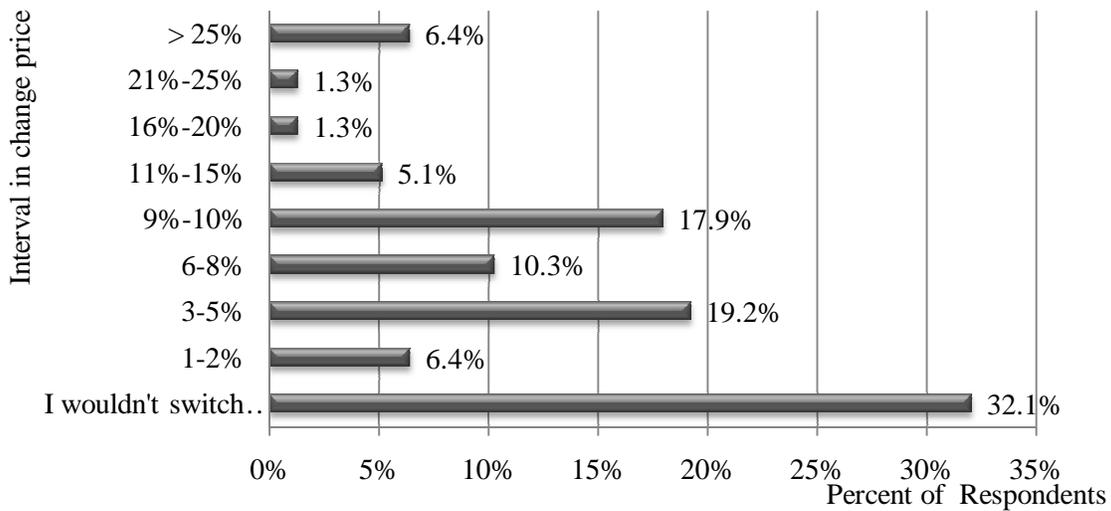


Figure 14. Buyer sensitiveness to price change (N=78)

Use of electronic media: Hardwood lumber buyers were questioned about the use of electronic business platforms to communicate with their suppliers. Most of the respondents (80.8%) used email for communicating with their suppliers. About 12.8% of the respondents indicated the use of web page as a tool for communication. About 17.9% of the respondents indicated not using e-mail or web page for business correspondence (figure 15), of which 1.3% stated that they are planning to use e-mail/web page in the near future. Around 20% of buyers use conventional communication ways such as phone, fax, personal meetings, etc., is prevalent in the hardwood lumber industry.

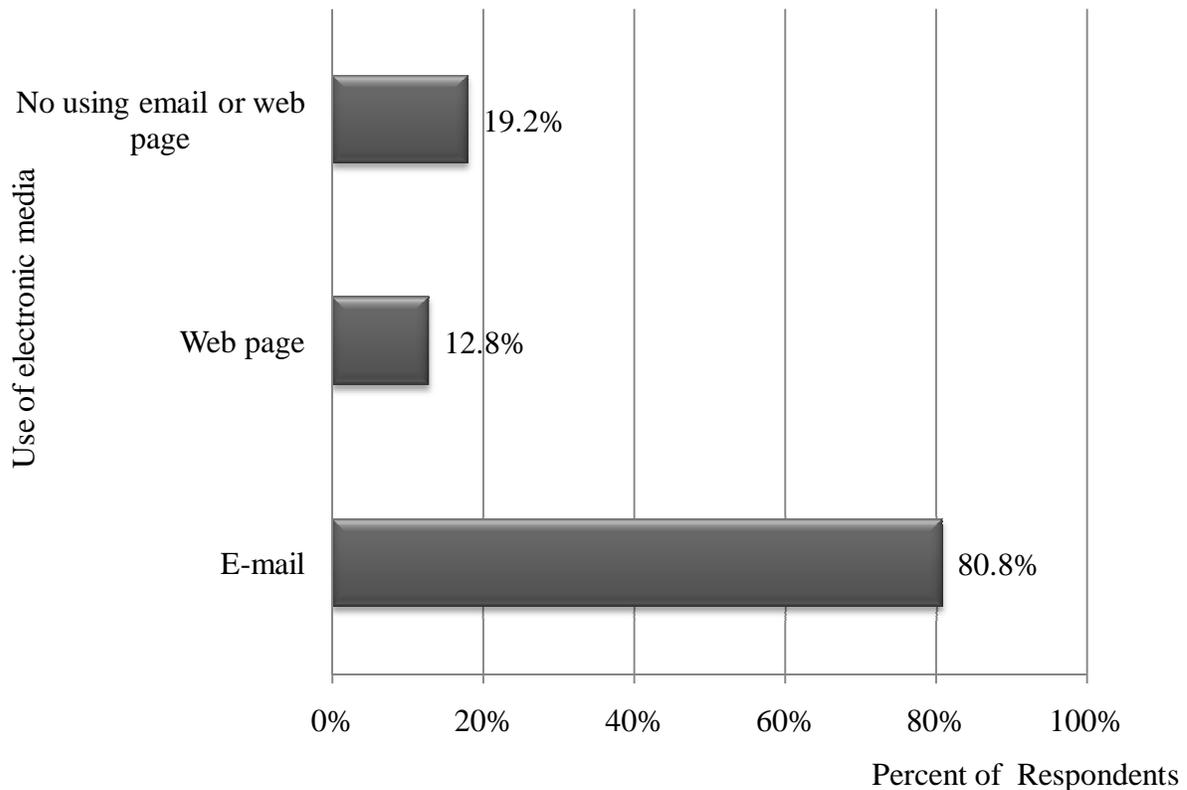


Figure 15. Use of electronic media by respondents (N=78)

Placing purchase order: Respondents were queried on their means of placing purchase orders (P.O.) with their suppliers. Respondents use a variety of means for purchase orders; in many cases using combination of different means (Figure 16). Results show that the most prevalent means used by respondents was phone (91%), followed by fax (76.9%) for placing purchase orders. The use of e-mail for placing P.O. was higher compared to “in person”

(67.9% and 47.5% respectively). The use of web page is found to be very low (1.3%), while the use of third party web pages for purchase did not receive any response. Results show that in the hardwood lumber industry there is high verbal interaction between buyers and suppliers for placing orders, and more inexpensive and faster communication electronic means are used rarely.

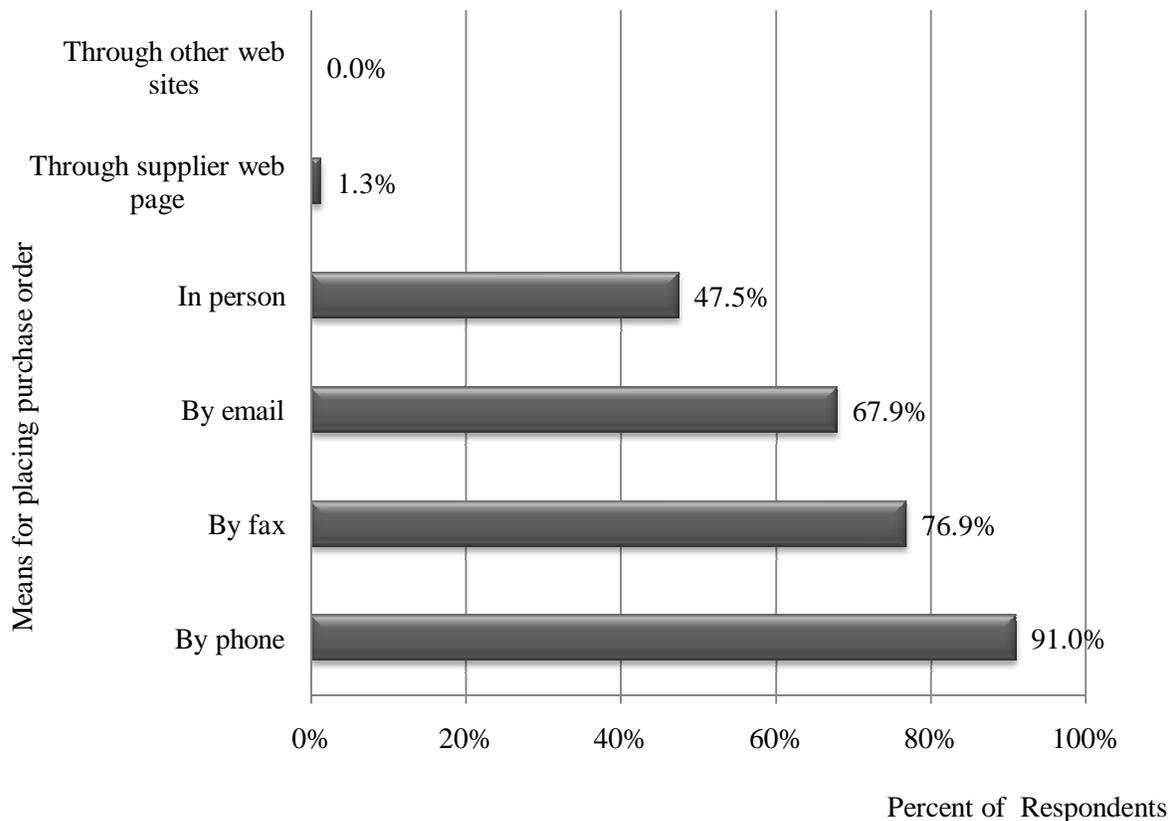


Figure 16. Media means of placing purchase order (N=78)

Geographic closeness: Respondents were asked to indicate their geographic closeness to their main and their second supplier. On average, 40% of the respondents (figure 17) stated that their suppliers were located more than 120 miles from their main warehouse (buyer’s warehouse). About 10% of suppliers were located near the buyer’s main warehouse (for both supplier 1 and 2 within a distance of 30 miles). Approximately 45% of suppliers were located between 30 and 120 miles of the buyers.

Although the results indicate that supplier’s products travel longer to reach the buyers currently, we expect this scenario to change with the rise in transportation costs and energy costs. More local sourcing might be the way of the future.

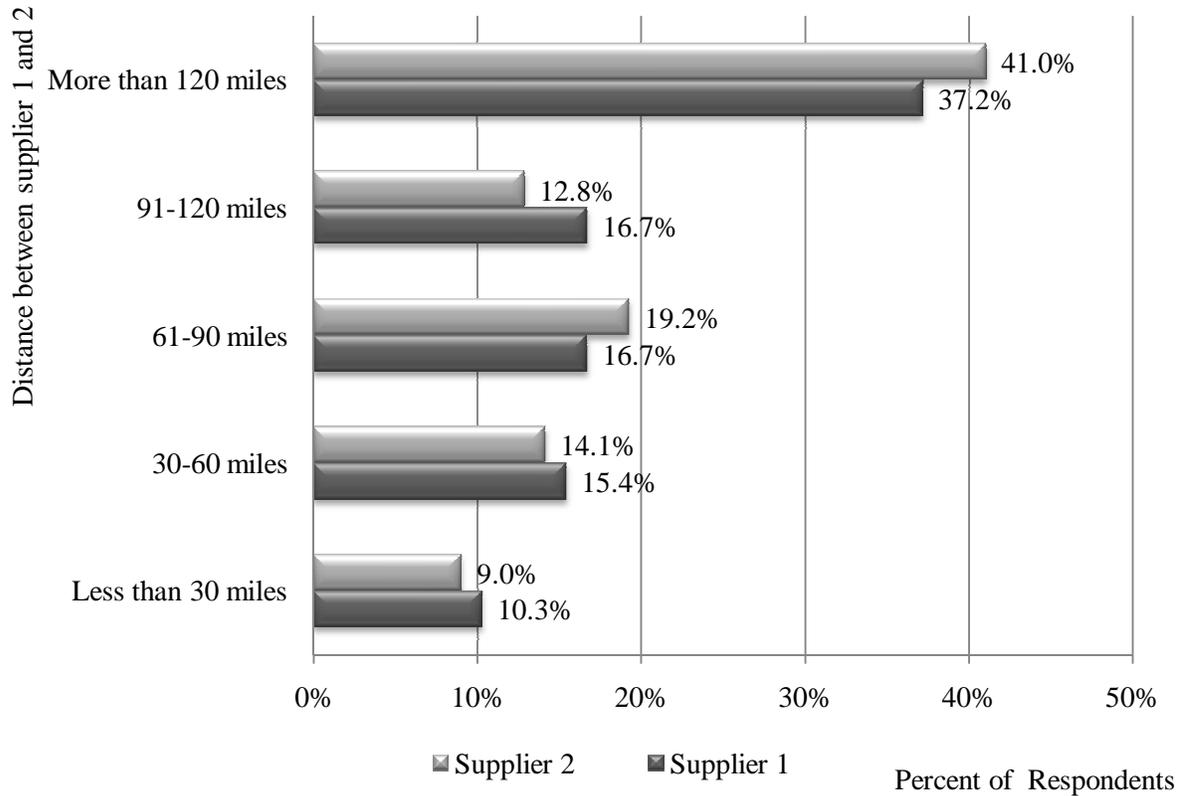


Figure 17. Respondent geographic closeness to their main and second supplier (N=78)

Buyer-supplier price and supply agreement: Hardwood lumber buyers were asked if they made any long term price or supply agreement with their top 2 suppliers (in order to determine long term planning, commitment and trust). About 36% of respondent buyers indicated that they had long term agreement with their top supplier for both price and supply of hardwood lumber orders (Fig. 18). About 31% of respondents indicated the same for their second supplier. Overall, the results show that buyers and suppliers had a longer agreement in supply of hardwood lumber as compared to price agreements. About 26% of suppliers indicated long term agreement in price with the top supplier, while 19 reported having

similar price agreements with supplier 2. This is logical based on the constant fluctuations in price of lumber.

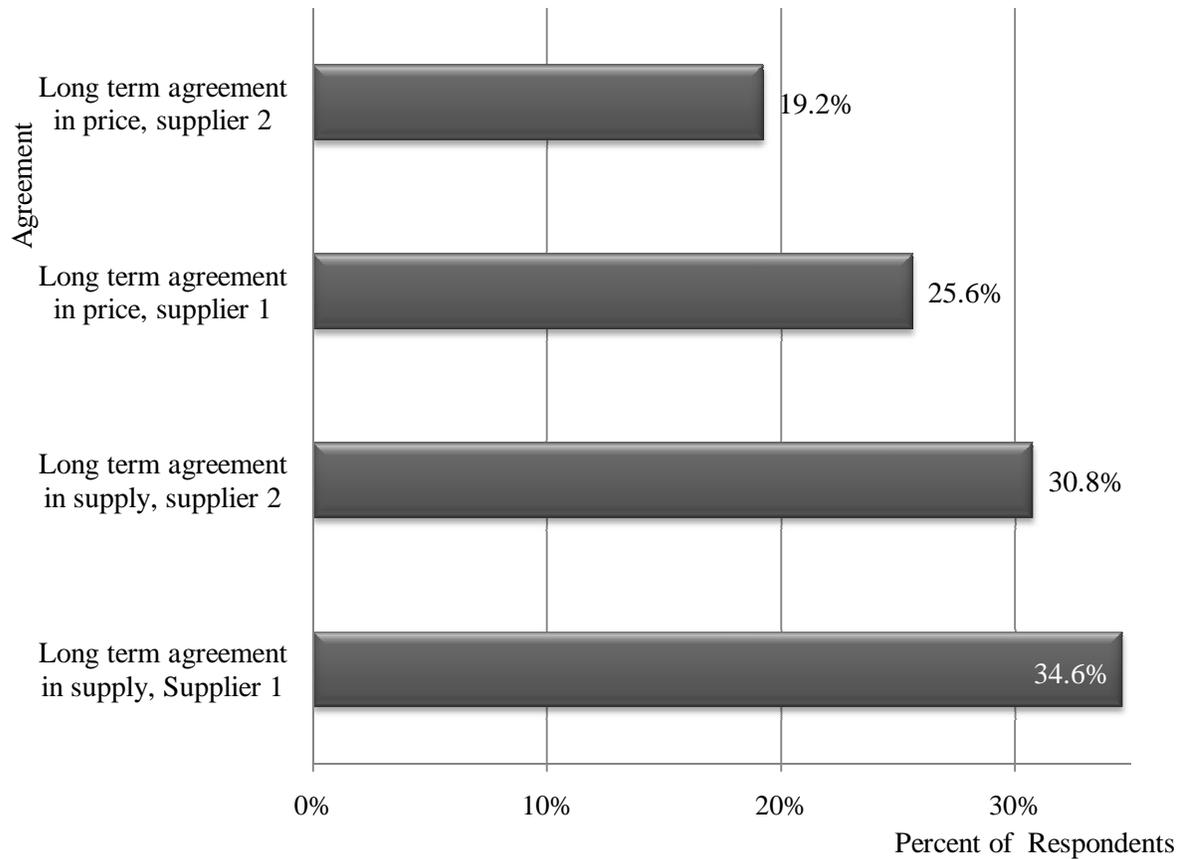


Figure 18. Buyer-supplier price or supply agreement for future purchase (N=78)

General hardwood lumber industry needs and respondent concerns: Respondents were asked to indicate their business concerns or any other issues in the industry where they would like to see improvements. Only 47.4% (n=37) respondents answered this opened category question. Their answers were grouped into four categories as follows (table 14):

Table 14. Issues and concerns about hardwood lumber business by buyers (N=37)

<p>Global concern</p>	<ul style="list-style-type: none"> • “We are now in a global market. We ship lumber to Asia, Africa, S. America, and Europe as well as throughout N. America. We are seeing competition from other species mainly from tropical regions and much of this is logged / harvested illegally. This puts pressure on the prices of lumber as well as the environment. I hope to see improvements in this area”. • “The market has lost stability. With global competition the market place has become very volatile. It is very frustrating to deal with this particularly with the language barrier you cannot easily verify any concerns directly. So I guess the language barrier is the biggest problem before us”. • “Product substitution continues to erode our markets. This comes from competitive manmade products as well as composite with foreign wood species. Off shore manufacturers are less in tune with our customs concerning integrity, honesty and strength of commitment, therefore making business harder to sustain and most costly”.
<p>Profit related concern</p>	<ul style="list-style-type: none"> • “Profit margins are way too low for long term survival”. • “Decreasing domestic manufacturing plants. Increasing manufacturing cost and decreasing lumber prices. Illegal logging from foreign markets”. • “Fuel costs and lack of government tax credits availability, all these are very much in the way of profit. We need huge improvements in these areas, the rest we can deal with”. • “Pricing on domestic hardwoods still remains high and is prohibiting domestic growth”. • “Lumber prices and the demand for lumber could increase a lot”. • “Freight costs”. • Timber costs have got to come down to compete with the other species around the world that sale for less and can thus be manufactured into lumber at lower costs. This has to happen here in America for our sawmills to compete and survive in the coming years”.

Table 14. Continued

<p>Supply chain concern</p>	<ul style="list-style-type: none"> • “Concerned about the financial health of our customer base as well as that of our suppliers and for that matter our competitors. This year will see a "weeding out" of some folks”. • “Ability of our suppliers to source logs to produce green lumber with”. • “We need help in this industry moving products. Trucking is the single biggest problem facing our industry. Higher cost and private truckers going out of business”. • “Log exports need to be decreased, in order to keep the raw materials and jobs that go with them in the U.S.”. • “Slowing down imports”. • “More consistency in supply”. • “We are spreading our purchases over more suppliers to soften leverage that some seem to feel they have. Some actions have seemed arrogant and we resent that” • “Suppliers always pushing the limits as to the grade. Also no consistent policy regarding price/tally for KD lumber”.
<p>Others:</p>	<ul style="list-style-type: none"> • “End trimming 8' stock longer than 2". As the resource gets shorter every year the over length on 8' stock will make it more saleable”. • “More demand for red oak in the market”. • “Rules on lumber grading need to be updated to apply to today’s timber growth. Many of the rules from the *NHLA* were written over 50 years ago and covered old growth timber, whereas sawmills today are dealing with much younger forest and must *stretch* the rules to meet demand”.

Table 14. Continued

Others:	<ul style="list-style-type: none">• “We need to make a big push to sell all hardwood lumber on the net board foot”• “We are changing from an end user of hardwood to an exporter to our overseas factory and many other ones. We see this as an area of growth for us. It would be easier if everyone used the same measurement system; board foot or cubic meter”.• “Currently our industry is suffering from the housing market down turn. Many sawmills, concentration yards, distribution yards, flooring companies, and cabinet companies will struggle to survive during this low time in the market”.• “A new market report that more accurately reflects current pricing”.• “The pro-green focus of this state will force much of our industry to look to other opportunities. The state's quest to own or control more land will steadily reduce the resource base to the detriment of the forest products industry, species diversity, and long-term environmental degradation. Example given-California”.
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CONCLUSIONS

1. This study indicates that on average:
 - a. The top two suppliers for hardwood lumber buyer represent about half of their purchase transactions.
 - b. The top supplier (in terms of volume) is perceived as better than the second supplier on delivery of product quality, service, relationship value, customer's satisfaction and other supplier performance attributes.
2. Purchase decisions of hardwood lumber buyers are very sensitive to product quality, relationship with buyer-supplier, overall service and price (presented in order of importance). As we can see from the results of this research, the dimension of relationship is ranked before overall service and price but it is ranked lower than product quality. This sequence indicates that relationship with supplier is important only after quality product standards have been achieved but is more important than or as important as service quality.
3. The value of relationship in the hardwood lumber industry can be explained through four main dimensions (as determined in this study) of (1) supplier know-how, (2) personal interaction with supplier, (3) product quality and (4) delivery performance/service support. Suppliers in the hardwood lumber industry can use these findings to reinforce their relational marketing strategies. At the same time, the managers need to pay more close attention and invest on these four attributes/variables to improve their buyer's overall perception of value in their relationship. The information obtained in this study is useful at the time of assigning scarce resource in for marketing programs in improve buyer perception.

4. A combination of high standards in the delivery of product quality, overall service, relationship value and supplier performance result in a higher satisfaction and loyalty in business relationships with the supplier. Overall increase in perceived relationship value will most likely help improve the hardwood lumber buyer's satisfaction with the supplier. Near 32% of respondents wouldn't change the supplier with any price increase in hardwood lumber, and 32% would change their suppliers partners only after 10% increase in price of hardwood lumber. Furthermore, most buyers consider it disruptive to end business relationships with their current top supplier.

5. The level of technology used for communication in the hardwood lumber industry is still conventional (phone, fax, in person). The use of electronic media is mainly through email, and the use of more sophisticated e-business platforms such as the web page is poorly used. Also for placing purchase orders for hardwood lumber, the web page is least used.

RECOMMENDATIONS FOR FUTURE RESEARCH

1. This is an exploratory study on the value of relationship. Future studies should include commitment and trust variables in addition to satisfaction, in order to see the effect of higher relationship value on trust and commitment in the hardwood lumber industry.
2. We used only the buyer's top 2 supplier in the study; however future research could look at the supplier comparisons on attributes between general suppliers to get a clearer picture.
3. Future researches should consider supplier comparison between main suppliers (first two) against the other set of suppliers. In this way there will be more differences in the attributes that characterized the main top supplier when compared with other less competitive suppliers.
4. As indicated earlier, we received a small response rate for the study, it would be interesting to re-test the attributes with a wider sample size so that differences between different businesses categories can be noted (e.g. furniture vs. cabinets vs. flooring).

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APPENDIXES

Appendix A: Initial contact letter

Dear [FirstName],

North Carolina State University, in cooperation with the National Hardwood Lumber Association, is conducting a study about customer preferences in hardwood lumber purchases in the U.S. (<http://www.surveymonkey.com/s.aspx>)

The outcomes from this survey will help the hardwood lumber suppliers to understand the need of their customers and the factors affecting the selection and purchase of hardwood lumber. In addition, this study will provide hardwood lumber suppliers with tools to enhance a better and more reliable relationship with their buyers. Please take a few moments to answer the attached survey link (<http://www.surveymonkey.com/s.aspx>). We assure you that your responses will be completely confidential. The survey will take you only ten minutes to complete. You can begin answering by clicking on the following link:
(<http://www.surveymonkey.com/s.aspx>)

We would be pleased to provide you with a complimentary summary of the study results, upon request. In addition, as a token of our appreciation for completing the survey, you will be entered into a drawing for 3 comfortable embroidered NC State sweatshirts. Please check your preferences at the end of the survey.

Thank you very much for your time and contribution to this research study. If you have any questions about the study, please call (919) 515-5728 or email us at sdasmoh@ncsu.edu or rwgonzal@ncsu.edu.

Sincerely,

Dr. Sudipta Dasmohapatra

Assistant Professor

Ronalds Gonzalez

Graduate Research Assistant

Department of Wood and Paper Science

Appendix B: Survey questionnaire

Relationship Value in the Hardwood Lumber Industry

1. What is your job title or position in your company?

2. How long has your company been in business, as of 2006?

Select years and months

Years ▼

Months ▼

Months

3. In which state is your facility located?

Please select your state

U.S. States

4. Please select the primary product that you manufacture in your company:

Please select one from the following list

Other (please specify)

5. What was the average number of people employed by your company at your facility during 2006?

What was the average number of people employed by your company at your facility during 2006? Number of full-time production employees

Number of full-time employees (except production employees)

Total

6. Which of the following do you purchase from your suppliers?

- Hardwood lumber
- Softwood lumber

7. Please estimate the total volume of hardwood lumber purchased by your firm in 2006 by volume. Please make sure to denote the appropriate unit of measure.

Volume

Unit

8. What species of hardwood lumber did you purchase for your facility in 2006? Please estimate the percent by volume for each species for 2006. The total must add to 100%.

Red/Black Oak (%)

White/Chestnut Oak (%)

Black Cherry (%)

Yellow Poplar (%)

Hard Maple (%)

Soft Maple (%)

Ash (%)

Beech (%)

Hickory (%)

Walnut (%)

Others (%)

9. Please indicate the estimated VOLUME (in %) of your hardwood lumber purchases from your TWO LARGEST hardwood lumber suppliers as a percent of your total hardwood lumber purchases in 2006 (as indicated in question # 7). Total must add to 100%.

If you purchase from only one supplier, please answer questions 9 to 11 and 22 to 28, for that supplier only.

Supplier 1

Supplier 2

All other Suppliers

10. Please indicate the importance of the following factors in your hardwood lumber purchase decisions:

	Not at all Important						Most Important
	1	2	3	4	5	6	7
Product quality	1	2	3	4	5	6	7
Availability of a range of grades	1	2	3	4	5	6	7
Availability of a range of sizes	1	2	3	4	5	6	7
Availability of a range of species	1	2	3	4	5	6	7
Brand	1	2	3	4	5	6	7
Packaging	1	2	3	4	5	6	7
Environmental certification	1	2	3	4	5	6	7
Price	1	2	3	4	5	6	7
Volume discount	1	2	3	4	5	6	7
Relationship with supplier	1	2	3	4	5	6	7
Geographic closeness to supplier	1	2	3	4	5	6	7
On-time delivery	1	2	3	4	5	6	7
Warranty on product	1	2	3	4	5	6	7
Overall service	1	2	3	4	5	6	7

11. Please estimate the LENGTH OF YOUR RELATIONSHIP (# of years of continuous purchase) with your 2 largest hardwood lumber suppliers (as of 2006)?

	Years		Months
Supplier 1	<input type="text"/>	Supplier 1	<input type="text"/>
	Years		Months
Supplier 2	<input type="text"/>	Supplier 2	<input type="text"/>
	Years		Months

12. Overall, how SATISFIED were you with your hardwood lumber purchases from your 2 largest hardwood lumber suppliers in 2006?

	Highly Dissatisfied							Highly Satisfied
Supplier 1	1	2	3	4	5	6	7	
Supplier 2	1	2	3	4	5	6	7	

13. Based on your current and past experience of hardwood lumber purchase from your two largest suppliers, to what extent do you agree with the following questions? Please indicate your response by checking the appropriate box. Please consider your first SUPPLIER (1):

	Strongly Disagree							Strongly Agree
In the future, this supplier will receive a larger share of our business	1	2	3	4	5	6	7	
We expect to expand our business with this supplier	1	2	3	4	5	6	7	
Over the next few years, this supplier will be used more than it is now	1	2	3	4	5	6	7	

14. Based on your current and past experience of hardwood lumber purchase from your two largest suppliers, to what extent do you agree with the following questions? Please indicate your response by checking the appropriate box. Please consider your second SUPPLIER (2):

	Strongly Disagree						Strongly Agree
In the future, this supplier will receive a larger share of our business	1	2	3	4	5	6	7
We expect to expand our business with this supplier	1	2	3	4	5	6	7
Over the next few years, this supplier will be used more than it is now	1	2	3	4	5	6	7

15. From questions 15-18, please rate your level of agreement with each of the following items, keeping in mind the product and service that you receive from your two best suppliers in terms of volume. Check one number for each item.

Compared to the second best supplier, your main supplier (Supplier 1) in terms of Product Quality:

	Strongly Disagree						Strongly Agree
Provides you with better quality	1	2	3	4	5	6	7
Products are more reliable	1	2	3	4	5	6	7
You reject less products from the main supplier	1	2	3	4	5	6	7
Provides you more consistent product quality over time	1	2	3	4	5	6	7

16. Compared to the second best supplier, your main supplier (Supplier 1) in terms of Delivery Performance/Service Support:

	Strongly Disagree							Strongly Agree
Performs better in meeting delivery due dates	1	2	3	4	5	6	7	
You have less delivery errors with the main supplier	1	2	3	4	5	6	7	
Provides you with better services	1	2	3	4	5	6	7	
Responds faster when you need information	1	2	3	4	5	6	7	

17. Compared to the second best supplier, your main supplier (Supplier 1) in terms of Personal Interaction:

	Strongly Disagree							Strongly Agree
It is easier to work with the main supplier	1	2	3	4	5	6	7	
There is a better interaction between the main supplier's people and ours	1	2	3	4	5	6	7	
You can address problems more easily with the main supplier	1	2	3	4	5	6	7	
Gives you a greater feeling of being treated as an important customer	1	2	3	4	5	6	7	

18. Compared to the second best supplier, your main supplier (Supplier 1) in terms of Supplier Know-How:

	Strongly Disagree						Strongly Agree
Provides you with better access to his know how	1	2	3	4	5	6	7
Knows better how to improve your existing products	1	2	3	4	5	6	7
Performs better at presenting you with new products	1	2	3	4	5	6	7
Knows better how to assist you in new product development	1	2	3	4	5	6	7

19. Compared to the second best supplier, your main supplier (Supplier 1) in terms of Time-to-Market/Value:

	Strongly Disagree						Strongly Agree
Helps you in getting your products to market faster	1	2	3	4	5	6	7
Performs better in helping you speed up product development	1	2	3	4	5	6	7
Adds more value to the relationship, overall	1	2	3	4	5	6	7
Offers higher value when comparing all benefits and costs of this relationship	1	2	3	4	5	6	7

20. Please rate your level of agreement with each of the following items, keeping in mind the product and service that you receive from your two best suppliers. Check one number for each item. Your main supplier (Supplier 1):

	Strongly Disagree						Strongly Agree
Readily adjusts their inventories to meet your needs	1	2	3	4	5	6	7
It would be disruptive to your company's operations to end the business relationship with this partner	1	2	3	4	5	6	7
The switching costs to another partner for this product would be large	1	2	3	4	5	6	7
You focus on long-term goals in this relationship	1	2	3	4	5	6	7
You are willing to invest time and other resources into the relationship with this supplier	1	2	3	4	5	6	7
You share costs with this supplier on common activities (such as distribution, promotion, handling, inventory system)	1	2	3	4	5	6	7

21. Please rate your level of agreement with each of the following items, keeping in mind the product and service that you receive from your two best suppliers. Check one number for each item. Your second supplier (Supplier 2):

	Strongly Disagree						Strongly Agree
	1	2	3	4	5	6	7
Readily adjusts their inventories to meet your needs	1	2	3	4	5	6	7
It would be disruptive to your company's operations to end the business relationship with this partner	1	2	3	4	5	6	7
The switching costs to another partner for this product would be large	1	2	3	4	5	6	7
You focus on long-term goals in this relationship	1	2	3	4	5	6	7
You are willing to invest time and other resources into the relationship with this supplier	1	2	3	4	5	6	7
You share costs with this supplier on common activities (such as distribution, promotion, handling, inventory system)	1	2	3	4	5	6	7

22. How much should be the difference in unit price of hardwood lumber between your two largest suppliers that would motivate you to switch your first and second suppliers (make your second supplier as your largest supplier). Please select from the list below.

23. Are you currently using electronic communication such as e-mail or webpage to interact with your supplier? Check all that apply.

- E-mail
- Web page
- No, but planning in near future
- None of the above

24. Which of the following do you use to place your hardwood lumber purchase orders with your suppliers? Please check all that apply.

- By phone
 - In person
 - By fax
 - Through supplier web page
 - By email
 - Through other websites
 - Other (please specify) Other (please specify)
-

25. Please select the distance (miles) between the location of your main warehouse and the location of your first, and second supplier?

	Supplier 1	Supplier 2
Please select one for each supplier	<div style="border: 1px solid black; width: 150px; height: 20px; margin: 0 auto;"></div>	<div style="border: 1px solid black; width: 150px; height: 20px; margin: 0 auto;"></div>
	Supplier 1	Supplier 2

26. Is there any long term agreement in price and/or supply of hardwood lumber between your company and your suppliers?

	Supplier 1	Supplier 2
Agreement in supply	yes/no	yes/no
Agreement in price	yes/no	yes/no

27. Please write about your business concerns or any issues in the industry where you would like to see some improvements.

28. Please check your preferences below:

- I would like to be entered into the raffle for the embroidered NC State University sweatshirt.
 - I would like to receive a summary of the study results. Please write your email address.
- Please write your e-mail address here:

29. If selected to be entered into the raffle, please select the sweatshirt size you prefer.

Appendix C: Reminder letter 1

Dear [FirstName],

Wish you a very happy new year 2008.

Approximately three weeks ago, a survey (from NC State University and NHLA) seeking your opinions about customer preference in hardwood lumber purchases was emailed to you. Even if you feel that your contribution to this study is small, it is important that we receive your input. Please click on the following link to complete the survey

<http://www.surveymonkey.com/s.aspx>

The outcomes from this survey will help the hardwood lumber suppliers to understand the need of their customers and the factors affecting the selection and purchase of hardwood lumber. We assure you that your responses will be completely confidential and the results will be reported only in combination with other responses. The data from this study will be used to complete a master thesis research. You can begin clicking

<http://www.surveymonkey.com/s.aspx>

We would be pleased to provide you with a complimentary summary of the study results, upon request. In addition, as a token of our appreciation for completing the survey, you will be entered into a drawing for 3 comfortable embroidered NC State sweatshirts. Please check your preferences at the end of the survey. <http://www.surveymonkey.com/s.aspx>

If you have any questions about the study, please call (919) 515-5728 or email us at sdasmoh@ncsu.edu or rwgonzal@ncsu.edu.

Sincerely,

Dr. Sudipta Dasmohapatra

Assistant Professor

Ronalds Gonzalez

Graduate Research Assistant

Department of Wood and Paper Science

Appendix D: Reminder letter 2

We hope you are having a wonderful new year. Approximately five weeks ago, a survey (from NC State University and NHLA) seeking your opinions about customer preference in hardwood lumber purchases was emailed to you. We need additional responses and completed questionnaires in order to provide valuable insights and recommendations to the industry. Even if you feel that your contribution to this study is small, it is important that we receive your input. Please click on the following link to complete the survey

<http://www.surveymonkey.com/s.aspx>

Outcomes from this survey will help the hardwood lumber suppliers to understand the need of their customers and the factors affecting the selection and purchase of hardwood lumber. The data from this study will also be used to complete a master thesis research. Please Help!!

<http://www.surveymonkey.com/s.aspx>

We would be pleased to provide you with a complimentary summary of the study results, upon request. Additionally, you will be entered into a drawing for 3 comfortable embroidered NC State sweatshirts. Please check your preferences at the end of the survey.

<http://www.surveymonkey.com/s.aspx>

If you have any questions about the study, please call (919) 515-5728 or email us at sdasmoh@ncsu.edu or rwgonzal@ncsu.edu.

Sincerely,

Dr. Sudipta Dasmohapatra

Assistant Professor

Ronalds Gonzalez

Graduate Research Assistant

Department of Wood and Paper Science

North Carolina State University

Appendix E: Reminder letter 3

Dear [FirstName]

Approximately 8 weeks ago, a survey (from NC State University and NHLA) seeking your opinions about customer preference in hardwood lumber purchases was emailed to you. We are almost ready to close this survey. However, we need just a few more additional responses in order to provide valuable insights and recommendations to the industry. Please click on the following link to complete the survey <http://www.surveymonkey.com/s.aspx>

Outcomes from this survey will help the hardwood lumber suppliers to understand the need of their customers and the factors affecting the selection and purchase of hardwood lumber. Without your inputs, we will not be able to complete a master's thesis research work. Please Help!! <http://www.surveymonkey.com/s.aspx>

We would be pleased to provide you with a complimentary summary of the study results, upon request. Additionally, you will be entered into a drawing for 3 comfortable embroidered NC State sweatshirts. Please check your preferences at the end of the survey. <http://www.surveymonkey.com/s.aspx>

If you have any questions about the study, please call (919) 515-5728 or email us at sdasmoh@ncsu.edu or rwgonzal@ncsu.edu.

Thank you.

Sincerely,

Dr. Sudipta Dasmohapatra

Ronalds Gonzalez

Graduate Research Assistant

Department of Wood and Paper Science

North Carolina State University

Appendix F: Reminder letter 4

Dear [FirstName]

At the beginning of December a survey (conducted NC State University and NHLA) seeking your opinions about customer preference in hardwood lumber purchases was emailed to you.

We are closing this survey with this last reminder. We need your valuable insights for appropriate analysis and to make recommendations to the industry. The results of the survey will be published as a master's thesis research work. Please click on the following link to complete the survey <http://www.surveymonkey.com/s.aspx>

A complimentary summary of the study results will be emailed to you approximately three months later. Additionally, you will be entered into a drawing for 3 comfortable embroidered NC State sweatshirts (drawing on March 5th). Please check your preferences at the end of the survey <http://www.surveymonkey.com/s.aspx>

If you have any questions about the study, please call (919) 515-5728 or email us at sdasmoh@ncsu.edu or rwgonzal@ncsu.edu.

Thank you.

Sincerely,

Dr. Sudipta Dasmohapatra

Assistant Professor

Ronalds Gonzalez

Graduate Research Assistant

Department of Wood and Paper Science

North Carolina State University

Appendix G: Survey responses Canada

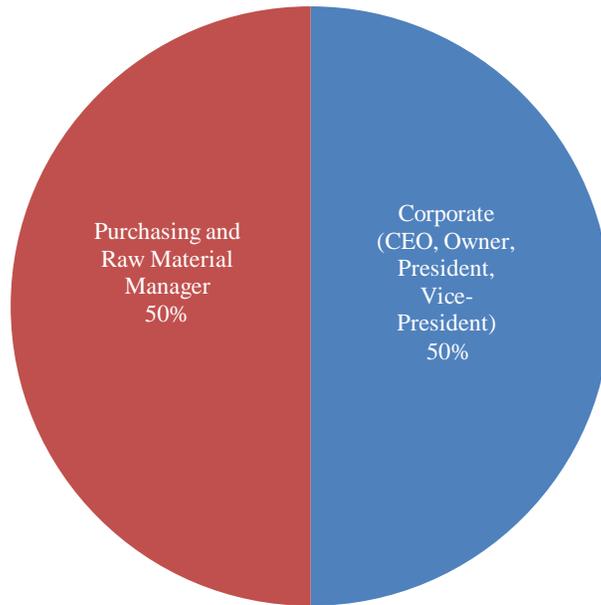


Figure 19. Percent of respondents by job profile (N=8)

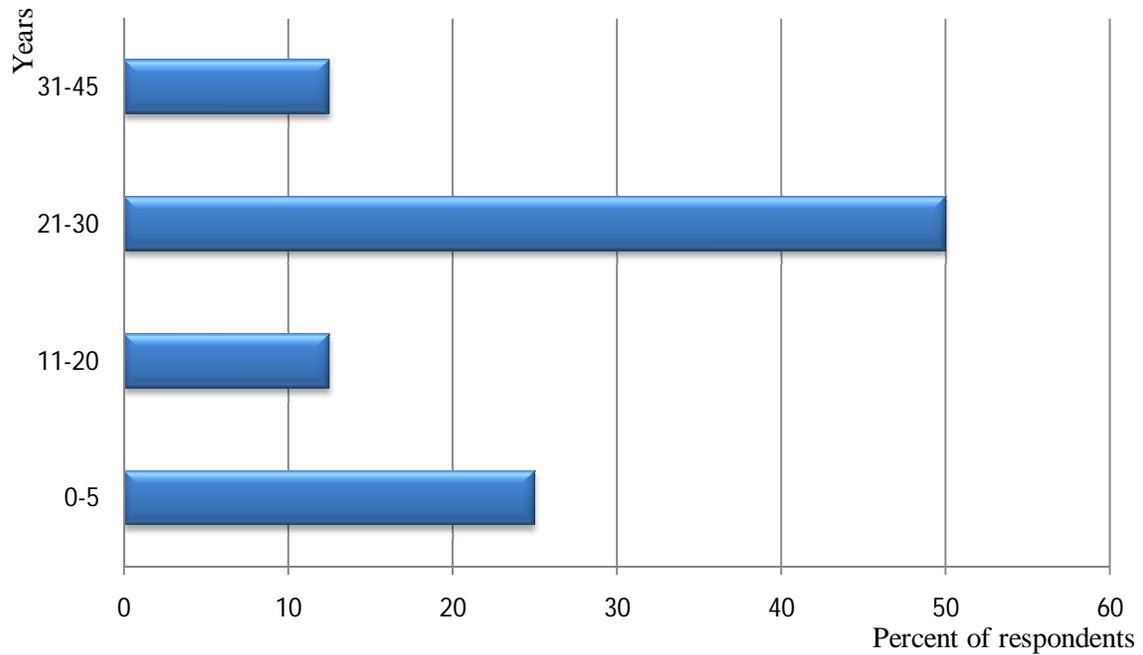


Figure 20. Percent of respondents by number of years in business as of 2006 (N=8)

Location: 50% of the respondents were located in Ontario and 50% in Quebec.

Line of business: 63% of the respondents were in the distribution and retailer business, 13% in furniture and 25% in flooring.

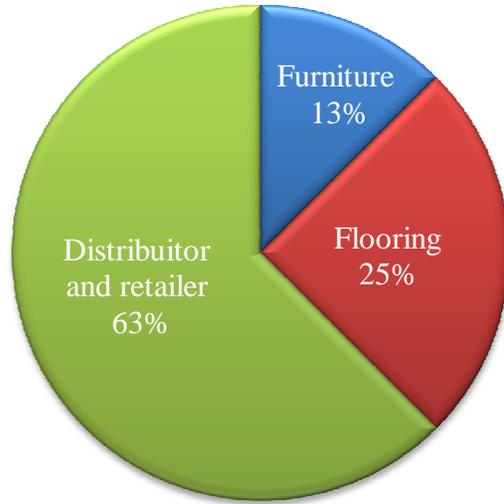


Figure 21. Percent of respondents by primary line of business (N=8)

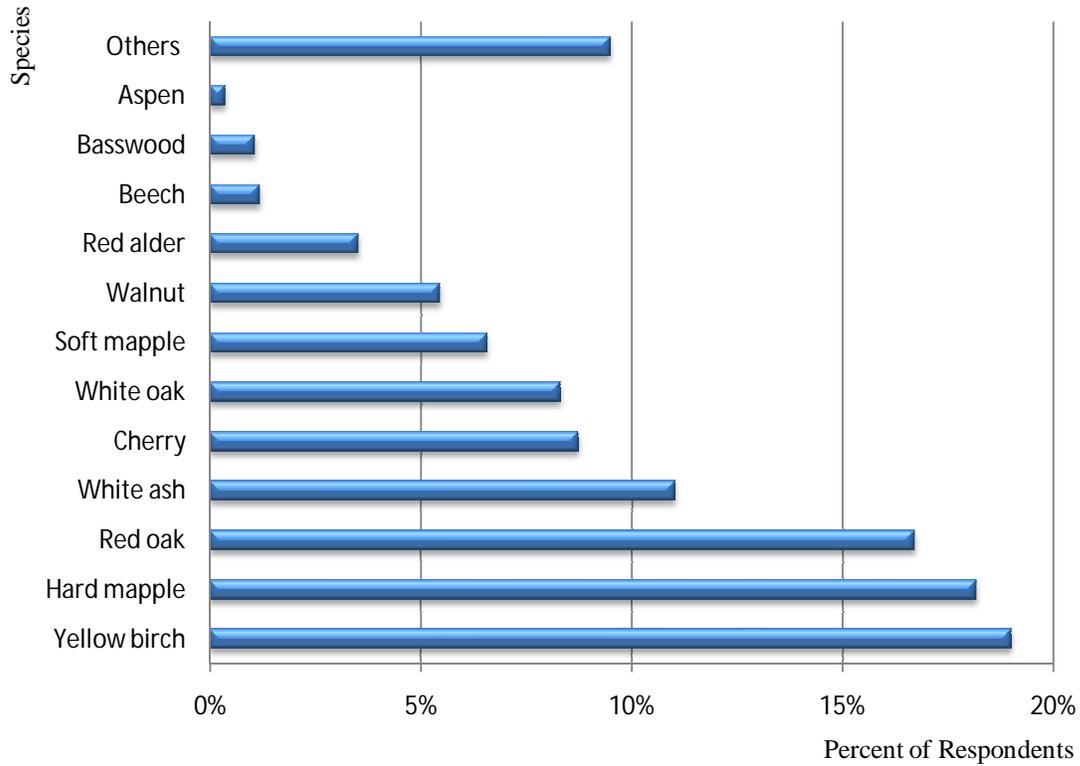


Figure 22. Respondents by relative composition of species purchased (N=8)

Table 15. Average volume purchase, average relationship length and level of satisfaction (N=8)

Supplier	Average volume purchased from (%)	Average relationship (years)	Mean level of satisfaction*
Supplier 1	20.4	10.8	6.0
Supplier 2	13.4	10.4	5.5

*Note: 7 point importance scale where 1 = not at all important and 7 = most important

Table 16. Factors driving hardwood lumber purchase decision (N=8)

Attributes	Mean*
Product quality	6.8
Relationship with supplier	6.0
Overall service	5.8
On-time delivery	5.4
Price	5.3
Warranty on product	5.0
Availability of a range of sizes	4.6
Availability of a range of species	4.6
Volume discount	4.4
Geographic closeness to supplier	4.4
Availability of a range of grades	4.3
Environmental certification	3.8
Packaging	3.4
Brand	2.6

*Note: 7 point importance scale where 1 = not at all important and 7 = most important

Table 17. Mean attribute importance between the main two suppliers

Attributes	Mean* Supplier 1	Mean* Supplier 2
You share costs with this supplier on common activities (such as distribution, promotion, handling, inventory system)	2.5	2.13
The switching costs to another partner for this product would be large	3.88	3.63
In the future, this supplier will receive a larger share of our business	4.25	3.88
We expect to expand our business with this supplier	4.29	4
Over the next few years, this supplier will be used more than it is now	4.86	4.29
Readily adjusts their inventories to meet your needs	4.88	4.13
It would be disruptive to your company's operations to end the business relationship with this partner	4.88	3.88
You are willing to invest time and other resources into the relationship with this supplier	5.88	5.38
You focus on long-term goals in this relationship	6.13	5.13

*Note: 7 point importance scale where 1 = not at all important and 7 = most important

Table 18. Level of agreement with attributes from main supplier

Attributes	Supplier 1 (Mean)*
Provides you with better quality	4.88
Products are more reliable	4.50
You reject less products from the main supplier	5.00
Provides you more consistent product quality over time	4.63
Performs better in meeting delivery due dates	4.38
You have less delivery errors with the main supplier	4.13
Provides you with better services	4.50
Responds faster when you need information	4.50
It is easier to work with the main supplier	4.88
There is a better interaction between the main supplier's people and ours	4.63
You can address problems more easily with the main supplier	4.75
Gives you a greater feeling of being treated as an important customer	4.88
Provides you with better access to his know how	4.38
Knows better how to improve your existing products	4.50
Performs better at presenting you with new products	3.88
Knows better how to assist you in new product development	4.25
Helps you in getting your products to market faster	3.88
Performs better in helping you speed up product development	3.38
Adds more value to the relationship, overall	4.00
Offers higher value when comparing all benefits and costs of this relationship	4.13

*Note: 7 point importance scale where 1 = strongly disagree and 7 = strongly agree

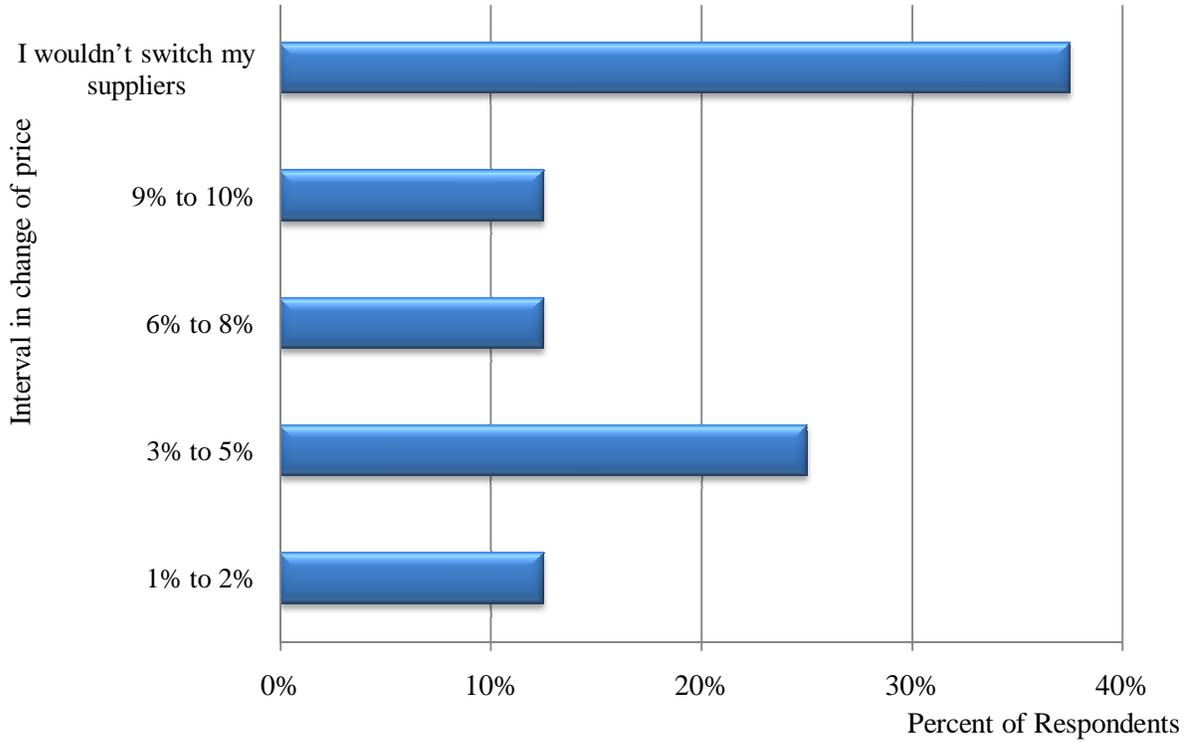


Figure 23. Relative frequency in sensitiveness of price change (N=8)

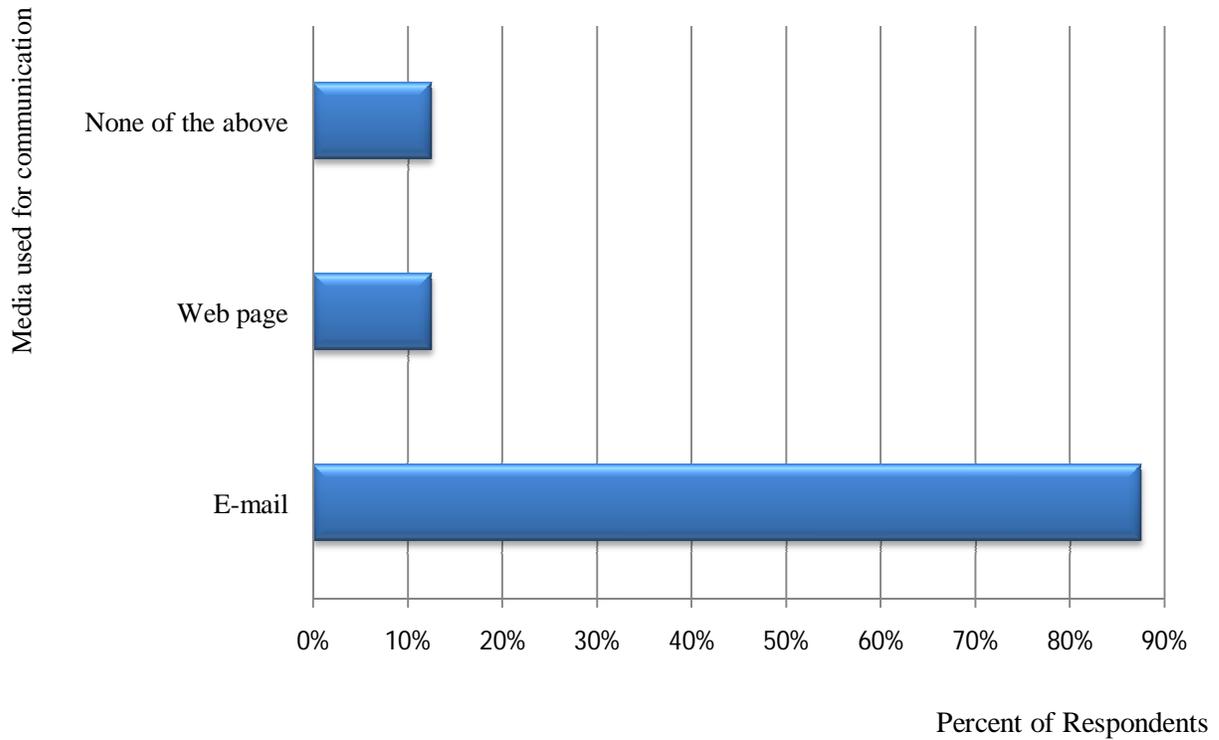


Figure 24. Use of electronic media to communicate with suppliers (N=8)

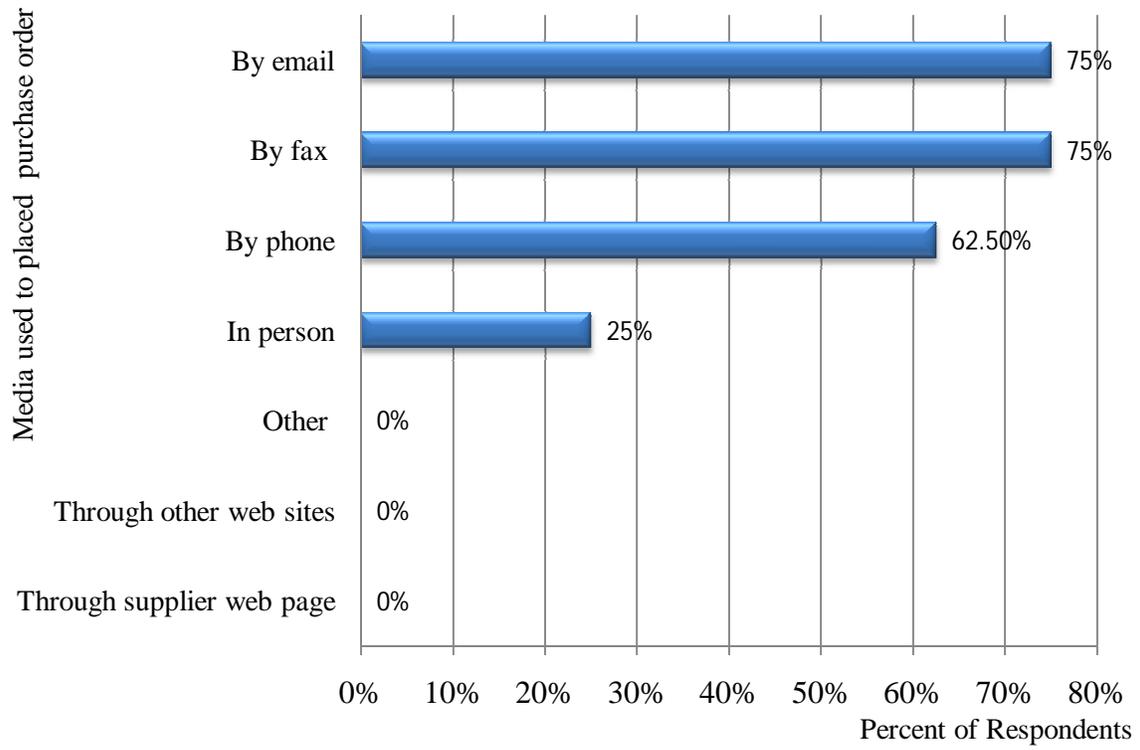


Figure 25. Media used to place hardwood lumber purchase order (N=8)