Breaking down barriers: Opportunities for Appalachian forest products in Central America

Scott William Lyon

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Henry J. Quesada-Pineda, Chair
Robert L. Smith
D. Earl Kline

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(ABSTRACT)

The research purpose was to determine strengths and weaknesses of Appalachian wood products sales in Central America. In the future, there may be a greater need for international forest products in Central America due to increasing population size, tourism, and deforestation. Potential market opportunities for Appalachian forest product companies in Central America were evaluated and strategies were developed to increase exports from Appalachian wood product companies. Interviews of Central American wood products wholesalers and government and non-government officials were conducted to determine the current situation of the forest, the demand for local wood production, and potential for future production of wood products. A survey of wood products retailers and manufacturers was conducted to determine drivers and barriers of the sale of Appalachian wood products in Central America. Models were developed to describe relationships between company performance and suppliers and a series of independent variables (e.g, supplier promotion, product attributes).

Results suggested that U.S. wood products companies have not put enough effort into marketing forest products in Central America. Central American wood products consumers lack knowledge of Appalachian wood products and their advantages over wood products currently used. Inconsistencies between Appalachian and Central American wood products industries (e.g., dimensions, species terminology) act as a barrier to efficient exchange of wood products. Models suggest that companies may need to focus on barriers to increase company performance.

The best market strategies for Appalachian forest products companies to increase sales into Central America are: partner with local wholesalers, offer higher value-added products, maintain similar pricing with competition, and offer sales and product discounts.

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1.1 Introduction

Appalachian forest products companies have a unique opportunity to meet the current demand for wood products in Central America. According to Salamone (2000), "*the United States forest product companies have overlooked Central America as an opportunity to expand their markets*." In the future, there will be a greater need for international forest products in Central America due to increasing population size, tourism, and deforestation. Because of improvements in health care, sanitation and education, the Central American population has almost quadrupled from 11 million in 1950 to 40 million in 2008 (Fox 1990; World Bank 2010).

In addition to increasing population size, tourism is booming in Central American countries. Nicaragua had an 11% increase in tourists from abroad in the first five months of 2009 (Rogers 2009). In the first year after breaking ground for the expansion of the canal in 2007, Panama has experienced an 11.2% increase in tourism investment. Panama offers a variety of tourist destinations including beaches, Spanish ruins, and islands. Royal Caribbean cruise line has built a "home port" in the providence of Colon to help attract visitors to a historic part of Panama (Aparicio 2008; Royal Caribbean International 2010). Ecotourism has played a big part in Central America's tourism trade because 8% of the world's animal and plant species live in Central America (Schieber 2009). Costa Rica is one of the most visited destinations for ecotourism, including 132 protected areas for flora and fauna (Sánchez-Azofeifa et al 2003). In addition to ecotourism, some retired Americans are moving to the Costa Rican coast to benefit from an inexpensive retirement and tropical environment (Kristof 2010).

The tourism increase in Central America has resulted in a growing need for wood products. A shortage of hotel rooms was observed in 2007 due to a 19% increase in number of

tourists since 2005 (Fallas 2008). Due to the rapid increase of tourism in Costa Rica, foreign investors have provided funding to help expand the infrastructure. In 2007, twenty-five percent of Costa Rica's foreign investment was provided to tourism (Quesada et al. 2009). To meet the wood demand as more hotels are built in Central America, some countries such as Costa Rica, Panama, and El Salvador look to their neighboring countries and continents to procure supplies. For example, the South and Central American countries of Chile, Honduras, Guatemala, and Nicaragua are the main providers of softwood lumber for building construction in Central America (Quesada et al. 2009).

Another driver for the import of international wood products is deforestation and related issues, which continues to be a major challenge today for all Central American countries. For instance, the Panama government removed Law No. 7 that provided tax incentives for landowners to reforest their properties. This removal resulted in illegal logging and a decrease of reforestation projects (Munoz 2007). Guatemala has been losing 54,000 ha of forest each year and only replants about 10,000 ha per year, which is not nearly enough to meet the growing demand for timber (Hurtarte et al. 2006). Also, the natural forests of Costa Rica have been exploited due to shortages of wood for housing and furniture (Montagnini et al. 2003). Throughout Central America, pasture expansion in easily burned dry, tropical forest has occurred over past decades contributing to deforestation (Kaimowitz 1996).

In most Central American countries, forest plantations were developed in the 1960s and 1970s through incentives offered by the government (DGR 1996 in FAO 2009*). Tectona grandiz, Eucalpytus spp*. and *Pinus Caribaea* are the primarily the tree species grown in Central American plantations (Table 1.1; (Solorazano 1994; AFE-COHDEFOR 1996; DGF 1996 Ronnie

de Camino and Marielos Alfaro 1998; Boyd 1998; Gutierrez and Diaz 1999; IRSG 1997 and 1999; Lopez and Veliz 1999; Rodriguez Cruz and Vaquerano Gómez 1999 in FAO 2009).

Table 1.1 Central American forest plantation species

Costa Rica	Panama	Nicaragua	Guatemala	Honduras	El Salvador
Gmelina arborea	*Tectona grandiz*	*Pinus spp.*	*Pinus spp.*	*Pinus Caribaea*	*Tectona grandiz*
Tectona grandiz	*Pinus Caribaea*	*Eucalyptus spp.*	*Gmelina arborea*	*Pinus spp.*	*Pinus Caribaea*
Cordia alliodora	*Khaya senegalensis*	*Swietenia macrophylla*	*Eucalyptus spp.*	*Eucalyptus spp.*	*Gliricidia sepium*
Bombacopsis quantum	*Bombacopsis quantum*	*Swietenia humilus*	*Tectona grandiz*	*Tectona grandiz*	*Eucalyptus spp.*
	Tabebuia pentaphylla			*Gmelina arborea*	*Inga vera*
	Acacia mangium			*Gliricidia sepuim*	
	Cordia alliodora			*Leucaena leucocphala*	

The main issue for plantations in Panama is that they are new and long term projects developed and maintained by landowners. The landowners need to borrow money to maintain the plantations and the banks are less likely to lend money for plantations because they are new and long-term projects (Gutierrez and Diaz 1999 in FAO 2009). Reforestation rates of plantations in Panama have been decreasing over the past decade (Table 1.2). Problems exist in Guatemalan forest plantations because they are spread throughout the country on poor growing sites and lack an inherent quality of seed (MAGA 1995). Honduras has a rich volume of natural forests resulting in a reduced need for plantations (Anon 1998 in FAO 2009). El Salvador has very little forested area (107,000 ha), therefore, it needs to import a large volume of timber and fuelwood to meet the demand (Earthtrends 2003; FAO 2009). Most of the natural forests in El

Salvador were deforested for coffee plantations, sugarcane, and cotton to meet the international demand (Rodriguez Cruz and Vaquerano Gomez 1999 in FAO 2009).

Table 1.2 Panama reforestation by species per year (Hectares) (Adapted from ANAM 2010)

Species	Before 2000	2000-2004	2005	2006	2007	2008	2009	Total
Tectona grandis	21,748	14,700	2,678	2,315	1,553	3,846	1,155	47,995
Pinus caribeae	10,386	396	12	20	37	47	82	10,980
Bombacopsis quinatum	1,377	259	8	28	7	186	6	1,871
Acacia mangium	1,109	213	0	0	13	65	0	1,400
Khaya senegalensis	1,123	149	1	2	0	1	2	1,278
Others	2,474	3,248	157	409	1,569	1,172	704	9,733
Total:	38,217	18,965	2,856	2,774	3,179	5,317	1,949	73,257

The goal of this research was to evaluate potential market opportunities for Appalachian forest product companies in Central America. This project follows a 2008 market study funded by the USDA focused on market opportunities for Appalachian wood products in Mexico and the Dominican Republic conducted by Smith, Miller, and Parhizkar (2008) from Virginia Tech. Smith et al. (2008) suggests that opportunities for Appalachian forest product companies may exist in Mexico and the Dominican Republic.

1.2 Appalachian Forest Product Industry Background

The Appalachian region consists of 205,000 square miles stretching from southern New York to northern Mississippi including Pennsylvania, Ohio, Maryland, West Virginia, Virginia, North Carolina, South Carolina, Tennessee, Kentucky, Georgia, and Alabama (ARC 2010). The economy in this region was fueled historically by forestry, mining, farming and industry. Currently, the region is primarily involved in a mix of manufacturing and service industries

(ARC 2010). Because of diversifying the economy, the amount of distressed counties in the region has been reduced from 223 in 1965 to 82 counties in 2010 (ARC 2010).

The manufacturing of forest products in this region is an essential sector of the economy employing over 1.1 million people (Murphy et al. 2008; NC-IOF & NCFA 2003; NESFA 2001; SCFC 2006; Ammerman Unknown Date; PFPA 2005; Young et al. 2007; VDACS 2008; Childs 2005; EDPA 2010; Ervin et al. 1994; McClure 2008; Mississippi State University 2010). An increase in global competition has caused the decrease of domestic markets for U.S. furniture. This increase in competition has taken a toll on the Appalachian hardwood lumber industry (Bowe et al. 2001). The forest products industry in the Appalachian region must be innovative in their marketing strategies to find potential markets for their products (Naka et al. 2009). The forest products industry has been impacted by urbanization in addition to increased competition. Land development and population growth has reduced the amount of timber available to the forest products industry (Young et al. 2007).

The hardwood industry in Pennsylvania manufactures 10% of the total production in the United States making it the top producer of hardwood lumber in the country (PFPA 2005; Smith et al 2003). Hardwood lumber mills range in size from producing 1 million board feet (MMBF) of lumber to over 40 MMBF a year (Smith et al 2004). Some Appalachian mills have increased the amount of value-added products/processes available to customers in order to increase market size and sales. These value-added processes include kiln drying, custom sorting/grading, S4S, finger jointing, and dimension manufacturing (Smith et al. 2004). Low grade sawlogs and small-diameter logs were not used traditionally in lumber production in the Appalachian region. The introduction of oriented strandboard (OSB) mills, parallel-strand lumber mills (PSL) and rotary-

cut plywood mills have allowed the forest product industry to expand the use of low grade raw material and make it into a value-added product (Luppold et al. 1998).

The forests in this region grow a large variety of hardwood and softwood timber species that are harvested for a wide assortment of forest products (VDACS 2008). A variety of hardwood timber species primarily grow in the Appalachian region including red oak (*Quercus rubra*), white oak (*Quercus alba*), black cherry (*Prunus serotina*), black walnut (*Juglans nigra*), hard maple (*Acer saccharum),* soft maple *(Acer rubrum & Acer saccharinum),* yellow-poplar *(Liriodendron tulipifera)* and American basswood *(Tilia americana).* These species are used in many different end-use applications including pallets, furniture, flooring, cabinets and millwork (Adams 2002; VDF 2007).

Softwood lumber species grown in this region include Eastern white pine (*Pinus strobus*), and Southern Yellow Pine (*Pinus palustris, P. elliotii, P. taeda, P. echinata*). These softwood species are primarily utilized as lumber for construction applications, furniture, cabinets, and other interior uses (VDF 2007).

1.3 International Marketing

Onkvisit and Shaw (1997) stated international marketing is "firm-level marketing practices across the border including market identification and targeting, entry mode selection, marketing mix, and strategic decisions to compete in the international markets." International business channels are more intricate than U.S. markets (Rosenbloom 1990). This complexity in overseas distribution channels is because of more channel members handling the product between the manufacturer and the end-user (Stern & El-Ansary 1992). International marketing is not an addition to domestic marketing because companies have different challenges in each country where they direct their marketing efforts. These challenges include issues such as

politics, competition, law, logistics, geography, culture, marketing channels, technology and economics (Jain 1995; Joshi 2005).

Exporting companies must decide if they will export by themselves or through a private distribution channel. A review of the exporting company sales force and distribution must be done to decide if they are capable of selling overseas (Anderson & Coughlan 1987). A company exporting by itself to a new sales territory brings more responsibility and risks (Ahmed 1977). These challenges are primarily uncontrollable by the exporting company. Economic factors include import tariffs and exchange rates that impact competitiveness of the product or service being marketed internationally. The legal factors affecting international marketing include modifying trade policies, such as restrictions on importing products from a certain country. These factors will greatly influence where countries choose to export products (Waller 2000).

The country's culture also affects how a company markets a product or service to them. These cultural and social features include languages, customs, religion and social beliefs (Joshi 2005; Hsieh 1994). Companies need to understand the cultures and social features of potential customers in the countries where they are exporting; if they do not, it will make international marketing difficult (Joshi 2005; Shoham et al.1997). Competition is stronger in international markets than in a firm's current domestic markets and competitors may have different trade barriers when marketing to the same country (Joshi 2005).

1.4 Forest Products Exporting

International marketing of wood products is essential for the Appalachian region in order to strengthen the economy (Hammett 1996). Exporting wood products offers many advantages for firms entering the global market such as increased profits and credit, market growth, and economic strength (Parhizkar 2008; McMachon and Gottko 1989).

Forest products industry export studies found several factors that impact successful export of products. Ifju and Bush (1993) suggested that small, domestically-oriented companies view themselves as non-exporters, but they still have potential to export. Many non-exporting companies are trying to enter a global market but have not because of lack of market information regarding product specifications and distribution channels (Ifju and Bush 1993). Ringe et al. (1987) found that Kentucky hardwood lumber exporters invested in global market information and built long-term relationships with overseas customers resulting in greater success with exporting products overseas. Overall, lack of market information is a main barrier for potential exporters of forest products overseas. A 2002 study of Appalachian hardwood lumber exports (Parsons 2002) showed that the lack of employee manpower and production limitations did not significantly affect exporting, but the need for marketing information was a major hurdle for companies.

1.5 Central American Market Segment

Market segmentation involves segregating a market into groups of similar buyers (Peter & Donnelly 2008). A variety of markets are available for Appalachian forest products in Central America. The Central American Free Trade Agreement (CAFTA) was established when El Salvador, Guatemala, Honduras, and Nicaragua entered into the agreement in 2006 (USDA FAS 2009). From 2006 to 2008, the exporting of wood products from the Appalachian region to Central America increased by 51% (Figure 1). Furniture exports to Central America increased by 43% from 2006 to 2007(Figure 1). The rise in exports from the Appalachian region to Central America may be a result of the establishment of CAFTA-DR. Starting in 2008, forest product companies in the Appalachian region may have reduced the amount of wood products and furniture exported to Central American countries (Figure 1.1) because of past unstable

financial markets, higher freight rates, tighter credit lines, and soft housing markets (VDACS 2008).

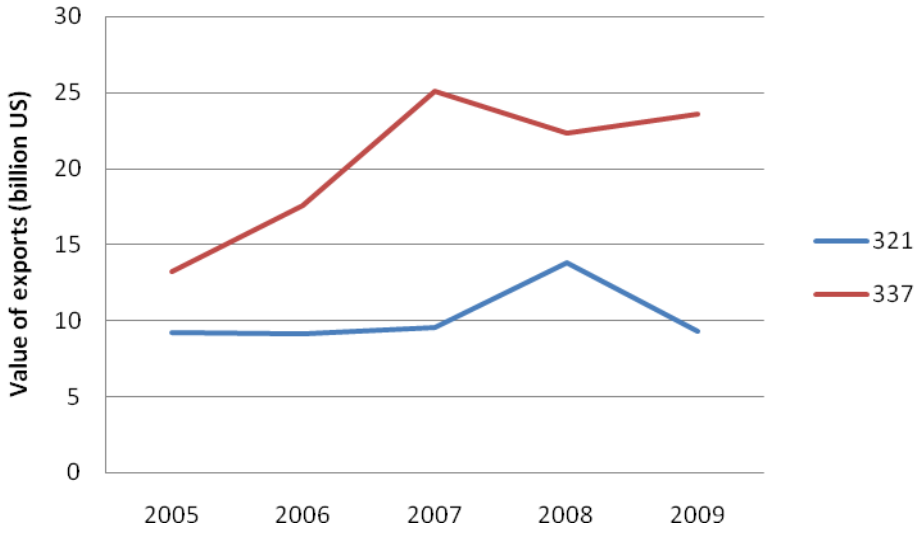

Figure 1.1 The North American Industry Classification System (NAICS) for wood products manufacturing (NAICS 337) and furniture and related products with wood, metal, and plastics (NAICS 337) exported from the Appalachian region to Central America. (USDC 2010)

Quesada (2008) concluded that Appalachian forest product companies need to partner with local wholesalers to distribute products. Also, forest product companies must export more value-added products that must be priced similarly to locally produced products (Quesada 2008). As a result of a worldwide "green" movement, there may be potential for certified sustainable forest products in Central America.

1.6 Central American Forest Products

In Guatemala, the use of forest products has been increasing over the past few decades due to wood-frame construction for roofs, walls and floors. In the late 1990s, the Guatemalan government estimated a shortage of 536,000 housing units (Salamone 2000). Because of the increase in the housing market, manufacturing plants began to appear and produce furniture and

cabinets to fill the newly built homes (Salamone 2000). To help meet the demand, the U.S. exported $184,000 of hardwood logs to Guatemala in 2009 (Table 1.3). Costa Rica was thought to be short 150,000 housing units for its increasing population (Salamone 2000). Also, Costa Rica needs to construct more than 50,000 hotel rooms by 2012 to lodge the growing number of tourists visiting the country (Quesada et al 2009). Although concrete and steel remain the dominant building materials in Central American countries, wood products are frequently used in interior applications (e.g., cabinets, furniture) (Salamone 2000; Fry 2008).

Table 1.3 U.S. Exports to Central American Countries from January-October 2009 (1000 DOLLARS) (Adapted from USDC 2010)

Commodities Exported	Costa Rica	Nicaragua	Honduras	Panama	El Salvador	Guatemala
Hardwood Logs	0	0	39	36	0	184
Softwood Logs	149	0	218	27	25	50
Hardwood Lumber	0	0	159	153	10	0
Softwood Lumber	114	6	3,237	675	47	0
Treated Lumber	130	0	0	20	4	-
Hardwood Veneer	70	0	283	8	4	0
Softwood Veneer	8	-	43	26	0	16
Hardwood Plywood	10	10	153	335	10	85
Softwood Plywood	213	0	60	998	53	0
Hardboard	25	10	44	148	12	316
Medium Density Fiberboard	95	10	500	40	10	327
Particleboard	149	3	227	3	0	0
Hardwood Flooring	19	-	3	5	31	245
Softwood Flooring	28	0	18	130	0	0
Hardwood Molding	0	0	0	10	0	6
Softwood Molding	0	3	10	20	0	0
OSB/Waferboard	32	-	120	0	0	11
Wood Packing Material	58	43	1,404	47	84	215
Prefabricated Buildings	30	0	69	62	0	0
Assembled Flooring Panels	18	6	71	31	6	106

In September 2007, the Panama Canal expansion started which caused a strong demand for concrete plyform used in the canal construction. Panama was the 12th largest importer of U.S. plywood at 2.5 million square feet (3/8-inch basis) by quantity in 2009. Since 2000, U.S. exports to Panama have been at their highest level (Random Lengths 2010). From January to October 2009, the U.S. exported over $990,000 of softwood plywood and $675,000 of softwood lumber (Table 1.3).

Although some Central American countries have little forested land, some countries have a strong wood product production industry. Costa Rica's medium-density fiberboard production competes with the U.S. in sales to Central American countries (Salamone 2000). Honduras was the top producer of roundwood in 2008 by harvesting over 9 million cubic meters (Table 6). In 2007, Costa Rica remained the number one producer of wood-based panels in Central America with 65,000 m^3 (Table 1.4). Between January and October 2009, Honduras imported over $150,000 of hardwood plywood and $283,000 of hardwood veneer from the U.S. (Table 1.3). These wood products are primarily used in furniture production, however, Honduras has also imported over $3 million in softwood lumber for building construction (Table 1.3).

In some cases, the Central American forest products industry is very complicated. In Nicaragua, the forest products industry lacks retail outlets and most raw materials are in low supply and therefore harvested illegally. Forest product mill employees lack education and on-the-job training. They use old machinery for production with poor manufacturing techniques, and a small number of dry-kilns are found in the industry. Even those facilities that have dry kilns are not familiar with the proper drying procedures (Hammett 1999).

Table 1.4 Central American countries forest product removal and production for 2009 (Adapted from FAOSTAT 2010)

	Units x 1,000	Costa Rica	Nicaragua	Honduras	Panama	El Salvador	Guatemala
Industrial Roundwood	Cubic Meter	1,198	93	822	174	682	454
Wood Fuel	Cubic Meter	3,410	6,003	8,641	1,173	4,210	16,960
Wood Chips and Particles	Cubic Meter	-	-	-	4	-	-
Wood Residue	Cubic Meter	-	80	-	2	457	-
Sawnwood	Cubic Meter	1,132	54	79	30	16	366
Wood Charcoal	Metric Ton	11	26	26	5	21	21
Wood-based panels	Cubic Meter	65	8	6	7	-	31
Other Fiber Board	Metric Ton	7	-	1	-	-	-

1.7 Central American Free Trade Agreement and Wood Products Exporting

The process of establishing the Dominican Republic-Central American Free Trade Agreement (CAFTA-DR) began in 2006 in El Salvador, Guatemala, Honduras and Nicaragua, Dominican Republic in 2007 and in Costa Rica in 2009. This region is the 14th largest export market for U.S. products (USEAC 2011). CAFTA-DR will phase out tariffs between the U.S. and Central American countries within 15-20 years (USDA FAS 2009). Some tariffs were immediately duty free after the trade agreement went into effect (USDA FAS 2009). The trade agreements help to expand market opportunities and allow companies to compete in the global market (USEAC 2011).

The CAFTA-DR may help to increase the opportunity for exports of wood products from the Appalachian region. In a 1996 study on the North American Free Trade Agreement (NAFTA), Prestemon and Buongiomo (1996) found that lumber and plywood may gain the most from free trade out of all wood products exported. Hardwood lumber exports were expected to increase from 45-120% as a result of NAFTA (Prestemon 1998). Immediately after the establishment of CAFTA-DR, 79% of wood products (including panels and composite wood products) were duty-free. After the first 5 years, an additional 6% more will be duty free and the remaining 15% will become duty free in the last 10 years (USDC 2010). This means all wood products included in the CAFTA-DR will be duty free within 10 years of establishing the free trade agreement. Each country involved in CAFTA has set up their own tariff schedule as to when products will become duty-free (USEAC 2011). It is important for Appalachian forest products companies to identify Central America as a potential export market.

Appalachian forest products companies looking to expand their markets into Central America should contact the U.S. Commercial Service in Central America. This service helps companies conduct successful business in Central America by providing promotion of products and services and protection of U.S. business interests overseas (USCSCA 2011).

1.8 Overall Goal and Justification

Appalachian forest products companies may have a unique opportunity to meet the current demand for wood products in Central America. There is a lack of research about marketing United States forest products into Central America. In the past few years, the Appalachian region has suffered from the economic crisis including forest product mill closures and loss of employment due to an increase in global competition. The region may need to increase product competitiveness by expanding export markets and improving product promotion

(Wang et al. 2010). Therefore, the overall goal of this study is to evaluate potential market opportunities for Appalachian forest product companies in Central America.

1.9 Objectives

1. Identify main competitors of forest product companies in Central American countries.
2. Investigate distribution channels of the Central American forest products industry.
3. Investigate local production, demand, and policy of forest products in Central American countries.
4. Determine drivers and barriers of the sale of Appalachian hardwood lumber and building materials in Central American countries.
5. Characterize different factors that affect marketing of Appalachian wood products into Central America.

In the near future, softwood and hardwood lumber will be needed in Central America due to an increase of housing starts, tourism, and public infrastructure improvements. Governmental laws have regulated national forests and severely limited legal harvests in Central American countries. These restrictions lead to a need for an imported source of wood products from other areas that have an abundant supply of timber and a well built infrastructure, such as the Appalachian Region.

1.10 Structure of the Thesis

This thesis consists of four chapters. The goal for chapter 2 was to determine the strengths and weaknesses of Appalachian wood products in Central America. This was accomplished by identifying the main competitors of forest product companies in Central American countries, investigating the Central American forest products industry distribution channels and investigating the local production, demand, and policy of forest products in Central

America. To accomplish the objectives of Chapter 2, a case study was conducted with top forest products importers, government and non-government agencies in Central America.

The goal of Chapter 3 was to determine the drivers and barriers of the sale of Appalachian hardwood lumber and building materials in Central American countries. To accomplish this goal, a face-to-face survey was conducted with wood products retailers/manufacturers in six Central American countries.

The goal of chapter 4 was to characterize different factors that affect marketing of Appalachian wood products into Central America. To accomplish this goal, a model was developed based on preliminary studies and applied to perceptions of wood products retailers and manufacturers of Central America.

Each chapter covers relevant objectives, methodology used, findings, discussion, and conclusions.

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Chapter 2. A Case Study to Determine Strengths and Weaknesses of Appalachian Forest Products in Central America

The purpose of this part of the research was to determine strengths and weaknesses of Appalachian wood product competitors in Central America through a case study approach. Previous research suggests that United States forest product companies have overlooked Central America as an opportunity to expand their markets (Salamone 2000). To understand the forest products market in Central America, an extensive market analysis was preformed through interviews and observation of industries in Central America. Interviews with 4 top importers of forest products and 2 forestry related government and non-government agencies in each of four countries (i.e., Costa Rica, Guatemala, El Salvador, and Panama) were conducted. Two questionnaires were developed using secondary sources of information from the Central American forest product market. The questionnaires included questions regarding current imports, product line, cultural opinions, transportation, and trade barriers. Also, previous research from Smith, Miller & Parhizkar 2008; Parhizkar (2008) was used to developed the questionnaires.

Research indicated that Central American wood products companies are not familiar with the benefits and advantages of Appalachian wood products. Central American wood products companies typically import from neighboring and South American countries. For the Appalachian wood products industry to be successful in Central America, companies need to partner with local distributors and offer value added products at similar prices to currently purchased products from South America.

Results support the claim that United States forest product companies have not placed enough emphasis into entering the forest product market in Panama, Guatemala, El Salvador, and

Costa Rica. Limited harvesting of forestlands occurs in Panama, Costa Rica, and El Salvador and the industry lacks support from the government, causing a reduction in the availability of raw material and amount of production. An outside source of wood is needed to meet the demands of a growing regional infrastructure. Central America will see an increase in current and future demand for wood product building materials due to the growing population size and tourism industry. Because of this demand and the variety of products the Appalachian forest product industry has to offer, they may have the opportunity to expand their markets into Central America.

2.1 Introduction

International marketing of wood products is essential for the Appalachian region to strengthen the economy (Hammett, 1996). Exporting of wood products offers many advantages for firms entering the global market including increased profits and credit, market growth, and economic strength (Parhizkar 2008; McMahon and Gottko 1989). In the past few years, the Appalachian region has suffered from the economic crisis resulting in forest product mill closures and loss of employment due to an increase in competition. Therefore, the region may need to increase product competiveness by expanding export markets and improving product promotion (Wang et al. 2010). The overall goal of this study is to evaluate potential market opportunities for Appalachian forest product companies in Central America through a case study methodology. To accomplish this goal 3 objectives were examined to understand the forest products market in Central America:

1. Identify main competitors of forest product companies in Central American countries.
2. Investigate distribution channels of forest products.

3. Investigate local production, demand, and policy of forest products in Central American countries.

2.2 Methodology

In order to conduct an extensive market analysis of Central America, interviews were conducted with top importing forest product companies and government and non-government agencies. The government agencies involved in the study are responsible for managing the public and private forests in the countries. These interviews were used as part of a case study to better understand the forest products market in Central America and gain more detailed information (Yin, 2009; Easterby-Smith et al 1991; Figure 2.1). Cresswell (1998) stated that a case study is an "*exploration of a bounded system or a case over time through detailed, in-depth data collection involving multiple sources of information rich in context. This system is bounded by time and place, and it is the case being studied – a program, an event, an activity, or individuals*".

In case study research, personal interviews are the most important sources of information (Yin 2009). Personal interviews have been useful in identifying barriers and customer preferences in marketing research (Sofaer 1999). An international market study on Appalachian hardwoods competitiveness in Mexico was performed as a case study involving personal interviews with Mexican customs agencies, transportation officials, and hardwood lumber importers (Smith et al. 2008; Parhizkar 2008). Conducting personal interviews is the most effective method for gaining information about international markets (Wai-chung 1995). Interviewing is a form of qualitative research that records descriptive data of people's own spoken words (Taylor & Bogdan 1998). When interviewing, qualitative researchers should set aside all past knowledge of the subject matter and observe and listen to the interviewee (Psaths

1973; Babbie 2010). Qualitative methods often used in case studies help researchers identify patterns and discern similarities and differences (Sofaer 1999) in the data. Qualitative research is also used to gain a more in-depth understanding of a particular issue (Mohd 2008; Patton 1987).

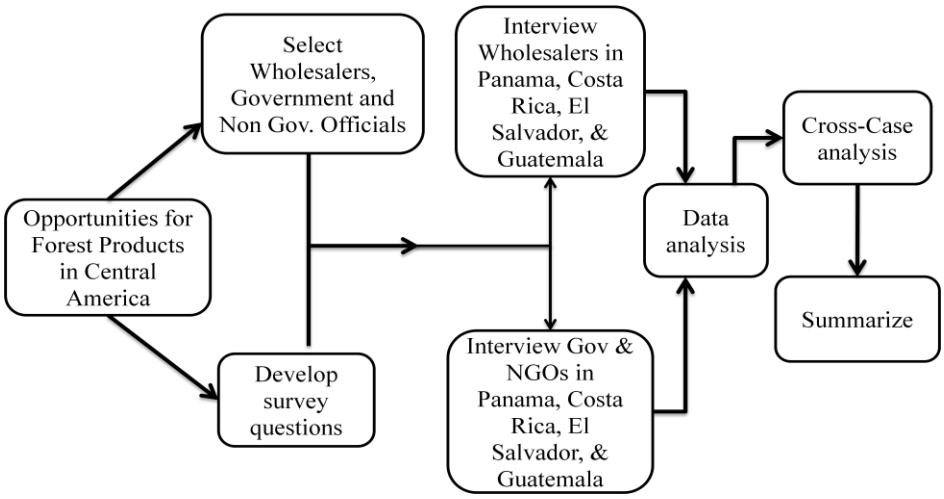

Figure 2.1 Central American case study to learn more about the wood products industry (Adapted from Mohd 2008; Yin 2009)

To guide the interviews, two structured questionnaires were developed from secondary research of the Central American forest product market (see Appendix A). In case study research, the structured questionnaire should mainly be open-ended (Sofaer 1999). The company questionnaire included 40 questions: 15 categorical, 20 open-ended, and 5 Likert scale (5-point scale) questions. The agency questionnaire included 20 questions: 17 open-ended, 1 categorical, and 2 Likert scale (5-point scale) questions. The questionnaire focused on forestry management, wood products imported, supplier attributes, state of the forest products industry in Costa Rica, Panama, Guatemala, and El Salvador, transportation issues (e.g. custom's documentation, inspections) and barriers to importing. The questionnaire also requested demographic and general information about the companies to better understand of their line of business. The

questions were adapted from a previous Virginia Tech study conducted in Mexico and the Dominican Republic (Smith, Miller & Parhizkar 2008; Parhizkar 2008). The interviews were conducted with samples from three populations: forest product companies, government agencies, and non-government agencies. These companies and agencies were purposively selected by the U.S. Commercial Service's Gold Key member program to save time and money (Smith, Miller & Parhizkar 2008; Parhizkar 2008). The U.S. Commercial Service selected companies by number of employees and current imports. The Gold Key program identified 4 top importers of forest products and 2 forestry related government and non-government agencies in each of four countries (i.e., Costa Rica, Guatemala, El Salvador, and Panama). The top importers were stratified into wholesalers or manufacturers. Due to time constraints, large supply of raw materials and politically unstable governments, the researchers did not perform case studies in Nicaragua or Honduras. The researchers did not examine Belize as a potential country to export because of the country's affiliation with the Caribbean Community and Common Market (CARICOM). Other Central American countries are members of the Central American Common Market (CACM).

Qualitative data analysis can be divided into 3 simple steps: noticing, collecting, and thinking (Seidel 1998). During the noticing stage, the researcher becomes familiar with their data by re-reading and examining for ideas related to their main research objectives. These ideas that are discovered must be coded or categorized for patterns (Spiggle 1994; Taylor-Powell and Renner 2003; Babbie 2010). The cross-case analysis approach will be used to examine patterns in different case studies (Babbie 2010). The collecting step involves searching for connections between categories in the coded data for similarities (Seidel 1998; Taylor-Powell and Renner 2003). Memoing or making personal notes during noticing and collecting stages will allow the

researcher to summarize the data more efficiently (Babbie 2010). The thinking stage allows the researcher to make sense of the groups of codes and patterns to determine if any patterns and relationships exist in the cases (Seidel 1998). Interpretation summarizes the results from the coded data and provides an overview of the findings (Spiggle 1994; Taylor-Powell and Renner 2003). Because opportunities for Appalachian forest products in Central America have not been researched in detail, a case study was used.

Results from the case studies were essential input for the development of the questionnaire to be used in a latter contracted survey of wood products retailers and manufacturers in Central America (Chapter 3).

2.3 Results and Discussion

This section discusses the results from interviews at wood products companies in four countries, including government agencies and non-government agencies. The wood products companies consisted of wholesalers and manufacturers. The wholesalers and manufacturers interviewed had 100-500 employees on average, with one wholesaler that had over 2,000 employees. Their customer base consists of retailers, homeowners, contractors, manufacturers, and government offices. The government and non government agencies are responsible for either managing the forests or certifying the forests that are sustainably managed. These agencies were chosen by the U.S. Commercial Service to help understand Central American forests and forest management practices.

2.3.1 Forestry Management

Forests in Panama, Costa Rica, and Guatemala are mainly Forest Stewardship Council (FSC) certified by the Smartwood program through Rainforest Alliance. There are currently no certified forest lands in El Salvador because of expensive certification costs and the Ministry of Agriculture and Livestock lags behind the widely accepted sustainable forest management

practices. Many of the companies and agencies interviewed claimed no incentives are available for companies to offer certified wood products; users primarily look at price and quality of a product when purchasing instead of certification.

Companies and agencies interviewed reported that a lack of incentives from the government is preventing reforestation. In Guatemala, government incentives are given to landowners to help fund reforestation, protection, and management of natural forests over a 5-6 year plan. One agency stated that instead of harvesting forests, it is better to protect the forest in order to protect watersheds for local communities. A government official in Costa Rica claimed that the government has created an incentive to preserve forestland in order to encourage ecotourism. A non-governmental organization in El Salvador claimed that the agriculture bank had given incentives to replant native tree species, but these incentives are not enough to meet the demand for wood products.

The agencies in the majority of the countries stated that the forests are managed by each country's government. For example, local residents may own the property, but they must ask permission of the governing agency before harvesting in Panama and Costa Rica. In some instances, Guatemalan communities must pay a pre–harvest tax before cutting timber, which may prevent communities from harvesting.

During the interview, researchers asked about forest management practices in the 4 countries. Companies and agencies responded that these practices primarily include clear cutting and selective harvesting. An agency in El Salvador reported that the forests are managed by the government and approximately 5,000 m^3 are harvested a year. Generally, individual trees of poor quality with small diameters, irregularities (e.g., knots), and poor form (e.g., crooked) are harvested from agroforestry locations throughout El Salvador.

Plantations seem to be the main source for raw materials for wood products in Central America. Most of the harvesting in Panama and Costa Rica occurs in plantations instead of the natural forests. The government agency stated some land in Panama used for pine plantations has poor quality soils and is not suitable for growing other more valuable timber species such as teak *(Tectona grandis).* Plantations in Panama plant around 11,000 hectares annually and grow typically 60% teak *(Tectona grandis),* and other species such as Caribbean pine *(Pinus caribaea),* eucalyptus (*Eucalyptus spp.),* cedar and African mahogany *(Khaya spp.)* (Table 2.1). In plantations, companies replant more teak *(Tectona grandis)* than native species because teak (Tectona grandis) is highly marketable overseas to Asia and Europe. Typically, privately owned plantation forestlands in Guatemala grow pine (*Pinus spp.),* whereas public lands grow broadleaf species such as mahogany. Plantations in Guatemala grow 11,000 hectares a year annually of teak (*Tectona grandis*), gmelina (*Gmelina arborea*), palo blanco (*Tabebuia donnell-smithii),* and cypress (Table 2.1).

At the time of plantation harvest, typically only small diameter trees are cut, yet the forest products industry does not have a strategy for production and marketing of small diameter trees. Costa Rica replants 6,000 hectares annually in plantations. The main species replanted are gmelina *(Gmelina arborea),* teak *(Tectona grandis)* and chancho blanco *(Vochysia quatemalensis)* (Table 2.1). El Salvador has 6,000 hectares of plantations and 1,000 additional hectares are planted a year. The plantations in El Salvador do not require a management plan. The species growing in the El Salvador plantations consist of teak (*Tectona grandis*), eucalyptus (*Eucalyptus spp.),* laurel (*Cordia alliodora*), Cortez blanco (*Tabebuia donnell-smithii),* and pine (*pinus spp.)* (Table 2.1). The natural forests comprise 19% of the land mass in El Salvador, yet

only 1,500 hectares are managed for forestry. Conifers such as pitch pine *(Pinus oocarpa),* and thinleaf pine *(pinus maximinoi)* consist of 15,000 hectares (Table 2.1).

Table 2.1 Response of interviewees about current species planted in each Central American country

	Panama	**Costa Rica**	**Guatemala**	**El Salvador**
Teak *(Tectona grandis)*	X	X	X	X
Caribbean pine *(Pinus caribaea)*	X	X		
Pine (*pinus spp.)*			X	X
Eucalyptus (*Eucalyptus spp.)*	X			X
African mahogany *(Khaya spp.)*	X			
Gmelina *(Gmelina arborea)*		X	X	
Chancho blanco *(Vochysia quatemalensis)*		X		
Palo blanco (*Tabebuia donnell-smithii)*			X	
Laurel (*Cordia alliodora*)				X
Cortez blanco (*Tabebuia donnell-smithii)*				X

2.3.2 Wood Products Imported

The companies interviewed largely import pressure treated lumber, softwood lumber, panels, hardwood lumber, hardwood veneer, flooring, and furniture/parts (Table 2.2). A few wholesaler companies in Panama and El Salvador imported pressure treated lumber from the United States treated with alkaline copper quaternary (ACQ). Some of the wood product wholesalers interviewed have interacted with wood product brokers in the U.S. for softwood lumber (Southern yellow pine) and panels, but all of the buyers were familiar with Southern yellow pine lumber from the United States. The buyers claimed that Southern yellow pine was

comparable to Caribbean *(Pinus caribaea)* and radiata (*Pinus radiata)* pine they current purchase (Table 2.2). Companies in Panama and Costa Rica primarily import softwood lumber from Chile, Brazil, Honduras, and Uruguay, which is dried to 12-14% moisture content. Chile is the main exporter of radiata pine (*Pinus radiata*) to Central America, the primary softwood species used in building construction. Other softwood species used in construction come from Brazil or Uruguay, such as elliotis pine (*Pinus elliotis*), loblolly pine (*Pinus taeda*), and slash pine (*Pinus elliottii*). Companies in Guatemala and El Salvador import softwood lumber and other building materials primarily from Chile, United States and Canada, as well as purchase softwood from local sawmills. Pine lumber is also used in Costa Rica, Panama, Guatemala, and El Salvador for furniture production, so Eastern white pine (*Pinus strobus*) may be a substitute for the current species being used in furniture.

Imported panel products consist of oriented strand board (OSB), plywood, medium-density fiberboard (MDF), particle board, and concrete plyform (Table 2.2). Buyers stated that China and Chile are the top exporters of plywood to Central America. The companies were introduced to specialized wood products such as fire-retardant lumber/panel, mold and insect resistant lumber/panel, and engineered wood products (e.g., I-joist beams, glulam, laminated veneer lumber). The majority of buyers agreed there will be a need for specialized wood products in the future because of the tropical climate in Central America. Some of the buyers were not aware of the engineered wood products available from the Appalachian region. The buyers stated the need for composite products such as medium-density fiberboard, plywood, and oriented strand board for current and future building construction.

Table 2.2 Wood products and species imported into Panama, Costa Rica, Guatemala, and El Salvador

Product	Species	Uses	Exported From	Imported to
Softwood Lumber	Radiata pine *(Pinus radiata*)	Construction/Furniture	Chile	Costa Rica, Panama, Guatemala, El Salvador
	Pine spp. *(Pinus spp.)*	Construction/Furniture	U.S., Canada	Costa Rica, Panama, Guatemala, El Salvador
	Caribbean pine *(Pinus caribaea)*	Construction	Central America	Costa Rica, Panama, Guatemala, El Salvador
	Chilean Oregon pine (Douglas Fir) *(Pseudotsuga menziesii)*	Construction Furniture	Chile	Costa Rica, El Salvador
Hardwood Lumber	Almendro *(Dipterix panamensis)*	Exterior Applications	Central America	Costa Rica, Panama, Guatemala, El Salvador
	Guapinol *(Hymenaea courbaril)*	Interior Applications	Central America	Costa Rica
	Cedro Amargo *(Cedrela odorata)*	Furniture/Interior Applications	Central America	Guatemala, Costa Rica
	Guanacaste *(Enterolobium cyclocarpum)*	Furniture/Interior Applications	Central America	Costa Rica, Panama
	Cenízaro *(Samanea saman)*	Furniture/Interior Applications	Central America	Costa Rica
	Pucte *(Bucida buceras)*	Furniture/Exterior Applications	Central America	Guatemala
	Danto *(Vatairea Iundellii)*	Construction/Interior Applications	Central America	Guatemala, Costa Rica
	Manchiche *(Lonchocarpus castilloi)*	Construction/Furniture/ Interior Applications	Central America	Guatemala

	Santa Maria ***(Calophyllum brasiliense)***	Furniture/Interior Applications	Central America	Guatemala, Costa Rica,
	Laurel (*Cordia alliodora)*	Furniture/Interior Applications	Central America	El Salvador, Costa Rica
	Caoba (Mahogany) *(Swietenia Macrophyllaa)*	Furniture/Interior Applications	Central America	Guatemala, Costa Rica, Panama, El Salvador
	Teak *(Tectona grandiz)*	Furniture/Interior Applications	Central America	Guatemala, El Salvador, Costa Rica, Panama
	Gmelina *(Gmelina arborea)*	Construction Furniture	Central America	Costa Rica, Guatemala,
Panel	Oriented Strand Board (OSB)	Construction	USA, Chile, Argentina	Costa Rica, Panama, Guatemala, El Salvador
	Plywood	Construction Furniture	China, Chile	El Salvador, Guatemala Costa Rica, Panama
	Medium Density Fiberboard (MDF)	Construction Furniture	Chile, Brazil	El Salvador, Guatemala Costa Rica, Panama
	Particleboard	Construction Furniture	Argentina	El Salvador, Guatemala, Costa Rica, Panama

The buyers frequently purchased certified wood products, but they believed that their customers take into account the price and quality of the product and are less interested in buying certified. A few buyers claimed that the market for certified forest products has improved over the past few years and they expect it to increase because of environmental concerns. In some instances, countries do not understand the meaning of sustainably managing forests. A government agency in Panama directly stated, *"Panamanians don't understand sustainability."*

Companies interviewed stated that wood products companies from South America offer a variety of products with better prices than United States and Canada. In addition to higher prices in North America, companies also do not offer the product dimensions required by Central American buyers.

When asked about future demands for wood products, some respondents believed demand would increase in the future. One Costa Rican wholesaler stated that using wood for building construction will make more affordable housing available for low income families and that there is still a lot of land available for development. A government agency stated that Costa Rica is required to be carbon neutral by 2021, therefore the need for utilizing wood in construction may increase over the next few years to meet that goal.

The majority of the buyers were familiar with Appalachian hardwoods and they were willing to import them if they were priced similarly to the native tropical species in the region. Appalachian hardwoods can be used in doors, mouldings, cabinets, furniture, flooring, and ceiling panels. Lighter colored hardwood species are found in many kitchen cabinets since customers can easily match appliances and other kitchen items to them. Appalachian hardwoods such as hard maple *(Acer saccharum)*, soft maple *(Acer spp.)*, red oak *(Quercus rubra)*, and American beech *(Fagus grandifolia)* would meet similar color specifications. Flooring and

furniture are primarily manufactured using dark reddish species, therefore, black cherry *(Prunus serotina)* and black walnut *(Juglans nigra)* from the Appalachian region could be a substitute for the tropical hardwood species currently used, such as Guanacaste *(Enterolobium cyclocarpum).*

2.3.3 Supplier Attributes

Buyers from the wholesalers and manufacturers were asked what criteria they take into account when selecting a wood product supplier. Buyers stated they are looking for a long history of business, on-time delivery, quality of the product, competitive price, variety and availability of products, and long-term relationships. Companies preferred to buy products from other companies that have been conducting business for a long time rather than a new start-up company. Companies did repeated business with suppliers who were on-time with deliveries of products. Respondents said that wood products purchased from suppliers need to be made with high quality materials. For example, a few importers complained that some plywood from China is made with poor quality materials causing the plywood to delaminate. Importers stated wood products being sold to them must be sold at a competitive price to Central American countries. For example, wood products from Chile were found to be of high quality and sold to Central American countries at a competitive price. Some companies required their suppliers to have a large assortment of products available for fast shipping. Some wholesalers stated they had problems with suppliers not meeting lead times and not having products in stock when purchasing. When companies are looking for new suppliers, they want to have a long-term relationship by making frequent orders and helping to promote products at tradeshows. Suppliers would need to have a representative at the tradeshow to help with any product demonstrations and questions from potential customers.

2.3.4 State of the Forest Products Industry in Costa Rica, Panama, Guatemala, & El Salvador

Companies and agencies were asked about the current state of the forest products industry in their country. In Panama, a state agency stated that the industry has been on a downward spiral since 1993 and only 5 large wood product companies exist with more than 50 employees (Table 2.3). Panama's forest products industry is technologically limited and there is a long distance between the forest and the primary processing facilities, which leads to problems with logistics. Costa Rica has only a few large wood products companies and the small-medium enterprises are technologically limited and segmented throughout the country (Table 2.3). Companies stated that the government does not help in the promotion of wood products in Panama, Costa Rica and El Salvador (Table 2.3). Pallet production is the main wood products industry in Costa Rica used for exporting of agricultural crops overseas. In Guatemala, an agency promotes the use of wood products at a few tradeshows throughout the year (Table 2.3). One agency in Guatemala pointed out that companies are technologically limited and produce low value-added products (Table 2.3). The main industries are pallet and furniture production and companies tend to use small diameter trees as a raw material.

The industry in El Salvador uses limited technology and the raw material is scarce because of poor quality trees (Table 2.3). Approximately 80 to 90 percent of the forest products industry is furniture production. Agencies and companies stated that the majority of small to medium enterprises were not familiar with kiln drying as a method to dry lumber, yet the wholesalers and manufacturers interviewed required their lumber to be kiln dried when purchasing. Local small to medium enterprises may reduce shipping costs if lumber is properly dried by reducing the overall weight (Simpson 1991). Since companies only have a small supply of raw materials, they must import hardwood species from Nicaragua and Guatemala. In 2011,

the El Salvadorian government is taking a stand to prevent illegal harvesting; companies in El Salvador will be required to obtain a permit to harvest trees. This permit must accompany the wood product through the harvesting and manufacturing process, which may persuade some companies to look elsewhere for raw material.

Overall, the wood products industry in Central America is limited due to lagging technological advances and governmental support.

Table 2.3 Responses from interviews when asked about the Central American forest products industry in each country

	Panama	Costa Rica	Guatemala	El Salvador
Limited Technology	X	X	X	X
Few large companies	X	X		
Lack of Raw Material				X
Lack of Government Promotion	X	X		X

2.3.5 Transportation Issues

Transportation of wood products was a challenge for some companies, but was not an issue for others. In Panama, Costa Rica and Guatemala, companies did not report a problem with logistics. The main problem in these countries was delayed delivery of products due to port strikes in exporting countries. Also, some products entering the Central American countries have experienced delays due to phytosanitary issues, such as lack of appropriate markings and paperwork to show that the product meets customs requirements. Custom authorities delay arrivals of products because of necessary inspections. Table 2.4 shows the main ports of entry of imports entering the Central American countries.

Table 2.4 Main ports of entry for wood products in Central America

Country	Port	Coast
Guatemala	Puerto Barrios	Caribbean
El Salvador	Puerto Barrios, Guatemala	
	Puerto Cortes, Honduras	
Costa Rica	Caldera Port, Puntarenas	Pacific
	Port of Limón	Caribbean
Panama	Panama City Port	Pacific

Most imports to El Salvador arrive by ship to either Guatemala or Puerto Cortes, Honduras and are then trucked to El Salvador. Companies have had problems when importing from South America because containers have been lost in transit at ports. Central American wood products companies primarily have products shipped by cost, insurance, and freight (CIF) to their main port of entry. Some companies may have available a cheaper freight opportunity and purchase the product Free on Board (FOB).

2.3.6 Barriers to Importing

Companies were asked about potential barriers that Appalachian forest product companies face when exporting to Central America. The interviewees stated 5 main barriers: (1) price, (2) lumber dimensions, (3) product knowledge, (4) product distribution and (5) language (Table 2.5). Most companies stated that they import wood products from Chile because they offer high quality products at a competitive price. Companies stated the United States must price products similarly to Chilean wood products in order to be successful as an exporter to Central America. A manufacturer in El Salvador stated, "*U.S. furniture is high in cost and low in quality.*"

Table 2.5 Responses from interviewees when asked about barriers to importing wood products to Central American countries

Barrier	**Country(ies)**	**Problem**
Language	Costa Rica, Panama, El Salvador, Guatemala	Most buyers only speak Spanish
Lumber Dimensions	Costa Rica, Guatemala, El Salvador	Use different lumber dimensions than the U.S.
Price	El Salvador	Competition with Chilean wood products
Wood Product Knowledge	Costa Rica, Panama, El Salvador, Guatemala	Builders, architects, and designers lack knowledge of wood and wood products
Wood Product Distribution	Guatemala, El Salvador	Lack of proper distribution of wood products to the country and end-users

One barrier reported by companies and agencies interviewed was incompatible dimensions of wood products offered by the U.S. Lumber dimensions seemed to be an important barrier for exporting to Central America, since lumber is purchased and sold in Central America in the unit of "varas." A vara measures as 32.908 in or 83.587 cm in length (Rowlett & UNC 1999). Companies stated that they preferred exporters to supply products to meet the specific dimensions required in their country.

Another barrier reported by companies and agencies interviewed was the lack of knowledge of the wood attributes. Companies and agencies stated that many builders and engineers have little knowledge of wood and wood products for practical uses. When designing homes and commercial buildings, architects and engineers primarily use construction materials with which they are experienced and familiar, usually cement and steel in Central America.

Distribution of wood products seemed to be challenging for some companies, but was not an issue for others. In Costa Rica and Panama, hardware stores and lumber deposits offer wood products to customers (Figure 2.2). Companies stated Guatemalan wood product distribution is currently a problem because of the lack of retail stores stocked with treated, dried and proper dimension lumber. A clearly defined supply chain needs to be implemented in Guatemala to target markets effectively.

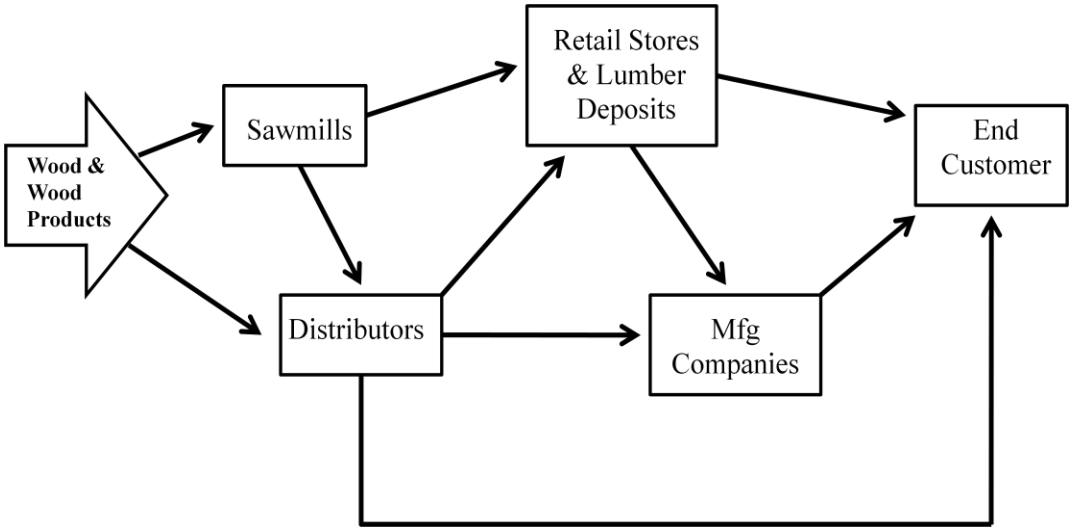

Figure 2.2 Distribution of forest products in Central American countries (Adopted from Quesada 2008)

The last barrier reported from the companies was language. Some companies interviewed stated that they had trouble negotiating importing forest products from the United States because of the language barrier. Companies with importing experience from the United States have primarily made purchases from a broker that speaks fluent Spanish.

2.3.7 Wood Products Importer Profile

The 4 companies in each country interviewed consisted of wood products wholesalers and manufacturers. The wholesalers and manufacturers interviewed had 100-500 employees on average, with one wholesaler with over 2,000 employees. Their customer base consists of

retailers, homeowners, contractors, manufacturers, and government offices. The companies stated their customers are primarily using cement and steel for building construction because they are insect and decay resistant materials. Historically, these items have been preferred building materials because of the hot and humid climate in Central America. The wholesalers' wood product lines currently consist of lumber, panels, cabinets, flooring, furniture, millwork, and home improvement items. The manufacturers' products included furniture, furniture parts, doors, and panels. Importers in Panama and Costa Rica tend to have more employees and produce a higher amount of annual sales (Table 2.6). Due to geographical closeness to North America companies, companies in El Salvador and Guatemala tend to import more from the U.S. and Canada than companies in Costa Rica and Panama.

Table 2.6 Responses from interviews when asked about their company demographics

Country	**Companies Size (number of employees)**	**Annual Sales (in U.S. $ million)**	**Customer Base**
Panama	Less than 50-1000	$10-249 million	Retailers, Manufacturers, Contractors, Wholesalers, Homeowners
Costa Rica	500-1000	$10-999 million	Retailers, Manufacturers, Contractors, Homeowners
Guatemala	50-250	Less than $10 million	Retailers, Manufacturers, Contractors, Homeowners, Manufacturers
El Salvador	Less than 50-250	Less than $10 million	Retailers, Contractors, Homeowners

2.4 Summary and Conclusions

The goal of this chapter was to examine the opportunities for Appalachian wood products in Central America using a case study design. Objective 1 of this chapter was to identify the main competitors of the forest products companies in Central American countries. The research

found that Central American wood products companies purchase wood products from either local companies, neighboring countries, South America, China and a small amount from the U.S.. Central American wood products importers purchase from South America because of the high quality and competitively priced products. Objective 2 examined the distribution channels of the Central American forest products industry. The research found that wood products importing to Central America primarily enter the countries through a wholesaler and then distributed to retailers or lumber deposits. In Guatemala and El Salvador it was found these countries lack wood product retailers and lumber deposits to help distribute wood products to the end-consumer. The last objective of Chapter 2 was to investigate the local production, demand, and policy of forest products in Central America. The demand for wood and wood products is high throughout Central America. Since the start of the expansion of the Panama Canal wood products are being used for construction of the canal and also in homes and businesses developing because of the strong economy. In Costa Rica the demand for wood products is rising because of the initiative to be carbon neutral by 2021. The source for available raw materials in El Salvador is decreasing because of strict environmental regulations and the amount of wood available to fill growing demand. Although Guatemala has numerous amounts of forest, environmental concerns have decreased the amount of forests being harvested. The research found that production is low because of strict environmental regulations, lack of governmental support and the low amount of raw material available for production. Because of the low production of wood products in Central America, companies primarily import wood and wood products to meet the demand. Most Central American countries produce lumber in specific dimensions and countries exporting to this region needs to either produce to the specific dimensions or educate the consumers on the benefits of using the other dimensions.

The majority of Central American wood products companies interviewed were willing to import wood products from the Appalachian region. In order for Appalachian companies to perform well in the Central American wood products market, they need to educate the public about wood and its uses, sell products that are of equal quality, produce products in the current dimensions used in Central America, price competitive with Chilean wood products, and partner with a local company to reduce any trade barriers. The best market strategies for Appalachian wood product companies to access the Central American market are to partner with local wholesalers, offer higher value-added products than local suppliers, and keep prices similar to local competition. Central American lumber dimension requirements have caused problems in the past when importing from the United States. Appalachian wood products companies need to produce products in the standard dimensions required in Central America to be successful exporters.

El Salvador is the smallest of the Central American countries and has a very high population density. This country seems to offer the highest potential for Appalachian wood products because of the high demand for building materials, scarce raw material source and strict environmental regulations. Although port access may be a problem, the country is still accessible through its neighboring countries. Panama and Costa Rica also provide the greatest potential for export success of Appalachian forest products because of the need for building materials to meet the demands of tourism and population increases. Also, these countries have strict environmental regulations and a lack of available resources to meet the growing needs.

This research may support the claim that United States forest products companies should consider expanding their international markets into Guatemala, El Salvador, Costa Rica and Panama. Wholesalers and government officials in Central American countries reported that the

majority of the general public is unfamiliar with the properties and uses of wood since steel and cement are the currently preferred building materials. They also noted that the wood products industry lacks support from the government and forest harvesting has been declining. These factors are leading to a reduction of raw material and production, therefore, an outside source of wood may be necessary to meet the needs of a growing region infrastructure. Because the Appalachian region's forest products industry offers products that are similar to those currently imported in Guatemala, El Salvador, Costa Rica and Panama, they have a unique opportunity to expand their markets into Central America.

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Chapter 3. Survey of Central American Wood Products Retailers and Manufacturers

The objective of this study was to identify market drivers and barriers for the sale of Appalachian wood products in the Central American market. Although end-consumer preferences were of interest for the survey, retailers and manufacturers were chosen as the target populations because they rely on end-consumer behavior when promoting products. From January through April 2011, a survey was implemented with wood products retailers and manufacturers in Panama, Costa Rica, Nicaragua, Honduras, Guatemala, and El Salvador. Two hundred and forty-seven valid questionnaires were completed. The majority of responding firms were small with less than 25 employees. The results indicated that Appalachian wood products may be suitable alternatives for wood products currently used in Central America. Respondents from the survey indicated that darker colored hardwood species are preferred used in furniture and interior applications within the home. Therefore, Appalachian hardwood companies may try to market darker colored hardwood species, such as black cherry *(Prunus serotina)* and black walnut *(Juglans nigra)*. White hardwood species were found to be desirable in kitchen applications. Appalachian wood product companies should market quality wood products at prices competitive with those of other countries selling to Central American companies.

To market products to Central American companies, the most successful promotional strategy identified by respondents was personal selling. Appalachian wood product companies need to take time and personally visit companies to promote products with potential customers in Central America. This will give buyers in Central America a better understanding of Appalachian wood products and their applications. By partnering with local wholesalers, small wood products firms may be able to purchase small amounts of wood products from the Appalachian region. Because the forest products industry in the Appalachian region offers

products that are similar to those currently used in Guatemala, El Salvador, Nicaragua, Honduras, Costa Rica, and Panama, they have a unique opportunity to expand their markets into Central America.

3.1 Introduction

Importing forest products into Central America may be necessary to meet the growing demand for building materials because of an increase in population, tourism, and deforestation (Fallas 2008, Rogers 2009; World Bank 2010; Montagnini et al 2002) . Recently, new home starts have increased in Central American countries because of economic improvements. Previous research shows that consumption of wood products (excluding fuel wood) in Central America was greater than 4 million m^3 in 2009. In 2009, Costa Rica produced over 1 million m^3 of wood products. Guatemala and Honduras each produced approximately 800,000 m^3 of wood products and El Salvador produced almost 700,000 m^3 of wood products. Panama and Nicaragua each produced around 100,000 m^3 of wood products in 2009 (FAOSTAT 2010). Although a small percentage of consumption consists of imports, only imported wood products from the U.S., Chile, and Brazil are considered to be high quality (Chapter 2).

The Appalachian Region boasts a wide variety of forest product companies and resources to help meet the growing demand for wood products in Central America. This region has several ports available for exporting products globally, such as Norfolk, VA and Baltimore, MD (Port of Virginia 2010; Maryland DOTPA 2010). Because Central American countries are relatively close in proximity to the United States, trade between the two countries can be facilitated relatively easily.

Some studies in the forest products industry found several factors that affect successful product export. The research of Ifju and Bush (1993) suggests that small, domestic companies

view themselves as non-exporters, but they still have potential to export. Non-exporting companies attempting to enter a global market state that the primary reason they have not done so is lack of market information regarding product specifications and distribution channels (Ifju and Bush 1993). Ringe et al. (1987) found that Kentucky hardwood lumber exporters invested in global market information and built long-term relationships with overseas customers resulting in successful exporting overseas. Overall, the lack of market information is believed to be the main barrier for potential exporters of forest products overseas (Ifju and Bush 1993; Naka et al 2009). A study of Appalachian hardwood lumber exports showed that few employees and production limitations did not significantly affect exporting, but the need for marketing information was a major hurdle for companies (Parsons 2002). A better understanding of the trade barriers between Central America and the Appalachian Region must be achieved for successful trade in marketing products. The objective of this study is to identify market drivers and barriers for the sale of Appalachian wood products to the Central American market through a survey of wood products firms.

3.2 Methodology

3.2.1 Population

In order to identify market drivers and barriers for Appalachian wood products companies into the Central American market, the research required a better understanding of the desires of the end-user in Central American countries. Because a sampling frame of end-users is not readily available, the researchers surveyed a sample of 300 representatives from forest product retailers and manufacturers in six Central American countries. Retailers and manufacturers were chosen as the target population for the survey because they rely on end-consumer behavior when promoting products (Urbany et al. 1990). Distributors were included to identify similarities and differences in usage and interests in wood products in Central America.

The six countries of interest were Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama.

3.2.2 Sample Frame

Due to the lack of an appropriate method for identifying all manufacturers and retailers in targeted countries, a contracted company was hired to identify appropriate firms and implement the survey. The contracted company employed individuals familiar with the wood product markets in each Central American country to identify firms to be included in survey. Using contracted surveyors who are native language speakers is courteous to the interviewee and respondents feel more comfortable and surveys tend to be of better quality (Davis and Young 2002).

3.2.3 Data Collection

Surveys were conducted from January through April 2011. Employees at the contract survey company (PHI Strategy, S.A.) located representatives and conducted the survey with them via phone, in person or email. The contractor scheduled survey times either on the phone or in-person with owners, managers, sales representatives, purchasers, or primary-decision-makers from selected retailers and manufacturers. Surveying via mail was not possible because valid street addresses were not available in Central American countries. The questionnaire (Table 3.1) was constructed with information from the results of the personal interview surveys of forest product importers and government officers in the Central America from Chapter 2. Also, some questions were adapted from a previous Virginia Tech study in Mexico and the Dominican Republic (Smith et al. 2008), a study in the U.S. concerning unknown Bolivian wood species (Cossio Antezana 2007) and a study of retail stores for hardwood specialty products (Cesa 1987).

Table 3.1 Questionnaire structure

Questionnaire Structure		
Section	**Questions**	**Citations**
1. Demographic Information	1. Type of business 2. Major products imported 3. Major products sold 4. Customer Demographics 4. Number of employees 5. Annual average gross sales	(Cesa 1987; Sun 1998; Bowe et al. 2001; Cossio 2007; Parhizkar 2008; Perkins 2009)
2. Supplier	6. Supplier attributes (e.g. honesty, patience, commitment)	(Parhizkar 2008)
3. Product Attributes	7. Product attributes when purchasing wood and wood products	(Cesa 1987; Hammett 1996; Sun 1998; Cossio 2007)
4.Retailer/ Manufacturer Promotion Strategy	8. Promotional strategies for selling wood products	(Cesa 1987; Parhizkar 2008)
5. Supplier Promotion Strategy	9. Promotional strategies when purchasing wood and wood products	(Cesa 1987; Parhizkar 2008)
6. Barriers	10. Potential barriers to importing Appalachian forest products	(Ifju and Bush 1993; Hammett 1996; Parhizkar 2008; Naka et al 2009)
8.Company Performance	11. How well your company preformed within the last 5 years?	(Perkins 2009)
9.Products	12. Hardwood lumber thicknesses 13. Softwood lumber dimensions 14. Softwood board dimensions 15. Panel thicknesses 16. Panel dimensions 17. Hardwood lumber color preferences 18. Future demand of Appalachian wood products 19. Finding information regarding new wood products 20. What category of suppliers do you purchase wood products from? 21. How often does your company place orders? 22. Number of 20-foot containers of hardwood lumber 23. Number of 20-foot containers of softwood lumber 24. Number of 20-foot containers of panels 25. List the top 5 countries where you purchase wood products?	(Cossio 2007; Parhizkar 2008)
10.Price	26. How much are you willing to pay for Appalachian wood products? 27. How much are you willing to pay for certified wood products?	(Cossio 2007; Parhizkar 2008)

Three types of questions were used in the questionnaire: categorical, rating, and open-ended (see Appendix B). Rating questions frequently are used in questionnaires to ask multiple related questions about a single concept. This technique enhances the reliability and validity of the survey questions (Vaske 2008). Reliability is the consistency of the questionnaire to yield similar results over multiple uses (Babbie 2010). Validity is the degree to which the questions measure the concepts the researchers think they are addressing (Babbie 2010). The rating questions used a 5-point Likert response format (e.g. strongly agree to strongly disagree) to indicate the respondent's level of agreement. The researchers chose to use a Likert response format to provide a consistent ordinal response format (Babbie 2010). The 5-point Likert response format was chosen over a 7-point format to reduce the respondent burden and because more than 5 points have not shown to offer any more added reliability (Lissitz and Green 1975).

The questionnaire was reviewed by wood products marketing experts and the researcher's fellow graduate students. The questionnaire was revised based on reviewers' suggestions. The questionnaire was translated into Spanish by native-speaking Central and South Americans who were experienced in the wood products industry in the region. The methodology can be seen in Figure 3.1.

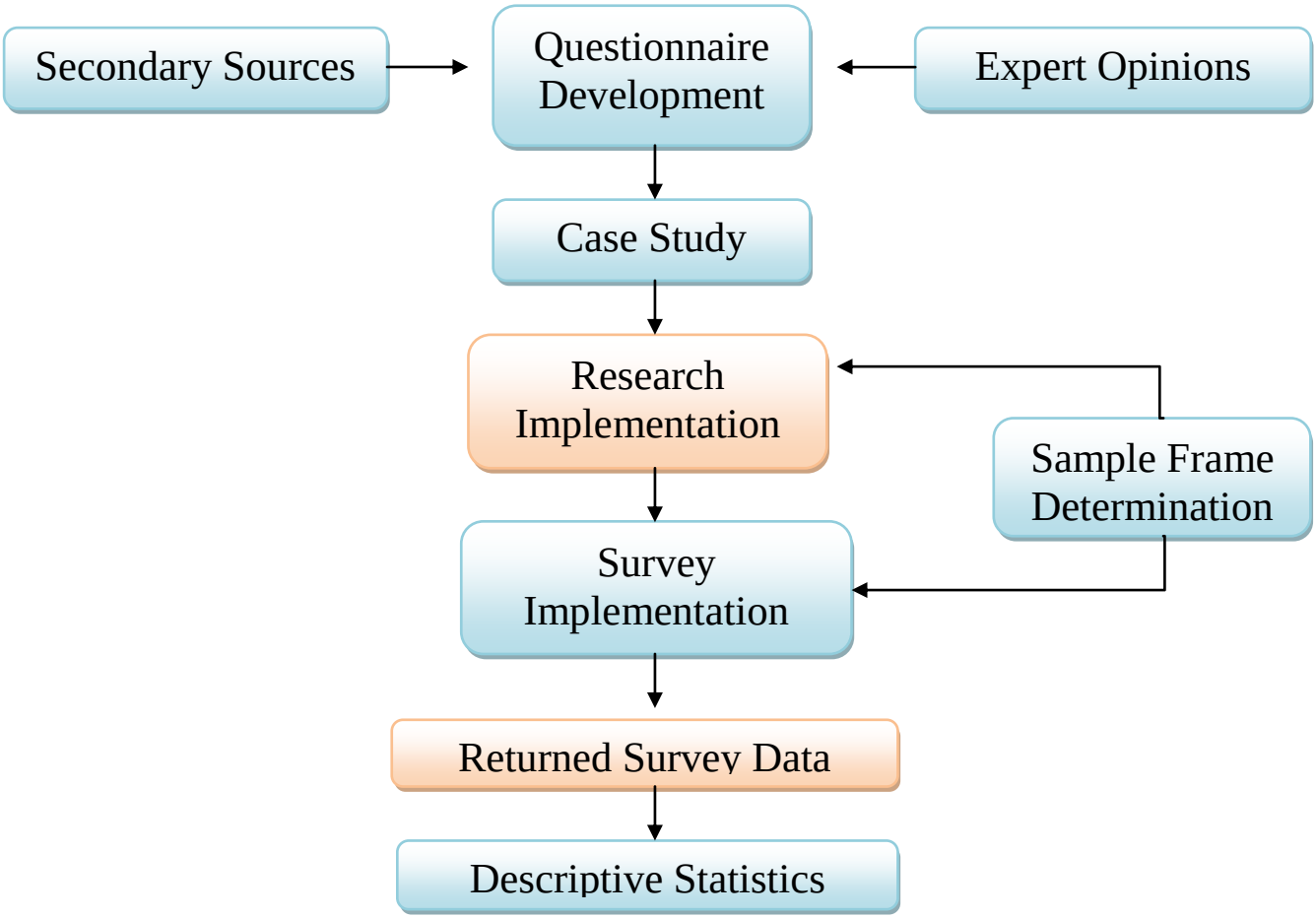

Figure 3.1 Methodology of survey

3.2.4 Data Analysis

Because the participants were purposively selected, the results are not representative of all wood products retailers and manufacturers in Central America. However, the results can give insights into drivers and barriers of exporting Appalachian wood products to Central America. Survey data was entered in SurveyPro 5.0 and statistical analysis was performed using SPSS® and MS-Excel®. Descriptive statistics were used to identify the means and standard deviations of marketing factors (e.g. supplier attributes, promotional strategy). Analysis of Variance (ANOVA) was used to test for significant differences in responses among Central American countries. Because response distributions were found to be non-normal, non-parametric statistics (i.e., Kruskal-Wallis one-way analysis of variance) were also used to identify differences between countries. Because minimal differences were detected between the two methods, the research decided to use the ANOVA results. Data were categorized into multiple respondent groupings by country (n=5; Questionnaires from Nicaragua were removed from the analysis because of invalid data).

3.3 Results and Discussion

A total of 298 questionnaires were returned from the contracting company. Fifty one surveys from Nicaragua were removed from analysis due to insufficient information; therefore, 247 questionnaires were valid for data analysis. Seventy-nine were from Costa Rica, forty-nine from Panama, forty each from Honduras, El Salvador and Guatemala

3.3.1 Demographics

The last six questions of the questionnaire provided demographic information about the respondent's business type, manufacturer type, customer type, number of locations, number of employees and gross sales in 2009.

3.3.1.1 Business Type and Manufacturer Business Type

The majority of respondents (43%) were manufacturers, followed by retailers (37%) and distributors (19%) (Table 3.2). Some respondents indicated that their company can be classified as more than one business type (e.g. manufacturer and/or retailer).

Table 3.2 Distribution of respondents by type of business (n=237)

Type of Business	Respondents	Percentage of Total
Manufacturer	139	43.3%
Retailer	120	37.4%
Distributor	62	19.3%

The largest category of manufacturer respondents was furniture manufacturers (29%) (Table 3.3). Although the results from Chapter 2 indicate that pallet manufacturing may be the largest consumer of wood products, only 1% of respondents to this questionnaire were classified as pallet manufacturers. Some respondents indicated that their company may be classified as more than one manufacturer type (e.g. window and/or door).

Table 3.3 Manufacturer business type (n=357)

Type of Manufacturer	Respondents	Percentage of Total
Furniture	104	29.1%
Door	55	15.4%
Cabinet	51	14.3%
Retailer	34	9.5%
Window	31	8.7%
Flooring	28	7.8%
Moulding/Millwork	25	7.0%
Dimension	24	6.7%
Pallet	5	1.4%

3.3.1.2 Customer Types

Respondents stated their companies sell primarily to homeowners and contractors (Figure 3.2). Over 36% of respondents reported that they sell to homeowners and 30% sell to contractors. Some respondents stated they have customers in multiple categories (e.g. manufacturers and/or retailers).

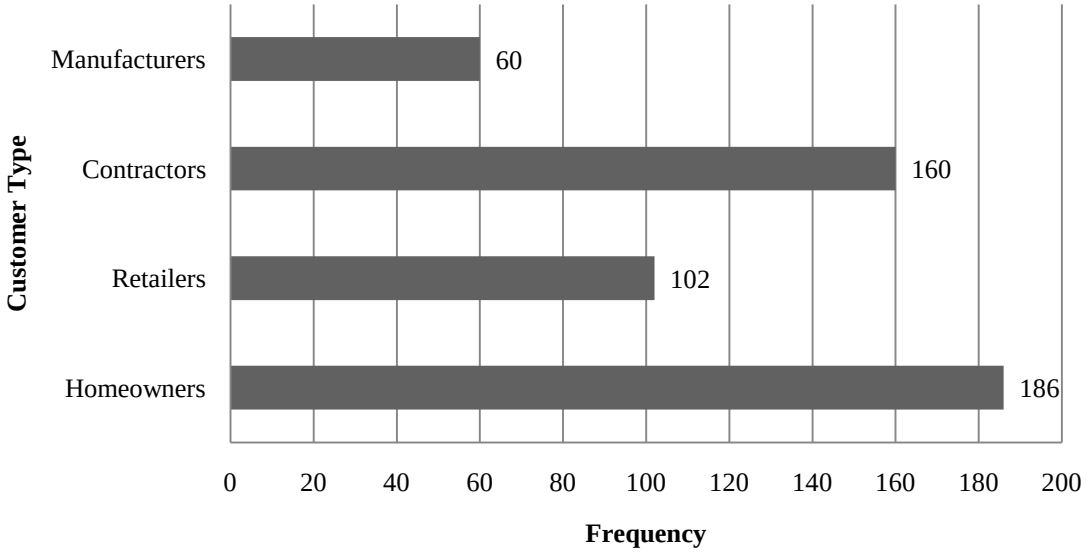

Figure 3.2 Customer types stated by respondents

3.3.1.3 Total Sales, Number of Locations, and Number of Employees

Figure 3.3 shows the approximate total sales in 2009 of the retailer and manufacturer respondents. Large companies have corresponding higher sales figures compared with smaller companies with lower amount of sales; 87% of companies reported less than $1,000,000 in sales, and only 10% of the companies reported sales between $1,000,000 and$5,000,000. The remaining respondents (3%) reported sales over $5,000,000.

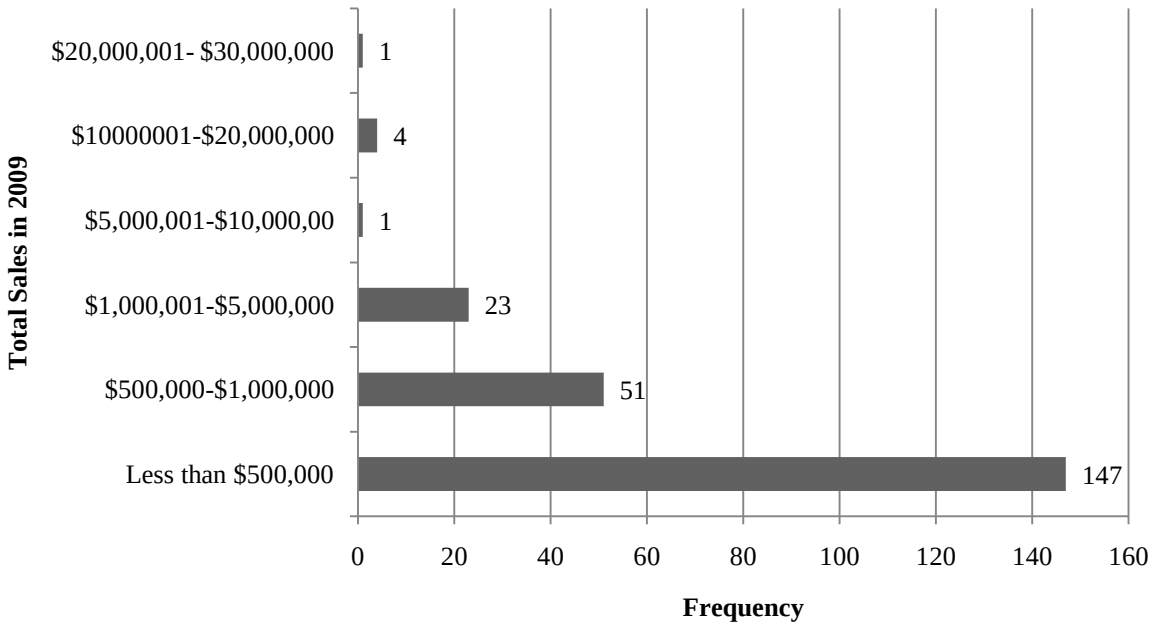

Figure 3.3 Approximate total sales in 2009 of respondents (n= 227)

The majority of respondents (56%) stated that their company had one company location (Figure 3.4). Ninety-two respondents (39%) reported that their company had between 2-5 locations, eleven respondents' companies (5%) had 6-15 locations and one company had more than 16 locations. Generally, responding companies had fewer than 25 employees (62%) (Figure 3.5). Only three percent of responding companies had more than 200 employees. The number of locations is correlated with the amount of sales and number of employees; in other words, larger companies tend to have higher sales and more employees.

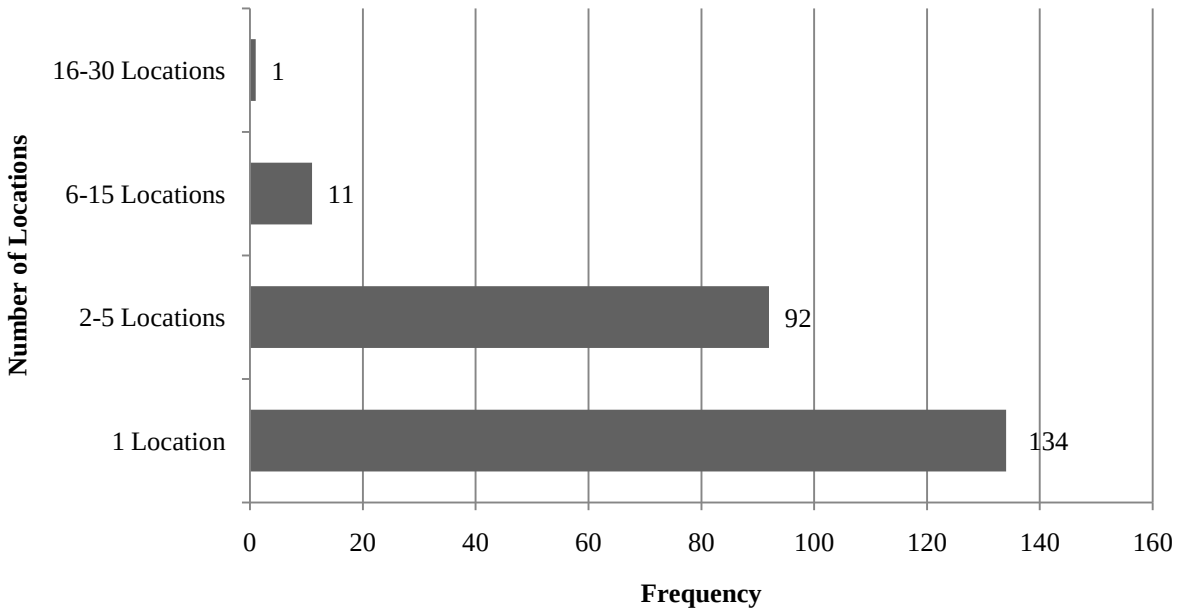

Figure 3.4 Number of company locations reported by respondents (n=238)

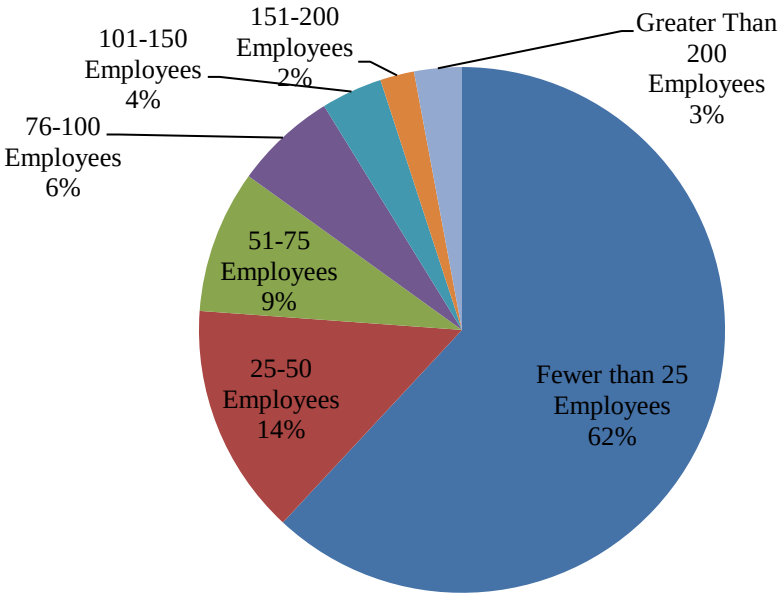

Figure 3.5 Number of employees reported by respondents (n=239)

3.3.2 Products

3.3.2.1 Purchased wood products

Thirty-five percent of companies that responded purchased 1-5 containers of wood products in 2009 (Figure 3.6). Of those that purchased 1-5 containers, forty-eight companies purchased hardwood lumber, forty-six companies purchased softwood lumber and twenty-six companies purchased panels. Smaller companies, which represented of the majority of respondents, tend to purchase fewer wood products than larger companies, which may explain the relatively high frequency of companies that purchased zero containers. Some respondents indicated that they purchased multiple containers of different product types (e.g. softwood lumber and panels).

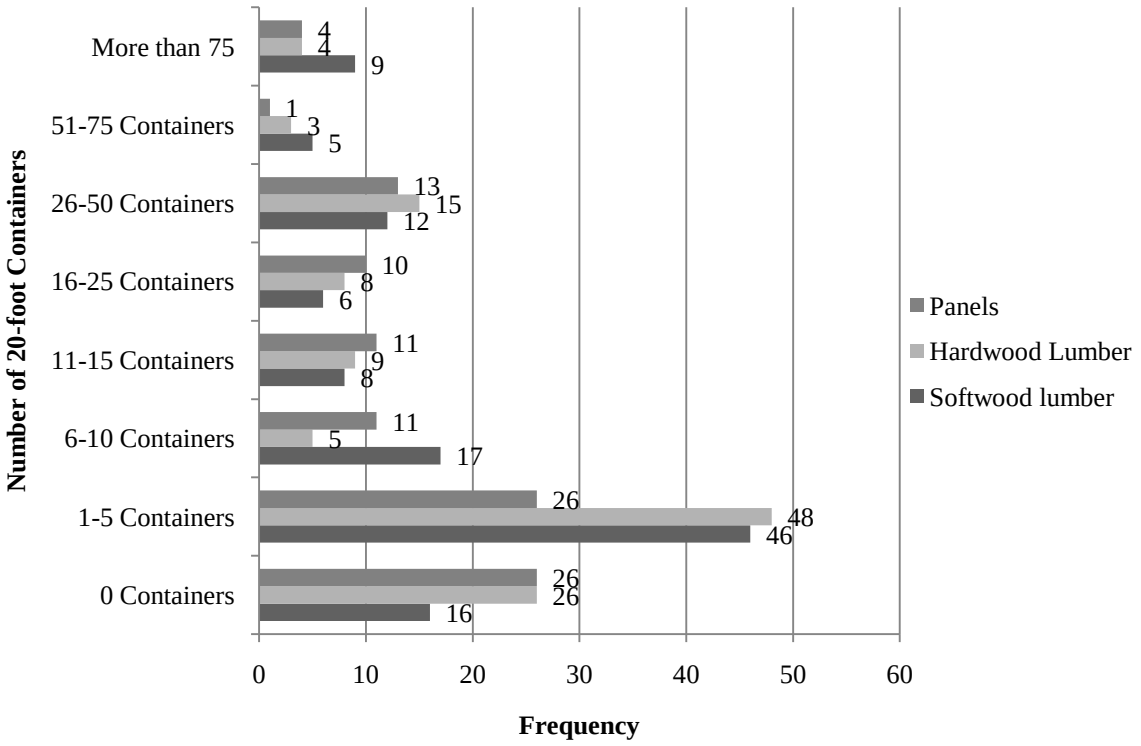

Figure 3.6 Number of 20-foot containers of hardwood, softwood lumber, and panels purchased in 2009 by respondents (n=102)

Respondents were asked about the wood products their company imported at the time of the questionnaire (Figure 3.7). Respondents stated the most frequently imported panels are plywood (12%), medium density fiberboard (10%), particle board (9%), and oriented strand board (8%). Ten percent of respondents import softwood lumber and 7% import hardwood lumber. Since the majority of manufacturers that responded are door manufacturers, there appears to be a high percentage of doors imported, as well as a high volume of veneer, lumber and panels used in the production of doors.

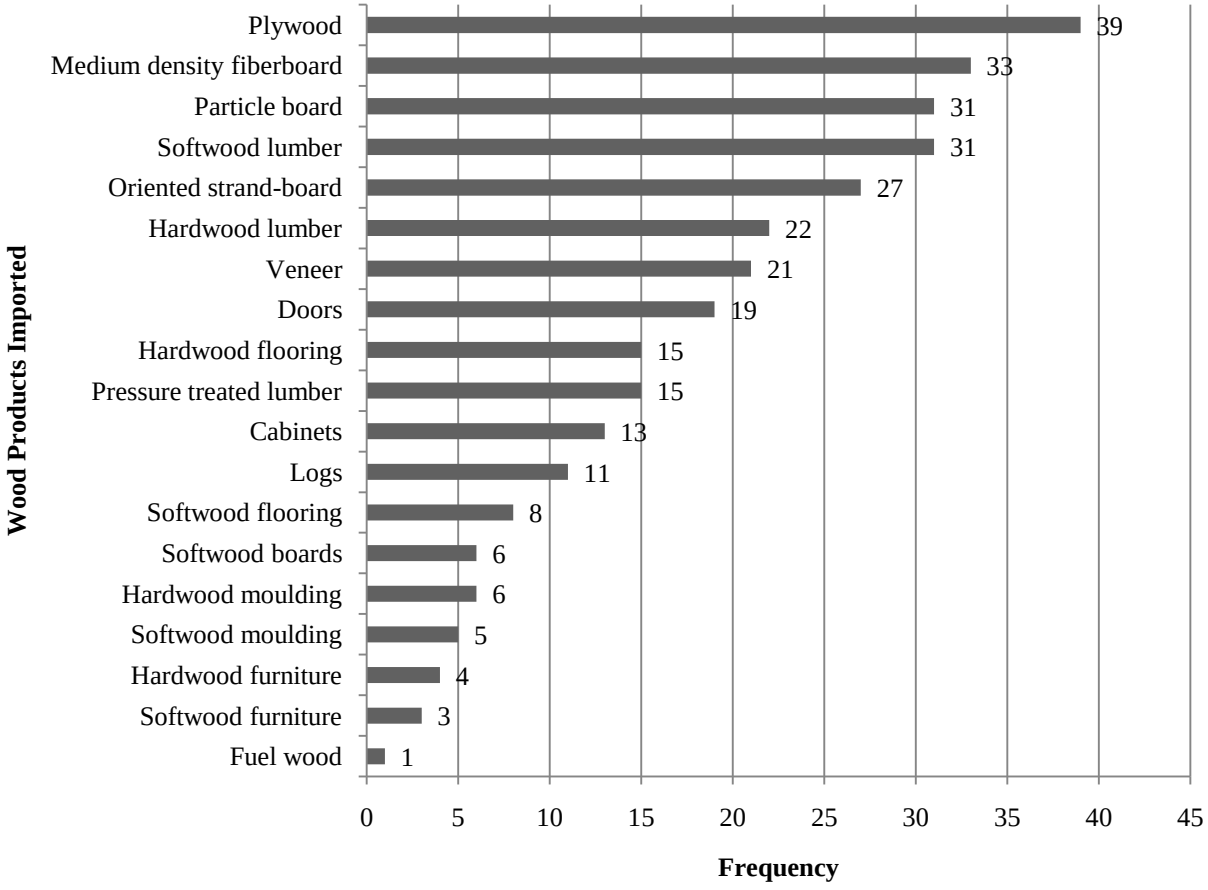

Figure 3.7 Number of imported wood products by respondents

Companies use the raw materials they purchase (i.e. panels, hardwood lumber, softwood lumber, logs, veneer) to produce doors, furniture, cabinets, flooring, moulding, and plywood (Figure 3.8). Some respondents reported that their company sells variety of products in their mix.

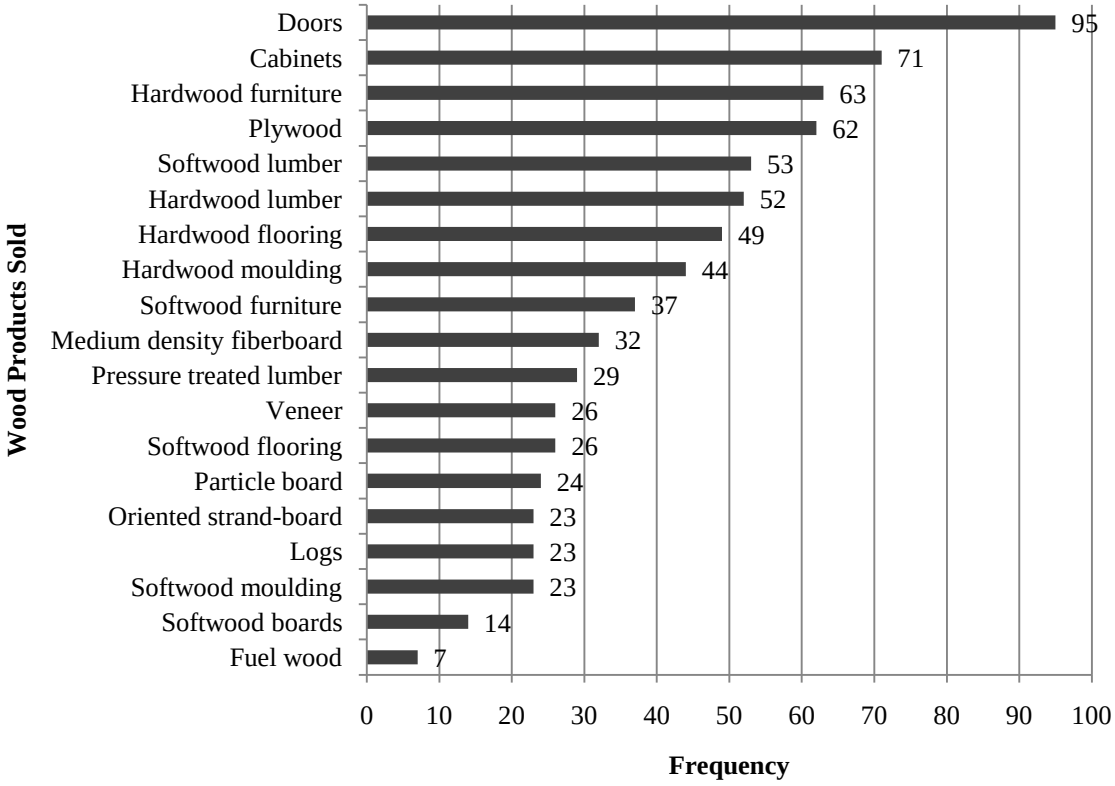

Figure 3.8 Products sold by respondents

3.3.2.2 Hardwood lumber preferences

Companies were asked about the thickness of hardwood lumber they purchase. Thirty percent of respondents purchase 1 inch (4/4) thick hardwood lumber, 26% purchase hardwoods 2 inches (8/4) thick, 15% purchase hardwoods 1.25 inches (5/4) think, 15% purchase hardwoods 1.5 inches (6/4) thick, and 14% purchase hardwoods 2.5 inches (10/4) thick (Figure 3.9). Some respondents stated the thickness of hardwood lumber purchased varied depending on the

customer or desired end product. The purchased hardwood lumber thicknesses ranged from 1/2 inch up to 10 inches.

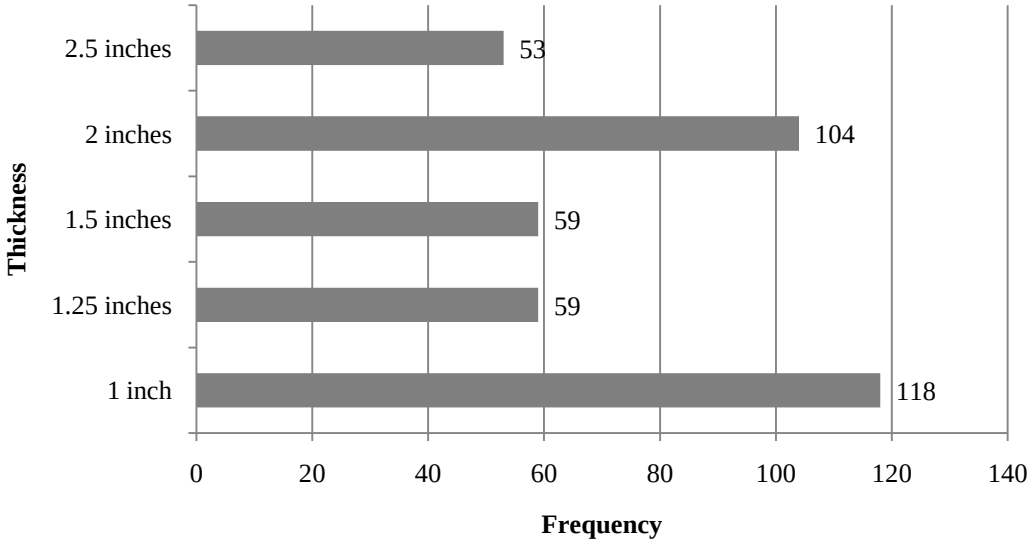

Figure 3.9 Purchased hardwood lumber thickness by respondents

Figure 3.10 shows respondents' color preferences for hardwood lumber. Dark brown (e.g. caobilla [*Swietenia humilis*], cenizaro [*Samanea saman*]) and white (e.g. gmelina [*Gmelina arborea*]) species were the most important hardwood color preferences indentified by the respondents. In Chapter 2, the researchers found that most furniture, flooring, ceilings, and wall panels were made with dark colored species. Kitchen cabinets were mostly made with lighter colored species that match light kitchen appliances. Red and light brown colors were ranked neither important nor unimportant; the importance varied equally among these two color preferences.

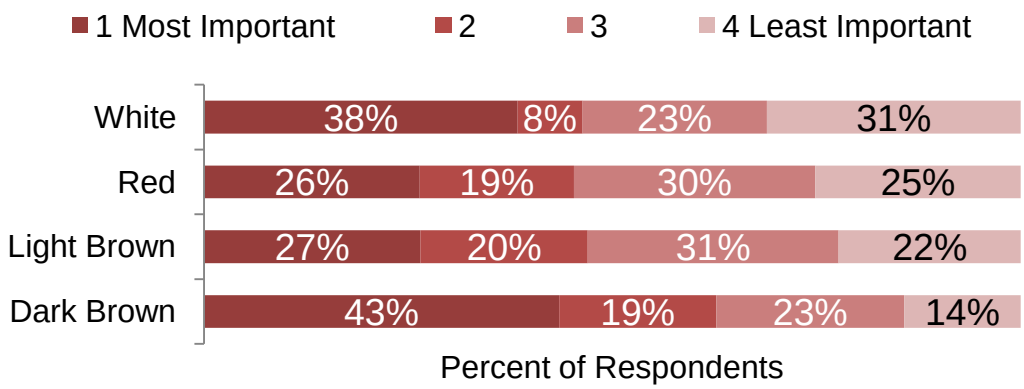

Figure 3.10 Purchased hardwood lumber color preferences by respondents (n=161)

3.3.2.3 Softwood Lumber and Board Dimensions

Companies were asked about what dimension of softwood lumber they purchased. The four most common sizes of softwood lumber purchased by companies were 2”x 4”-8’, 2”x4”-10’, 2”x 4”-12’, and 2”x 6”-12’. Typically these sizes are mainly used for frame building construction (Smith and Wood 1964). The companies typically purchased boards in the following dimensions: 1”x3”-10’, 1”x4”-12’, 1”x6”-10’, 1”x8”-12’, and 1”x10”-12’. From Chapter 2, the researchers found that softwood boards are typically used for furniture production in Central America.

3.3.2.4 Panel Dimensions

Companies were asked what thickness of panels they purchase. Twenty percent of respondents stated their companies primarily purchase panels ¼” (6mm) thick, 15% purchase panels 3/8” (9.5mm) thick, 13% purchase panels ¾” (19mm) thick, and 12% purchase panels ½” (12.5mm) thick (Figure 3.11). Fifty percent of the respondents purchase panels 4’x 8’ (1220 mm x 2440 mm) thick and 25% purchase panels 4’ x 10’ (1220 mm x 3050 mm) thick (Figure 3.12). The dimensions indicated by respondents tend to be the most common panel thicknesses purchased globally (Truini and Ingersoll 1984).

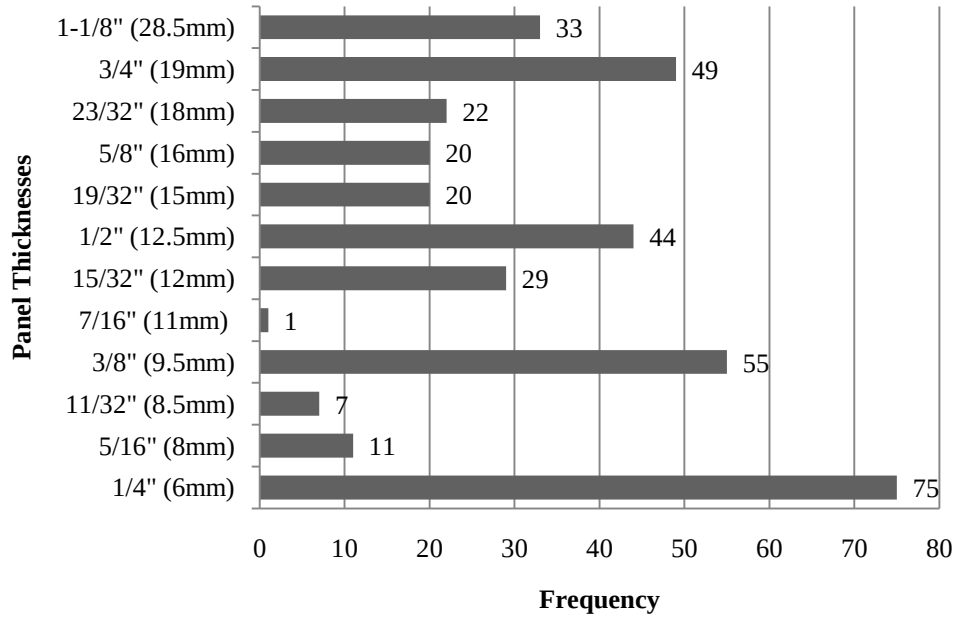

Figure 3.11 Panel thicknesses by respondents

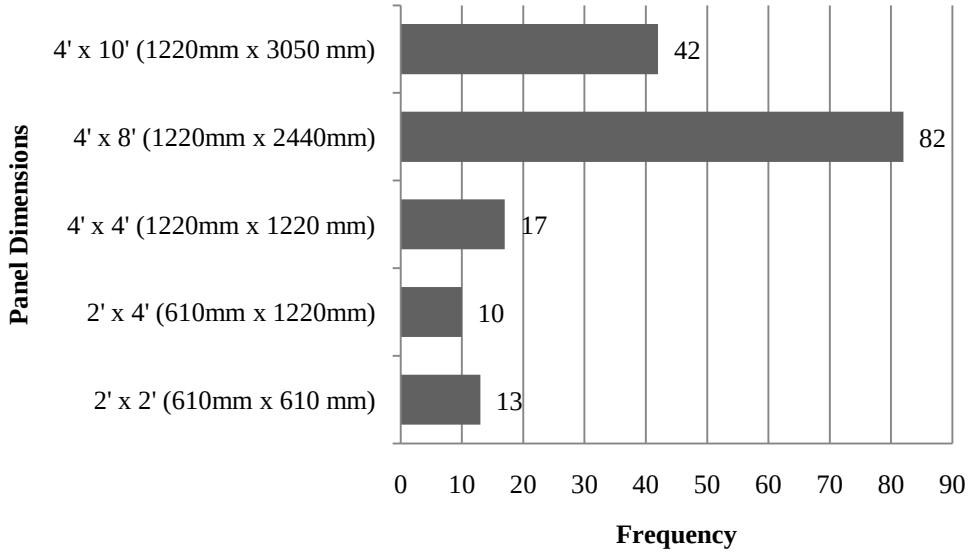

Figure 3.12 Panel dimensions by respondents

3.3.2.5 Demand of Future Appalachian Wood Products

Respondents were given a list of Appalachian wood products and a map of the Appalachian region. Respondents were asked to predict the future demand for wood products

from the Appalachian region. The respondents stated the three main products needed within the next 5 years were composite wood products, termite resistant lumber/panels, and certified forest products (Figure 3.13). Composite wood products may be needed for building construction and furniture production. Due to the high insect populations and humid climate conditions in Central America, respondents from Panama and Costa Rica believed that the use of termite resistant building materials will be needed in the future if wood frame construction increases over concrete and steel building construction. Environmental concerns have sparked interest in certified forest products in Central America. Respondents from Panama and Costa Rica feel that the demand for these products will increase in the near future as the environmental regulations and forest protection increases. Engineered wood products had the lowest predicted future demand. This predicted demand may have been low because the respondents are unaware of these products and their uses. The research found that most interviewees had low awareness and knowledge of engineered wood products.

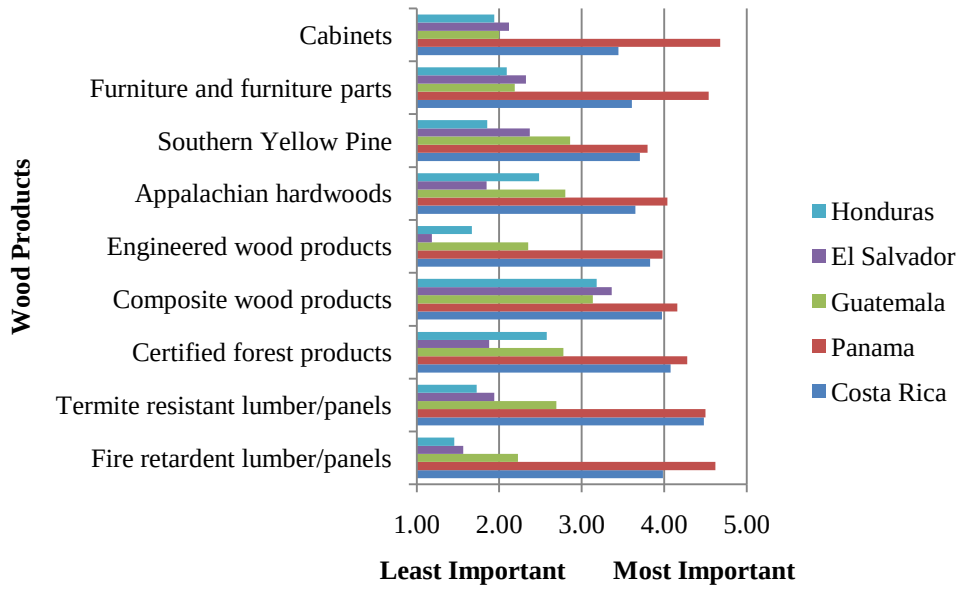

Figure 3.13 The predicted demand of Appalachian wood products within the next 5 years (n=203)

3.3.2.6 Information Gaining of New Imported Wood Products

Figure 3.14 shows the media forms that respondents' companies use to access information about new products imported to their country. Respondents reported that they generally obtained information on new products directly from the supplier. Internet websites and emails were also very useful for gaining knowledge on new imported wood products. The least useful method identified by respondents was advertising new products in newsletters. This lack of interest in newsletters may be due to the small number of customers reached by newsletters.

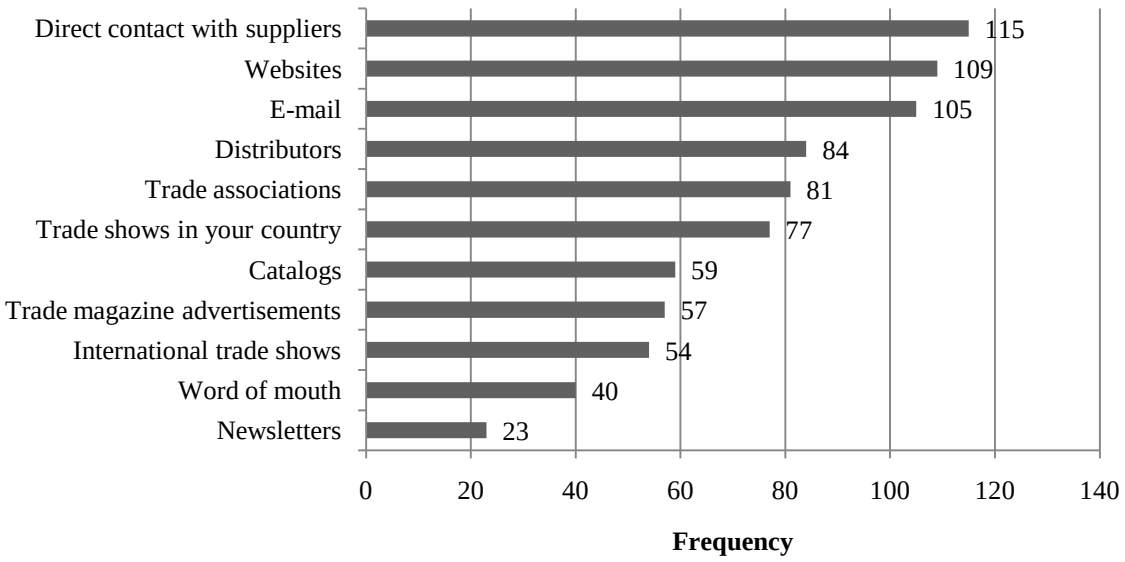

Figure 3.14 Information on new imported wood products by respondents

3.3.2.7 Frequency of Wood Product Orders Placed with Suppliers

Respondents declared they mainly buy wood products directly from the manufacturers and wholesalers (Figure 3.15). Governments and states were ranked last; this is an interesting finding since most of the forests are owned by the governments (Chapter 2).

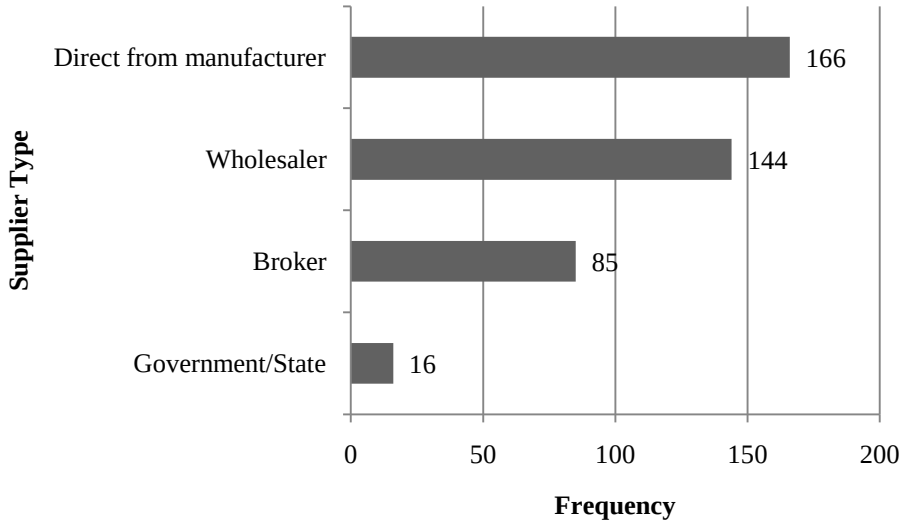

Figure 3.15 Supplier type by respondents

Primarily, orders for wood products are placed monthly by companies (Figure 3.16). Larger companies may order more frequently than smaller companies based on product demands.

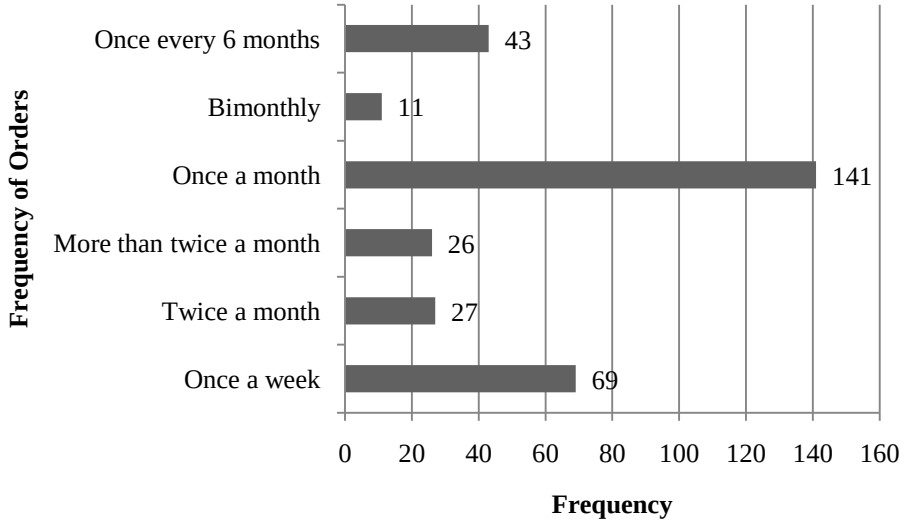

Figure 3.16 Frequency of orders placed by respondents

3.3.3 Price

Companies were asked how much they were willing to pay for Appalachian and certified forest products (Figure 3.17). Eighty-eight percent of the companies were not willing to pay an increased price on top of their current wood products. Only 7 companies (9 %) would pay a maximum of 10% more for Appalachian and certified forest products. Some respondents reported that their companies in El Salvador and Guatemala would pay up to 10% more for Appalachian wood products. One company in El Salvador would pay up to 15% for wood products; this high percentage of price may be a result of the shortage of a raw material to meet the growing demand for wood products in El Salvador.

Respondents' companies are not willing to pay more for certified forest products such as Forest Stewardship Council (FSC) and/or Programme for the Endorsement of Forest Certification (PEFC). Eighty-four percent of respondents were not willing to pay more for wood products than their current prices. Only 7 companies would pay a maximum of 10% more for certified forest products. Some companies in Costa Rica, Guatemala, and El Salvador were willing to pay up to 10% more for certified forest products. This increased willingness to pay may be due to strict environmental forest regulations in these countries.

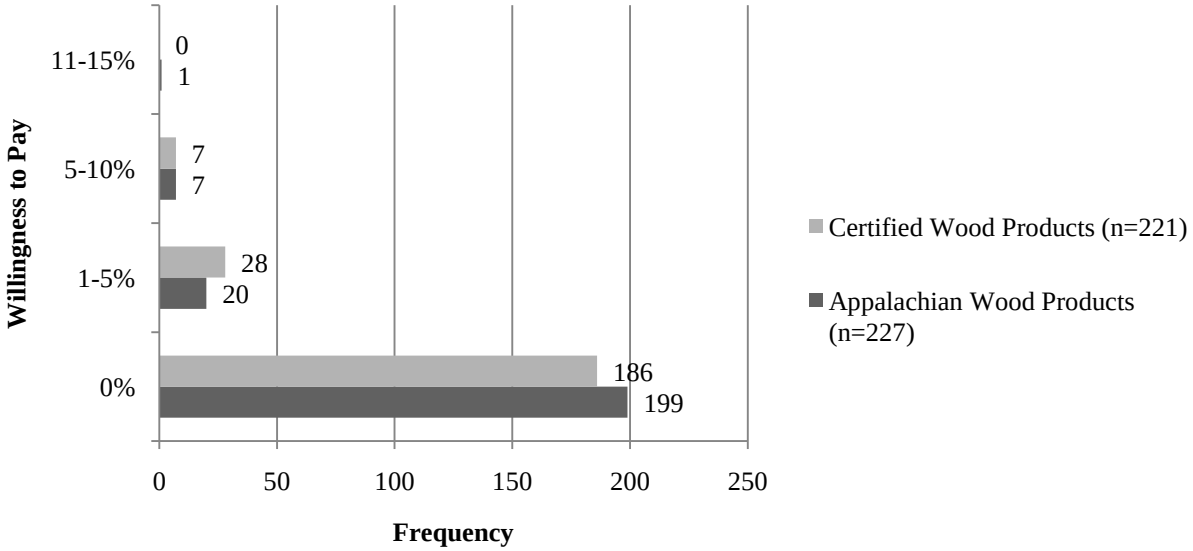

Figure 3.17 Willingness of respondents to pay for Appalachian and certified wood products

3.3.4 Suppliers Attributes

Respondents were asked to rate the supplier attributes desired when purchasing wood products on a five-point Likert scale. Respondents believed that most supplier attributes were important when purchasing wood products (Figure 3.18, Table 3.4). All the Central American countries surveyed provided consistent responses for *offering quality products*, *information sharing*, and *visits.* Panama and Costa Rica respondents indicated that *culture sensitivity* was

more important to them than El Salvador and Guatemala. The supplier attributes of most importance were *offer quality products, honesty, compromise, and communication.* Wood products companies look for suppliers that offer quality products. Buyers also look for suppliers who are honest and willing to work with buyers to reach a mutual agreement when selling. Buyers prefer that their suppliers communicate with them regularly to help maintain the buyer-seller relationship. Although all supplier attributes were believed to be important, the attribute rated the least important was *culture sensitivity*. Appalachian wood products companies should market products of good quality and priced competitively to be successful in Central American markets. Central American wood products buyers prefer Appalachian companies that frequently visit and share information with them on current and new products. Appalachian companies entering Panama and Costa Rica may need to educate themselves on Panamanian and Costa Rican culture in order to be successful in marketing wood products to them.

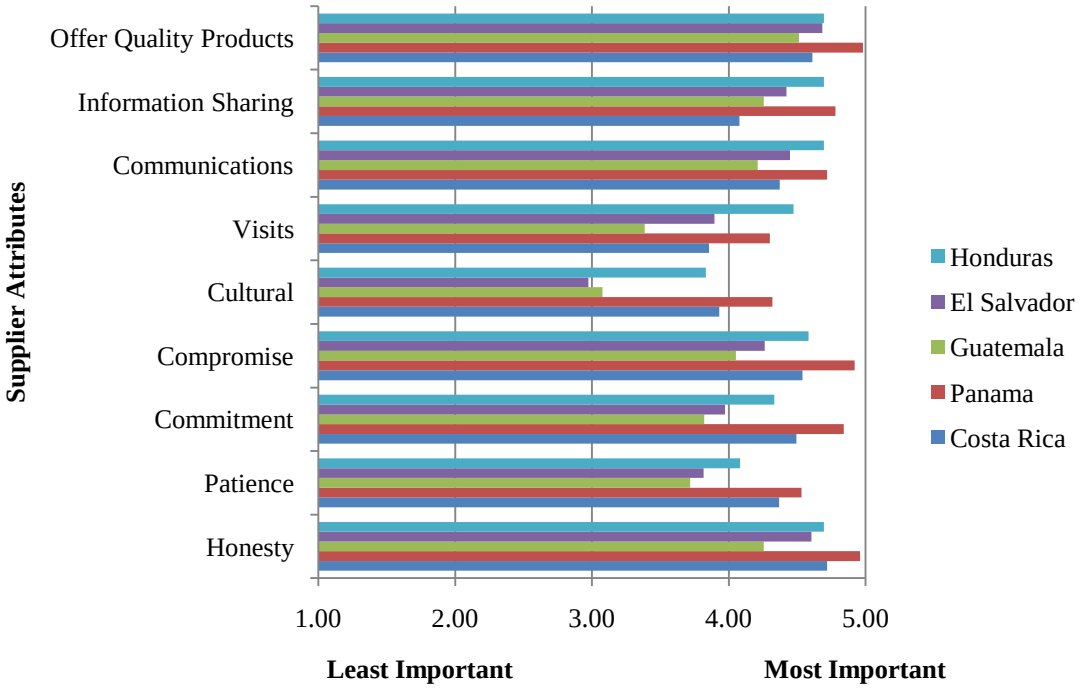

Figure 3.18 Supplier attributes by respondents (n=226)

Table 3.4 Mean responses to supplier attributes items. Values within each item with the same letter were not significantly different (P > 0.05) based on Tukey's multiple comparison tests.

Supplier Attributes	**Costa Rica** n=76	**Panama** n=50	**Guatemala** n=39	**El Salvador** n=38	**Honduras** n=36
Offer Quality Products	4.61A	4.98A	4.51A	4.68A	4.69A
Compromise	4.54AC	4.92B	4.05C	4.26AC	4.58ABC
Communication	4.37A	4.72B	4.21A	4.45AB	4.68AB
Information Sharing	4.08A	4.78A	4.26A	4.42A	4.69A
Commitment	4.49A	4.48A	3.82B	3.97B	4.33AB
Patience	4.37A	4.53A	3.72A	3.82A	4.08A
Honesty	4.72AB	4.96A	4.26B	4.61AB	4.69AB
Visits	3.86A	4.30A	3.38A	3.89A	4.47A
Culture Sensitivity	3.93A	4.32A	3.08B	2.97B	3.83AB

3.3.5 Product Attributes

Respondents were asked to rate product attributes desired when purchasing wood products on a 5-point Likert scale. Respondents thought most product attributes were considered important when purchasing wood products (Figure 3.19). All the Central American countries surveyed provided consistent responses for *product quality, price, volume discounts, and warranties on products* (Table 3.5). When purchasing wood products, respondents from Panama and Costa Rica believed that *environmentally certified* products were more important than Guatemala, Honduras and El Salvador. The highest rated product attributes were *product quality, price, on time delivery, volume discounts,* and *product warranty.* Products purchased need to be of good quality and priced competitively for Central American wood products companies to purchase from suppliers. Appalachian wood products suppliers need to be on time with deliveries in order to continue business with buyers. Companies would like suppliers to offer volume discounts on the amount of products they purchase; in other words, the more products the company purchases, the lower the price for each item. Companies prefer products that are backed with a warranty so if they are not satisfied, the products can be returned.

Although all product attributes were believed to be important, the product attributes with the lowest rating were *packaging* and *brand.* Central American wood products companies were not very interested in how the product was packaged. Brand is not particularly important to companies as long as the product is of good quality and competitively priced.

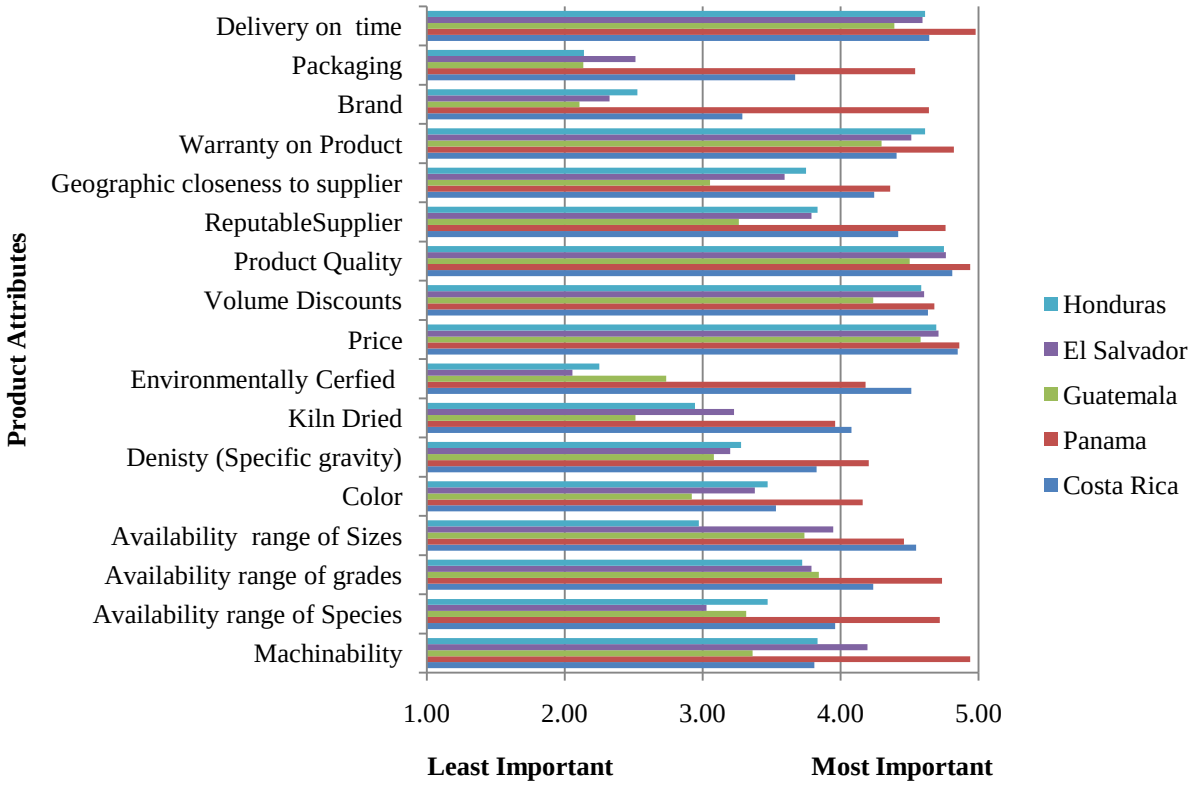

Figure 3.19 Importance of wood/wood product attributes (n=195)

Table 3.5 Mean responses to product attributes items. Values within each item with the same letter were not significantly different (P > 0.05) based on Tukey's multiple comparison tests.

Product Attributes	Costa Rica n=76	Panama n=50	Guatemala n=37	El Salvador n=37	Honduras n=36
Product Quality	4.81A	4.94A	4.50A	4.76A	4.75A
Price	4.85A	4.86A	4.58A	4.71A	4.69A
Delivery on time	4.64A	4.98A	4.39A	4.59A	4.61A
Volume Discounts	4.63A	4.68A	4.24A	4.61A	4.58A
Warranty on product	4.41A	4.82A	4.30A	4.51A	4.61A
Availability of a range of grades	4.24A	4.73B	3.84A	3.79A	3.72A
Reputable supplier	4.42A	4.76A	3.26B	3.79C	3.83C
Availability of a range of sizes	4.55A	4.46AB	3.74C	3.95BC	2.97D
Machinability	3.81A	4.94B	3.36A	4.19A	3.83A
Geographic closeness to supplier	4.24A	4.36A	3.05A	3.59A	3.75A
Availability of a range of Species	3.96A	4.72B	3.32C	3.03C	3.47AC
Density	3.83A	4.20A	3.08B	3.20B	3.28B
Color	3.53A	4.16C	2.92B	3.38AB	3.47AB
Kiln-dried	4.08A	3.96AC	2.51BC	3.23B	2.94ABC
Environmentally certified	4.51A	4.18A	2.74B	2.06B	2.25B
Packaging	3.67A	4.54A	2.14B	2.51B	2.14B
Brand	3.29A	4.64B	2.11C	2.32C	2.53C

3.3.6 Retailer/Manufacturer Promotion Strategy

Respondents were asked to rate the importance of retailers' or manufacturers' promotional strategies for selling wood products to the end consumer on a 5-point Likert scale (Figure 3.20). All the Central American countries surveyed provided consistent responses for personal selling (Table 3.6). When selling wood products, respondents from Panama and Costa Rica believed that *trade shows, sales and product discounts, word of mouth* and *attractive display racks* were more important media for promoting products than Guatemala, Honduras and El Salvador. Overall, respondents believed that *personal selling, sales* and *products discounts,* and *point of purchase product literature* were the most important promotional strategies. Respondents believed advertisement in *magazines and newspapers,* and *radio and television*

commercials were the promotional strategies of lowest importance for selling wood products to the end consumer. Results suggest that end consumers prefer personal contact (e.g., visiting a store and talking to a sales representative about a product) when looking for wood products to meet their needs.

Figure 3.20 Importance of retailer/manufacturer promotion strategy (n=204)

Table 3.6 Mean responses to retailer/manufacturer promotion strategy items. Values within each item with the same letter were not significantly different (P > 0.05) based on Tukey's multiple comparison tests.

Retailer/Manufacturer Promotion Strategy	Costa Rica n=66	Panama n=50	Guatemala n=39	El Salvador n=38	Honduras n=36
Personal Selling	4.68A	4.82A	4.49A	4.53A	4.69A
Trade Shows	4.14A	4.20A	2.69B	3.06B	2.67B
Magazines	3.14A	3.35A	2.39AB	2.47AB	2.33B
Radio Commercials	2.86A	3.12A	1.89B	2.14B	1.81B
TV Commercials	2.70A	3.88A	1.79B	1.86B	1.33B
Advertisement in local newspaper	3.17A	3.58A	2.11B	2.73AB	2.44B
Advertisement in store flyer	4.03AC	4.54A	2.74B	3.63AC	3.17BC
Store website	3.28AC	4.46B	2.90AC	2.78AC	2.31C
Attractive display rack	4.57A	4.72A	3.03B	3.53B	3.36B
Point of purchase product literature	4.69A	4.72A	3.48B	4.18A	3.78AB
Sales and product discounts	4.74A	4.66A	3.88B	4.08B	3.97B
Word-of-mouth	4.88A	4.96A	2.79B	3.39B	2.83B

3.3.7 Supplier Promotion Strategy

Respondents were asked to rate the importance of promotion strategies of suppliers when companies are purchasing wood products on a 5-point Likert scale (Figure 3.21). Respondents believed that *personal selling* was important for suppliers to use when selling wood products to retailer and manufacturers (Figure 3.21 and Table 3.7). Personal selling allows the salesperson to develop and maintain a relationship with the customer. The promotion strategies of lowest importance to suppliers were advertisements in *local newspapers* and *trade shows*. Promoting products at trade shows was found to be more important for Costa Rica than the other countries, possibly because the other countries have few trade shows to promote products. The reason why newspapers may be a poor promotion strategy is their readership continues to decline with the introduction of the internet and newspaper websites (Perez-Pena 2008).

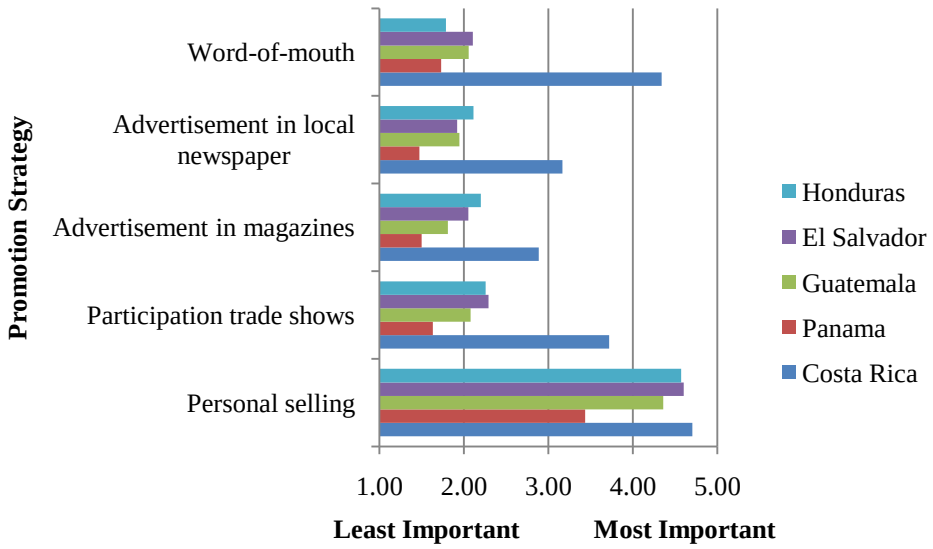

Figure 3.21 Importance of supplier promotion strategies (n=192)

Table 3.7 Mean responses to supplier promotion strategy items. Values within each item with the same letter were not significantly different (P > 0.05) based on Tukey's multiple comparison tests.

Supplier Promotion Strategy	**Costa Rica** n=61	**Panama** n=38	**Guatemala** n=37	**El Salvador** n=39	**Honduras** n=35
Personal Selling	4.70A	3.44B	4.36A	4.60A	4.57A
Participation in trade shows	3.72A	1.63B	2.08B	2.29B	2.26B
Advertise in magazines	2.89A	1.50A	1.81A	2.05A	2.20A
Advertise in local newspaper	3.16A	1.47B	1.95B	1.92B	2.11B
Word-of-mouth	4.34A	1.73B	2.06B	2.11B	1.79B

3.3.8 Barriers

Respondents were asked to rate the importance of potential barriers to importing Appalachian forest products on a five-point Likert scale. Companies believed that most potential barriers were important when importing wood products (Figure 3.22, Table 3.8). All the Central American countries surveyed provided consistent responses for *transportation and logistics, price, delivery time, language, quality of Appalachian wood products, U.S. government and international policies, lack of agents and brokers*. Respondents from Panama indicated that past

experience of purchasing from the Appalachian region was more important to them than the other countries. The most important potential barriers to importing from the Appalachian region were *price, delivery on time, payment methods,* and *transportation and logistics.* Chapter 2 supports the finding that Appalachian companies need to be competitively priced with Chilean wood products companies when marketing wood products to Central America. The barrier of lowest importance was *language barrier.* Most large Central American wood products companies have employees that can speak English and translator services are available for companies expanding globally, so this barrier may seem less important to Central American companies.

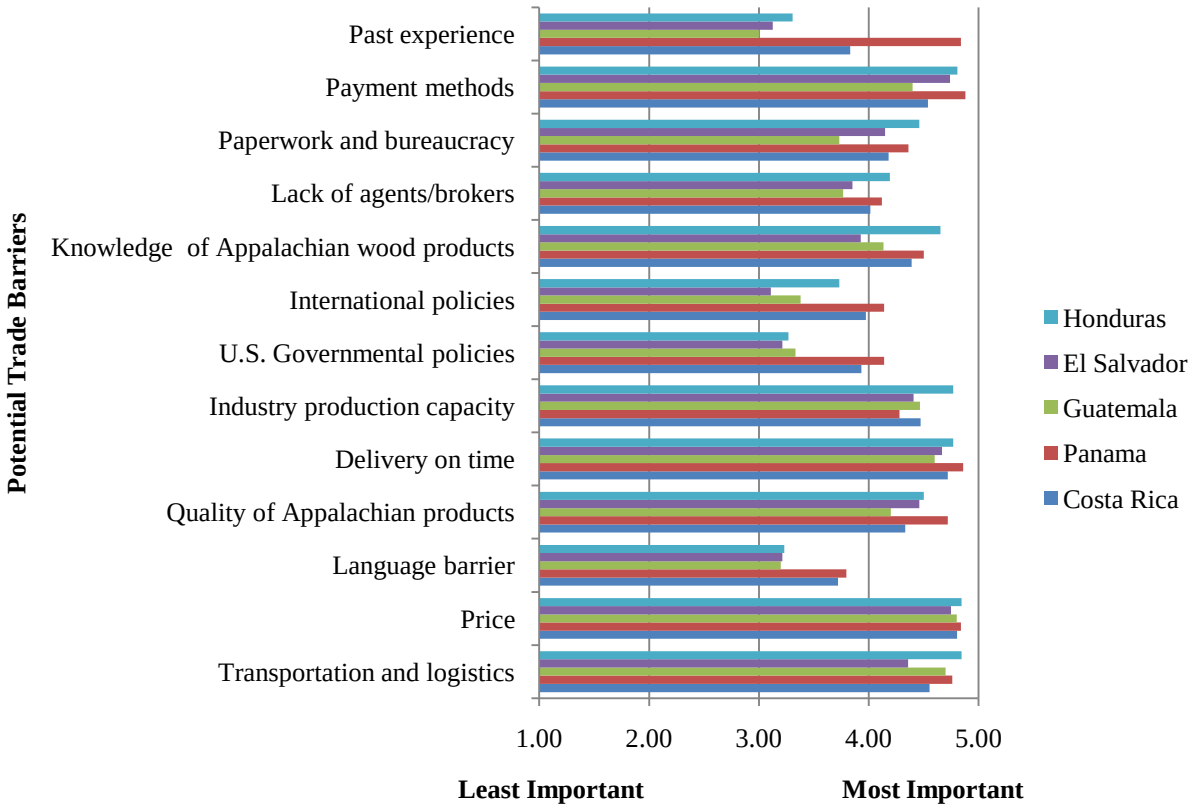

Figure 3.22 Importance of potential barriers for Appalachian forest products by respondents (n=168)

Table 3.8 Mean responses to barrier items. Values within each item with the same letter were not significantly different (P > 0.05) based on Tukey's multiple comparison tests.

Barriers	**Costa Rica** n=74	**Panama** n=50	**Guatemala** n=30	**El Salvador** n=27	**Honduras** n=26
Transportation and logistics	4.55A	4.76A	4.70A	4.36A	4.85A
Price	4.81A	4.84A	4.80A	4.75A	4.85A
Language barrier	3.72A	3.80A	3.20A	3.21A	3.23A
Quality of Appalachian products	4.33A	4.72A	4.20A	4.46A	4.50A
Delivery on-time	4.72A	4.86A	4.60A	4.67A	4.77A
Industry production capacity	4.47A	4.28A	4.47A	4.41A	4.77A
U.S. Government policies	3.93A	4.14A	3.33B	3.21B	3.27B
International policies	3.97AB	4.14A	3.38AB	3.11B	3.73AB
Knowledge of Appalachian wood products	4.39A	4.50A	4.13A	3.93A	4.65A
Lack of agents/brokers	4.01A	4.12A	3.77A	3.85A	4.19A
Paperwork and bureaucracy	4.18A	4.36A	3.73A	4.15A	4.46A
Payment methods	4.54A	4.88A	4.40A	4.74A	4.81A
Past experience	3.83A	4.84B	3.00A	3.13A	3.31A

3.3.9 Company Performance

Respondents were asked to rate how well their company performed within the last 5 years on a 5-point Likert scale. Respondents believed their companies performed well in the last 5 years (Figure 3.23, Table 3.9). The top measures for company performance were *product quality, customer satisfaction, and competitive price.* All the Central American countries surveyed provided consistent responses for *number of orders received*, *profits*, *sales*, *competitive price*, *costs*, *customer satisfaction*, *product quality,* and *supplier relationship*. These measures were high because companies aim to purchase quality products at a competitive price to meet the needs of their customers. Companies felt the lowest performance attribute was in the *employee*

turnover rate. Employee turnover rate may be higher than desired because of the global economic crisis and the amount of employees laid off due to a decrease in product demand. Respondents from Panama and Costa Rica agree slightly more that their companies performed better in employee turnover and employee satisfaction than the other countries over the past 5 years.

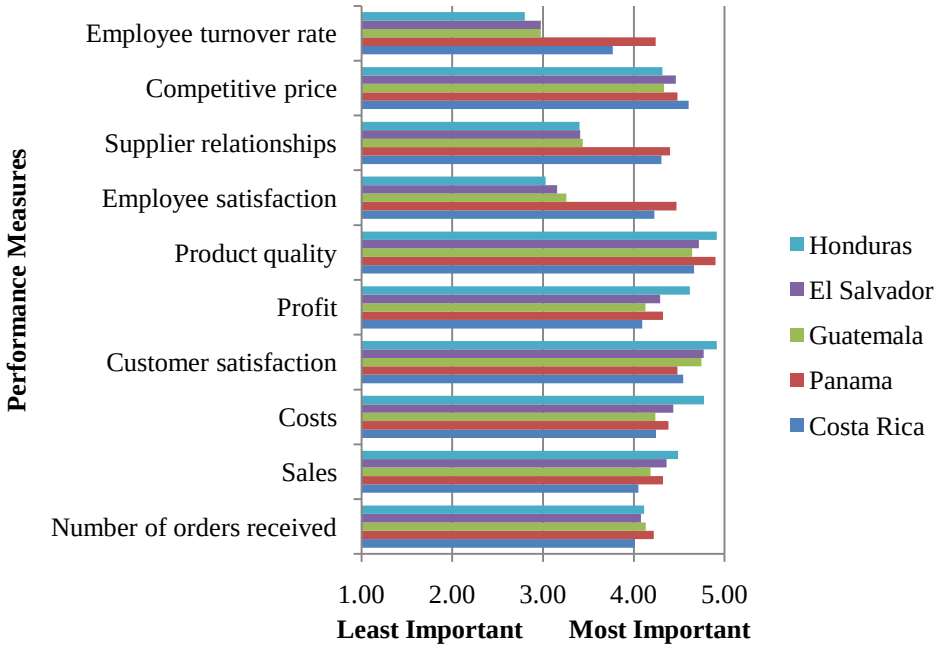

Figure 3.23 Company performance in the last 5 years by respondents (n=228)

Table 3.9 Mean responses to company performance items. Values within each item with the same letter were not significantly different (P > 0.05) based on Tukey's multiple comparison tests.

Company Performance	Costa Rica n=78	Panama n=50	Guatemala n=39	El Salvador n=39	Honduras n=35
Number of orders received	4.01A	4.22A	4.13A	4.08A	4.11A
Sales	4.05A	4.32A	4.18A	4.36A	4.49A
Costs	4.24A	4.38A	4.24A	4.44A	4.77A
Customer satisfaction	4.55A	4.48A	4.74A	4.77A	4.91A
Profit	4.09A	4.32A	4.13A	4.29A	4.62A
Product quality	4.66A	4.90A	4.64A	4.72A	4.91A
Employee satisfaction	4.23A	4.47A	3.26B	3.15B	3.03B
Suppliers relationship	4.30A	4.40A	3.44B	3.41B	3.40B
Competitive price	4.60A	4.48A	4.33A	4.46A	4.31A
Employee turnover rate	3.77A	4.24A	2.97B	2.97B	2.80B

3.4 Discussion and Conclusions

The results indicate that Appalachian wood products may be suitable alternatives for wood products currently used in Central America. Generally, responding companies purchased a small amount of wood products in 2009, usually less than 5 containers. Companies predicted that there will be neither a high nor low demand for Appalachian wood products in the future. Respondents from the survey indicated that darker colored hardwood species are preferred used in furniture and interior applications within the home. Therefore, Appalachian hardwood companies may try to market darker colored hardwood species such as black cherry *(Prunus serotina)* and black walnut *(Juglans nigra).* White colored hardwood species were found to be desirable in kitchen applications. Appalachian light colored species such as maples *(Acer spp.)* and oaks *(Quercus spp.)* may be a substitute for the species currently being used in Central America. In Chapter 2, the researchers found that most furniture, flooring, ceilings, and wall

panels were made with dark colored species. In a previous market study of Mexican forest products, it was found that lighter color species such as red oak, white oak, hard maple, poplar and ash from the Appalachian region are used in solid furniture production (Parhizkar 2008). The high volume of light colored hardwood species imported to Mexico from the U.S. is mainly because Mexico is one of the top exporters of wood furniture to the U.S., and U.S. customers tend to prefer light colored wood species (Schuler et al. 2001).

Within the next five years, the need for certified forest products and composite wood products may increase with new laws enforcing environmental regulations. Composite wood products are generally manufactured from recycled or recovered wood waste, which decreases the need for harvesting additional forest. Also, termite resistant lumber/panels may be needed now and in the future in Central America because of the high population of wood deteriorating insects.

Appalachian wood products companies may need to market quality wood products at prices that are competitive with other countries that sell to Central American companies (Table 3.10). Most of the wood products are purchased from Chile and neighboring Central American countries because products are made of high quality and priced very competitively. Companies indicated they preferred doing continuous business with suppliers that met delivery times, and neighboring countries are in close proximity to meet the demand.

Table 3.10 Market strategy for Appalachian wood products companies

	Costa Rica	Panama	Guatemala	El Salvador	Honduras
Product	Quality				
	Brand				
	Environmental Certified				
	Kiln Dried				
	Availability of Sizes				
	Availability of Grades				
	Availability of Species				
Promotion	Personal Selling				
	Point of Purchase Product Information				
	Warranty on Products				
	Attractive in Store Display Racks				
	Sales and Products Discounts				
	Trade Shows				
	Word-of-mouth				
Place	Wholesalers				
	Direct with Manufacturer				
Price	Competitive with Current Imports				

In order to market products to Central American companies, the most successful promotional strategy identified by respondents was personal selling (Table 3.10). Appalachian wood product companies need to take time and personally visit companies to promote products with potential customers in Central America. This will give buyers in Central America a better understanding of Appalachian wood products and their applications. To be successful in

marketing Appalachian wood products to retailers in Central America, companies may need to offer point-of-purchase product literature in Spanish to help market products to end-use customers. It was found that sales and volume discounts may be important when offering products to end-consumers in Panama and Costa Rica (Table 3.10). Parhizkar (2008) found that one of the largest barriers for U.S. forest products companies exporting to Mexico is the lack of knowledge Mexican customers had of U.S. wood products. U.S. companies may feel that, due to their geographic closeness to Mexico, they do not have to be as aggressive in marketing and strengthening their relationships with Mexican companies. However, competition from other countries such as Chile, Brazil, and China have penetrated the market and are successful in marketing wood products to Mexican consumers from a further distance. This situation may also be occurring with U.S. wood products companies; they may not be exerting enough marketing effort to successfully enter the Central American market.

Although all supplier attributes were believed to be important, the attribute rated the least important was culture sensitivity. This attribute may be of less concern because most of the suppliers are from other Latin American countries with similar cultures. ANOVA suggests Panama and Costa Rica believe suppliers that are sensitive to their culture were more important than other countries. Appalachian wood products companies trying to enter these countries may need to take time and learn the culture in order to be successful in marketing. Parhizkar (2008) found that U.S. wood products companies exporting to Mexico and Asia were not satisfied with their primary distribution partner regarding the amount of visits, information sharing, compromise, and commitment. However, companies exporting to Asia, Mexico, and Europe were more satisfied with their distributors regarding honesty, communication, and patience. Many of the companies surveyed were small and had few resources to allocate toward

researching into product mix. The companies had limited knowledge of engineered wood products and their applications. Therefore, Appalachian wood products companies need to provide technical information and samples to these companies to educate them about specialty wood products. Respondents from Panama and Costa Rica believed kiln dried lumber was more important to them than other countries. Appalachian wood products firms may want to promote kiln dried lumber to the other Central American countries and raise awareness of the benefits and advantages of these products.

Brand is not particularly important to companies as long as the product is of good quality and competitively priced. A similar market study in Mexico found that competitive prices and product packaging were important factors to exporting (Parhizkar 2008). Wood products from Chile have been found to be very competitive with regard to price and quality as reported by Central American wood products importers. Over the last decade, Chilean wood products imports have increased in Mexico because of better price and quality over competitive countries such as the U.S. and Canada (Parhizkar 2008). Currently, Central American wood products companies primarily purchase wood products from Chile.

Companies in Central America generally are not willing to pay a premium for Appalachian or certified wood products. Respondents from Costa Rica and Panama believed certified wood products were more important to them than other countries. To be successful in Central America, Appalachian companies may try to promote certified forest products to Costa Rica and Panama. Parhizkar (2008) found that most U.S. wood products companies were more successful if they shipped directly to their final customer in Mexico. Shipping wood products directly to the final customer in Central America may be a problem since U.S. wood products companies do not have a thorough understanding of the Central American wood products market

in the past. Appalachian wood products firms may need to partner with local distributors in order to successfully market products to Central American customers (Table 3.10). Appalachian wood products exporters can be competitive by offering products that are similarly priced to products currently purchased and partnering with local wholesalers. By partnering with local wholesalers, small wood products firms in Central America may be able to purchase smaller amounts of wood products from the Appalachian region. Because the forest products industry in the Appalachian region offers products that are similar to those currently used in Guatemala, El Salvador, Nicaragua, Honduras, Costa Rica, and Panama, they have a unique opportunity to expand their markets into Central America.

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Chapter 4. Success Factors in Marketing Appalachian Forest Products to Central America

4.1 Summary

The purpose of this Chapter was to characterize different factors that affect marketing of Appalachian wood products into Central America. A conceptual model was developed based on preliminary studies and applied to the survey of perceptions of wood products retailers and manufacturers from Central America regarding supplier attributes, product attributes, retailer/manufacturer promotion strategy, supplier promotion strategy, potential importing barriers, and company performance (see Chapter 3). Cronbach's alpha and factor analysis were used to validate the data. The results of factor analysis suggested meaningful groupings within many of the constructs, including factors such as product attributes, purchasing attributes, and supplier services. Two hypothetical models were developed and the relationships were tested for significance using ANOVA and multiple regression analyses. Barriers were found to positively affect company performance and supplier attributes. These constructs may be important to consider when Appalachian wood products companies are interested in exporting to Central American countries. Appalachian wood products companies need to invest resources and work to overcome barriers in order to be successful exporters to Central America.

4.2 Introduction

To strengthen the economy, the wood products industry in the Appalachian region must engage in international marketing (Hammett 1996). Exporting wood products offers many advantages for firms entering the global market, such as increased profits and credit, market growth, and economic strength (Parhizkar 2008; McMachon and Gottko 1989).

Forest products industry export studies have identified several factors that impact the successful export of products. Ifju and Bush (1993) suggested that small, domestically oriented

companies view themselves as non-exporters, but they still have the potential to export. Many non-exporting companies are trying to enter a global market but are unable to because of lack of market information regarding product specifications and distribution channels (Ifju and Bush 1993). Ringe et al. (1987) found that Kentucky hardwood lumber exporters invested in global market information and built long-term relationships with overseas customers, resulting in greater success with exporting products overseas. Overall, lack of market information is a main barrier for potential exporters of forest products overseas. A 2002 study of Appalachian hardwood lumber exports (Parsons 2002) showed that the lack of employee manpower and production limitations did not significantly affect exporting, but the need for marketing information was a major hurdle for companies.

Importing forest products into Central America may be necessary to meet the growing demand for building materials because of an increase in population, tourism, and deforestation (Fallas 2008, Rogers 2009; World Bank 2010; Montagnini et al 2002). Research suggests that United States forest products companies have not exerted enough effort into marketing forest products in Central America. In the past few years, the Appalachian region has suffered from the economic crisis, including forest product mill closures and loss of employment due to an increase in global competition. The region may need to increase product competitiveness by expanding export markets and improving product promotion (Wang et al. 2010). Therefore, the objective of this chapter is to characterize different factors that affect marketing of Appalachian wood products into Central America. The results from this research may help to guide Appalachian wood products companies that are interested in exporting to Central American countries.

4.3 Methodology

The Likert scale items describing marketing constructs (e.g., supplier promotion strategy, product attributes, retailer/manufacturer promotion strategy, company performance, supplier attributes) from the results of the personal surveys (Chapter 3) were compiled and descriptive statistics were analyzed. Cronbach's alpha and factor analysis were used to check the reliability and validity of the data (Figure 4.1). Reliability involves getting the same results if the survey is conducted with similar populations (DeVillis 2003). Validity measures whether the questionnaire addressed the constructs the research is targeting (DeVillis 2003). Both these items are good criteria to assess measurement quality.

Review of literature, case studies, and surveys acted as the foundation to formulate factors, research hypotheses, and the proposed conceptual model (Figure 4.1). The method of data collection for this research was the contracted personal survey of Central American wood product retailers/manufacturers described in Chapter 3. Other international marketing studies were consulted to determine what attributes to consider in the survey and the conceptual model (Cossio 2007; Parhizkar 2008). The survey focused on supplier attributes, product attributes, retailer/manufacturer promotion strategy, supplier promotion strategy, potential importing barriers, and company performance. In the previous chapter, descriptive statistics for all marketing attributes (e.g., product attributes, retailer/manufacturer promotion strategy) of the survey were used to identify market drivers and barriers for the sale of Appalachian wood products in the Central American market. In this chapter, the data points from the individual responses from the marketing attributes were also used to validate and test the proposed hypothesized models.

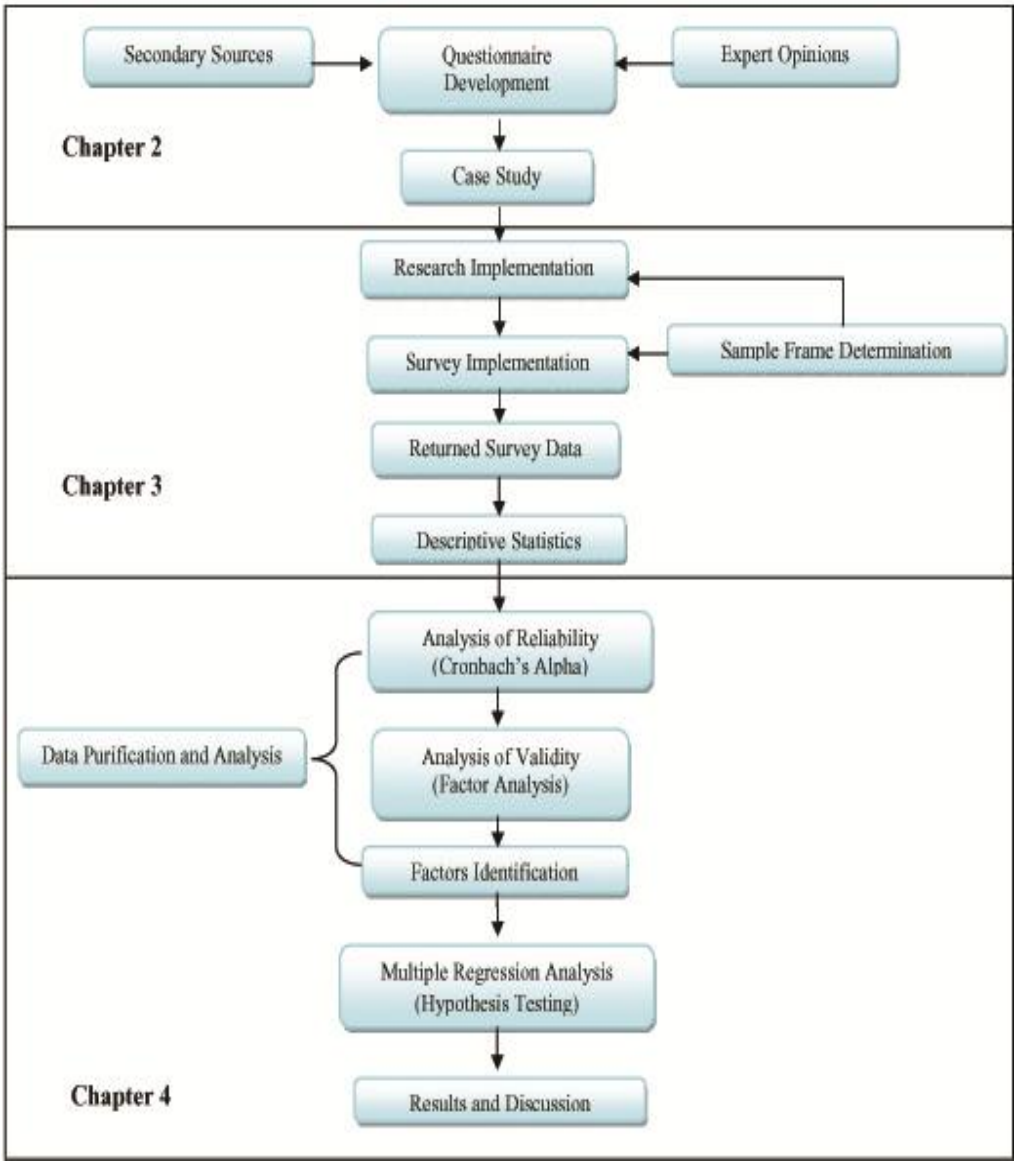

Figure 4.1 Research methodology. Items pertinent to each chapter are shown.

The hypothesized models of factors that predict company performance and supplier attributes were evaluated using Cronbach's alpha, factor analysis, ANOVA, and multiple linear regressions (Figure 4.1). The research used Cronbach's alpha to examine the internal consistency of items and how they relate to the overall construct. Factor analysis was performed to verify items and how they related to the constructs. These two methods were used to check

the validity of the data, or the ability of the researchers to measure the constructs that they intend (Babbie 2010). The two hypothesized models from the conceptual model were developed beforehand and were then tested for significant relationships using ANOVA and multiple regression analyses. The alpha level of 0.05 was used providing 95% confidence in the results. All statistics were analyzed using SPSS® and SAS®.

4.3.1 Data Analysis

4.3.1.1 Validation of Internal Consistency and Structure of the Data

Cronbach's alpha was used to examine the internal consistency of items within each construct (Lattin et al. 2003). Cronbach's alpha ranges from 0-1; generally, a value of 0.7 or higher is considered acceptable internal consistency and a value of 0.9 or higher is considered very good internal consistency (Lattin et al. 2003). Cronbach's alpha is calculated as follows:

$$\alpha = k\bar{r}/[1 + (k-1)\bar{r}]$$

Where: k= number of items, and $\bar{r} =$ the average inter-item correlation among k (Lattin et al. 2003)

Factor analysis was performed to validate the data and to test the constructs in the survey design. Factor analysis identifies patterns of association within the data to determine a factor solution and is a data reduction technique to see if fewer factors can describe the data well (Lattin el al 2003), which can be helpful in preparing data for multiple regression analysis. Principle components and orthogonal rotation (Varimax) were used as part of the factor analysis procedure to standardize the data, to achieve a more simple structure through data reduction, and help the researchers interpret the results (Lattin et al. 2003). When conducting factor analysis, the number of factors to retain is usually determined by identifying eigenvalues greater than 1 which contribute significantly to the variance explained by the factor pattern. The researchers

then identified which items or variables "load" heavily on each of the factors. Some sources suggest that a general rule is that a factor loading of 0.40 or higher is acceptable (Lattin et al. 2003; DeVellis 2003). The next step is to label each factor as a construct to describe the series of items that load heavily on that factor (Lattin et al. 2003). The original data and new factor pattern were used then to calculate factor scores that project the data under the new, simpler factor pattern.

4.3.1.2 Hypothesis Testing and Regression

In order to understand the factors that affect marketing of wood products to Central America, a conceptual research model describing findings from the literature was developed prior to this research, similarly to other research studies (Li, 2002; Lee, 2009; Sanchez 2011; (Figure 4.2). In the following sections, the conceptual research model is explained, as well as research hypotheses, data purification and analysis, and hypotheses testing of the significance of factors. All of the hypotheses are shown in the conceptual model in Figure 4.2.

A) Research hypothesis 1 (Product Attributes and Company Performance)

Product Attributes determine if the product will be purchased by a consumer. If the customer expectations of the product are met, then they will likely make a re-buy from the supplier increasing their performance (Swan and Combs 1976). This leads to the following hypothesis:

H_1: Product Attributes affect the product offered to consumers, causing a positive impact to Company Performance.

B) Research hypothesis 2 (Suppliers and Company Performance)

The relationship between suppliers and buyers must be successful to increase mutual profits (Anderson and Weitz 1992). Communication, cultural sensitivity, commitment and patience were discovered to be important factors in developing a long-term

relationship between buyers and sellers (Robicheaux and Coleman 1994; Olsen and Ellram 1997; Leonidou et al. 2006). This leads to the following hypothesis:

H_2: Suppliers affect the marketing plan, causing a positive impact to Company Performance.

C) Research hypothesis 3 (Retailer/Manufacturer Promotion and Company Performance)

Promotion plays an important part in the marketing mix of a company. Walter and MacKenzie (1988) found that coupon promotions in a store circulation increased company profits. Advertising and sales promotions are part of the promotion mix. This leads to the following hypothesis:

H_3: Retailer/Manufacturer Promotion affect products sold, causing a positive impact to Company Performance.

D) Research hypothesis 4 (Barriers and Company Performance)

Companies entering the export market find themselves struggling with barriers such as lack of information of international markets (Parhizkar 2008). Buyers in international markets may currently procure low quality products and are looking for high value-added products. However, firms exporting high value-added products may not enter the global market because of barriers, which may cause company performance to decrease in international markets. This leads to the following hypothesis:

H_4: Barriers affect products sold, causing a negative impact to Company Performance.

E) Research hypothesis 5 (Barriers and Suppliers)

Lack of information of global markets and long-term commitment are the main barriers affecting exporting forest product companies (Ringe et al. 1987). Exporters need to

understand markets, distribution channels and desired products in overseas markets in order to be successful (Ifju and Bush 1993). This leads to the following hypothesis:

H_5: Barriers facing wood product companies in importing markets negatively impact suppliers in global markets.

F) Research hypothesis 6 (Supplier Promotion and Suppliers)

The supplier's promotion strategy affects how buyers perceive their products. Personal selling is one part of the promotion strategy that affects the supplier's overall sales performance, especially when the salesperson has adequate selling knowledge (Szymanski 1988). This leads to the following hypothesis:

H_6: Supplier's promotion strategy positively affects suppliers performance in the amount of products sold.

G) Research hypothesis 7 (Supplier Promotion and Company Performance)

Trade promotions help increase demand with resellers. Temporary price discounts offered to resellers will help reduce raw material costs, allowing the reseller to increase profits when passing the product onto the end-user (Abad 2003). This leads to the following hypothesis:

H_7: Supplier promotion strategy positively affects reseller's Company Performance by increasing profits.

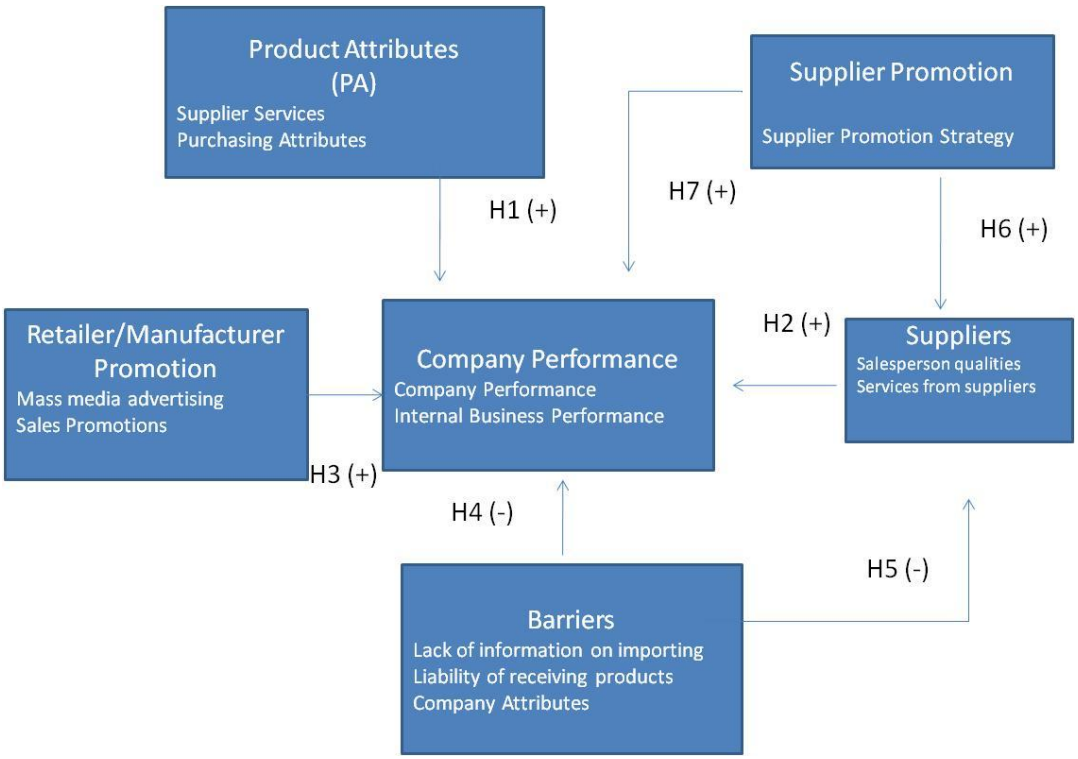

Figure 4.2 Conceptual research model developed from the literature

The factor scores obtained from factor analysis were used in regression analysis. There are some disadvantages of using factor scores to conduct the regression analysis. Using different extraction and rotation methods will give the researcher different scores, therefore, factor scores can be very subjective. In order to conduct regression, the factor scores also must be normally distributed (DiStefano et al. 2009).

Two hypothesized regression models were developed beforehand using previous research and the relationships between variables were tested with ANOVA and regression analyses. Multiple linear regression analysis is used frequently to describe the relationships between independent variables and a dependent or response variable (Lattin et al 2003). Multiple linear regression fits a line to the data to describe the trend of the linear relationship between predictor and response variables. The equation for multiple linear regression is below:

$$Y_i = b_0 + b_{1\,xi} + b_2 x_{i2} + \ldots + b_p x_{ip} + \xi$$

After analyzing the items included in the questionnaire, some were removed during factor analysis of each factor, similarly to previous research (Li 2002; Lee 2009; Sanchez 2011). After the purification of data was complete, the researchers used hypothesis testing for the following constructs believed to effect marketing of products to Central America: (1) Product Attributes, (2) Suppliers, (3) Retailer/manufacturer promotion strategy, (4) Suppliers Promotion, and (5) Company performance (Table 4.1). As part of factor analysis, factor scores, or the re-projection of all the survey data points, were obtained. The average of the factor scores for each construct was used in the hypothetical model. Average factor scores were used in ANOVA and in multiple linear regressions to test for significant relationships.

Table 4.1 Hypothesis testing variables

Hypothesis	**Independent Variable**	**Item Code**	**Dependent Variable**	**Item Code**
H1	Product Attributes	PA	Company Performance	CP
H2	Suppliers Attributes	SA	Company Performance	CP
H3	Retailer/ Manufacturer Promotion	RMP	Company Performance	CP
H4	Barriers	B	Company Performance	CP
H5	Barriers	B	Suppliers Attributes	SA
H6	Suppliers Promotion	SP	Suppliers Attributes	SA
H7	Suppliers Promotion	SP	Company Performance	CP

The hypothesized models were developed, where:

B_0 = Intersection, B_1, B_2, B_3, B_4, B_5 = Regression coefficients, and ξ = Regression error

The main relationships between dependent and independent variables can be seen in the hypothesized models below:

$CP=B_0 +B_1PA +B_2S+ B_3RMP+ B_4B + B_5SP +\xi$

$S= B_0+B_1B+ B_2SP + \xi$

The measure of R-squared describes the percent of variance in the response variable explained by information provided by the independent variables (Lattin et al. 2003). The analysis of variance table for the regression model gives the F-statistic and p-value to determine the significance of the model (Lattin et al. 2003). The larger the F-statistic and lower the p-value (< 0.05), the better the model fit (Lattin et al 2003).

4.4 Results and Discussion

4.4.1 Validation of Internal Consistency and Structure of the Data

Cronbach's alpha was used to examine the internal consistency of items within each construct to ensure the researchers are measuring the constructs intended. The use of exploratory factor analysis was performed to identify meaningful groupings within each of the constructs and test for validity. Principle components was used for the extraction of components and the solution was rotated using the Varimax method to simplify the results. Later, factor analysis will be used to create factor scores and then relationships will be tested using ANOVA and multiple linear regression analyses. Tables shown below depict the output from SPSS®.

4.4.1.1 Supplier Attributes

The Cronbach's alpha output from SPSS® (Table 4.2) was higher than 0.60 which shows a high reliability and internal consistency of the construct. If the Cronbach's alpha (i.e., internal consistency) was lower than 0.7, the researchers then consulted Table 4.2 to see if removing any of the individual items would increase internal consistency (alpha).

Table 4.2 Reliability analysis for items within the supplier attribute construct

Code	Supplier Attributes	Cronbach Coefficient Alpha (α)
Q4.1	Honesty	0.861
Q4.2	Patience	
Q4.3	Commitment	
Q4.4	Compromise	
Q4.5	Cultural sensitivity	
Q4.6	Visits	
Q4.7	Communication	
Q4.8	Information sharing	
Q4.9	Offer quality products	

The Cronbach's alpha values when deleted for supplier attributes show that no items should be removed because there was no possible improvement in consistency (Table 4.3).

Table 4.3 Individual Cronbach's alpha for supplier attributes items

Cronbach Alpha if Item is Deleted			
Code	**Supplier Attributes**	**Corrected Item-Total Correlation**	**Alpha (α)**
Q4.1	Honesty	0.616	0.845
Q4.2	Patience	0.964	0.846
Q4.3	Commitment	0.746	0.829
Q4.4	Compromise	0.678	0.838
Q4.5	Cultural sensitivity	0.598	0.849
Q4.6	Visits	0.452	0.863
Q4.7	Communication	0.613	0.846
Q4.8	Information sharing	0.576	0.847
Q4.9	Offer quality products	0.586	0.849

Factor analysis was preformed and the output from SPSS ® shows two factors were identified with eigenvalues greater than 1 (4.504 and 1.340) (Table 4.4). The items that load heavily on each factor are shown in **bold**. No items were eliminated since consistency could not be improved. Factor one includes *honesty, patience, commitment, compromise, cultural sensitivity, and offer quality products;* these items seem to describe intangible sales. Other studies have found these attributes to be important for salesmen when selling to export markets

(Parhizkar, 2008; Hansen and Bush, 1999). Factor two includes *visits, communication and information sharing;* these items may describe commication provided to the customer by the supplier. Similar studies have found that visits, communication, and information sharing are important attributes when starting and continuing a relationship with a supplier (Parhizkar, 2008).

Table 4.4 Factor analysis for items within the supplier attribute construct

Code	Supplier Attributes	Eigenvalues per component		Factor loading per component		Percent of Variance	
		1	2	1	2	1	2
Q4.1	Honesty	4.504	1.340	**.822**	0.113	50.04%	14.88%
Q4.2	Patience			**.786**	0.076		
Q4.3	Commitment			**.852**	0.233		
Q4.4	Compromise			**.770**	0.281		
Q4.5	Cultural sensitivity			**.543**	0.396		
Q4.6	Visits			.069	**0.840**		
Q4.7	Communication			.292	**0.792**		
Q4.8	Information sharing			.259	**0.792**		
Q4.9	Offer quality products			**.636**	0.326		

4.4.1.2 Product Attributes

The Cronbach's alpha shown in Table 4.5 was higher than 0.60 which shows a high reliability and internal consistency.

Table 4.5 Reliability analysis for items within the product attributes construct

Code	Product Attributes	Cronbach Coefficient Alpha (α)
Q5.1	Machinability	0.911
Q5.2	Availability of a range of species	
Q5.3	Availability of a range of grades	
Q5.4	Availability of a range of sizes	
Q5.5	Color	
Q5.6	Density (Specific gravity)	
Q5.7	Kiln-dried	
Q5.8	Environmentally certified	
Q5.9	Price	
Q5.10	Volume discounts	
Q5.11	Product quality	
Q5.12	Reputable supplier	
Q5.13	Geographic closeness to supplier	
Q5.14	Warranty on product	
Q5.15	Brand	
Q5.16	Packaging	
Q5.17	Delivery on time	

The alpha values when deleted for product attributes show that no items should be removed because there was no possible improvement in consistency (Table 4.5).

Table 4.6 Individual Cronbach's alpha for product attributes construct

Cronbach Alpha if item is deleted			
Code	**Product Attributes**	**Corrected Item-Total Correlation**	**Alpha (α)**
Q5.1	Machinability	0.566	0.907
Q5.2	Availability of a range of species	0.582	0.905
Q5.3	Availability of a range of grades	0.668	0.904
Q5.4	Availability of a range of sizes	0.582	0.906
Q5.5	Color	0.555	0.907
Q5.6	Density (Specific gravity)	0.706	0.903
Q5.7	Kiln-dried	0.635	0.905
Q5.8	Environmentally certified	0.690	0.903
Q5.9	Price	0.476	0.910
Q5.10	Volume discounts	0.372	0.911
Q5.11	Product quality	0.484	0.910
Q5.12	Reputable supplier	0.676	0.904
Q5.13	Geographic closeness to supplier	0.499	0.909
Q5.14	Warranty on product	0.512	0.909
Q5.15	Brand	0.753	0.901
Q5.16	Packaging	0.811	0.898
Q5.17	Delivery on time	0.444	0.910

Factor analysis was preformed and 2 factors were identified with eigenvalues greater than 1.000 (Table 4.7). The items that load heavily on each factor are shown in **bold**. Factor one includes *machinability, availability range of sizes, availability of a range of species, availability of a range of grades, color density, kiln dried, environmental certified, brand, packaging, reputable supplier* and *geographic closeness to supplier;* these items describe supplier services. These items have been found to be important when buyers are looking for a supplier (Hansen and Bush 1999). These items may be important for small firms looking to purchase a small amount of wood products from a reliable local source. A reliable local wholesaler would be able to meet this demand easily if a foreign firm partnered with them to gain sales in an overseas market.

Factor two includes *price, volume discounts, warranty on product, delivery on time and product quality;* these items describe purchasing attributes. Wood product buyers prefer to purchase quality products that are priced competitively (Cossio 2007; Parhizkar 2008; Chapter 3).

Table 4.7 Factor analysis for items in the product attribute construct

Code	Product Attributes	Eigenvalues per components		Factor loading per component		Percent of Variance	
		1	2	1	2	1	2
Q5.1	Machinability	6.907	1.559	**0.572**	0.186	71.73%	87.92%
Q5.2	Availability of a range of species			**0.695**	0.142		
Q5.3	Availability of a range of grades			**0.656**	0.249		
Q5.4	Availability of a range of sizes			**0.518**	0.330		
Q5.5	Color			**0.598**	0.128		
Q5.6	Density (Specific gravity)			**0.715**	0.205		
Q5.7	Kiln-dried			**0.624**	0.242		
Q5.8	Environmentally certified			**0.699**	0.221		
Q5.9	Price			0.189	**0.751**		
Q5.10	Volume discounts			0.085	**0.743**		
Q5.11	Product quality			0.180	**0.792**		
Q5.12	Reputable supplier			**0.673**	0.225		
Q5.13	Geographic closeness to supplier			**0.449**	0.300		
Q5.14	Warranty on product			0.333	**0.537**		
Q5.15	Brand			**0.821**	0.145		
Q5.16	Packaging			**0.845**	0.204		
Q5.17	Delivery on time			0.268	**0.519**		

4.4.1.3 Retailer/Manufacturer Promotion Strategy

The Cronbach's alpha shown in Table 4.7 was higher than 0.60 which shows a high reliability and internal consistency.

Table 4.8 Reliability analysis for items within the retailer/manufacturer promotion strategy construct

Code	Promotion Strategy	Cronbach Coefficient Alpha (α)
Q6.1	Personal selling	0.923
Q6.2	Trade shows	
Q6.3	Magazines	
Q6.4	Radio commercials	
Q6.5	TV commercials	
Q6.6	Advertisement in local newspaper	
Q6.7	Advertisement in store flyer	
Q6.8	Store website	
Q6.9	Attractive display rack	
Q6.10	Point of purchase product literature	
Q6.11	Sales and products discounts	
Q6.12	Word-of-mouth	

The alpha values when removed for retailer/manufacturer promotion strategy attributes are shown in Table 4.9. The results indicate that the Cronbach's alpha can be improved eliminating question Q1 (personal selling).

Table 4.9 Individual Cronbach's alpha for promotion strategy construct

Cronbach Alpha if Item is Deleted			
Code	**Promotion Strategy**	**Corrected Item-Total Correlation**	**Alpha (α)**
Q6.1	Personal selling	0.253	0.929
Q6.2	Trade shows	0.760	0.913
Q6.3	Magazines	0.675	0.917
Q6.4	Radio commercials	0.747	0.914
Q6.5	TV commercials	0.760	0.913
Q6.6	Advertisement in local newspaper	0.750	0.914
Q6.7	Advertisement in store flyer	0.752	0.913
Q6.8	Store website	0.605	0.920
Q6.9	Attractive display rack	0.805	0.911
Q6.10	Point of purchase product literature	0.710	0.916
Q6.11	Sales and products discounts	0.560	0.921
Q6.12	Word-of-mouth	0.677	0.917

When question Q1 (personal selling) was eliminated, the recalculated Cronbach's alpha increased to 0.928 (Table 4.10).

Table 4.10 Recalculated reliability analysis of the retailer/manufacturer promotion strategy construct

Code	Promotion Strategy	Cronbach Coefficient Alpha (α)
Q6.2	Trade shows	0.928
Q6.3	Magazines	
Q6.4	Radio commercials	
Q6.5	TV commercials	
Q6.6	Advertisement in local newspaper	
Q6.7	Advertisement in store flyer	
Q6.8	Store website	
Q6.9	Attractive display rack	
Q6.10	Point of purchase product literature	
Q6.11	Sales and products discounts	
Q6.12	Word-of-mouth	

Factor analysis was preformed and two factors were identified with eigenvalues greater than 1 (6.440 and 1.317) (Table 4.11). The items that load heavily on each factor are shown in **bold**. Factor one includes *trade shows, magazines, radio commercials, tv commercials, advertisement in local newspapers,* store website; these items describe mass media advertising. These items tend to drive consumer behavior by covering a large local audience (Peter and Donnelly 2008). Factor two includes advertisement in *store flyer, attractive display rack, point of purchase product literature, word of mouth,* and *sales and products discounts.* These items describe sales promotion and tend to be aimed at promoting wood products to the end consumers (Peter and Donnelly 2008). Distributor and manufacturer sales and product discounts tend to be useful with target retailers and other middlemen companies (Peter and Donnelly 2008).

Table 4.11 Factor analysis for supplier promotion strategy construct

Code	Promotion Strategy	Eigenvalue per component		Factor loading per component		Percent of Variance	
		1	2	1	2	1	2
Q6.2	Trade shows	6.440	1.317	**0.681**	0.439	58.55%	11.97%
Q6.3	Magazines			**0.833**	0.165		
Q6.4	Radio commercials			**0.827**	0.264		
Q6.5	TV commercials			**0.833**	0.267		
Q6.6	Advertisement in local newspaper			**0.729**	0.378		
Q6.7	Advertisement in store flyer			0.507	**0.642**		
Q6.8	Store website			**0.713**	0.203		
Q6.9	Attractive display rack			0.501	**0.717**		
Q6.10	Point of purchase product literature			0.258	**0.867**		
Q6.11	Sales and products discounts			0.095	**0.844**		
Q6.12	Word-of-mouth			0.329	**0.744**		

4.4.1.4 Supplier Promotion Strategy

The Cronbach's alpha shown in Table 4.12 was higher than 0.60 which shows a high reliability and internal consistency.

Table 4.12 Reliability analysis for supplier promotion strategy factor

Code	Promotion Strategy	Cronbach Coefficient Alpha (α)
Q7.1	Personal selling	0.840
Q7.2	Participation in trade shows	
Q7.3	Advertisement in magazines	
Q7.4	Advertisement in local newspaper	
Q7.5	Word-of-mouth	

The alpha if deleted values for supplier promotion strategy attribute items are shown in Table 4.13. The results indicate that the scale reliability can be improved eliminating question Q1 (personal selling).

Table 4.13 Individual Cronbach's alpha for supplier promotion strategy attributes factor

Cronbach Alpha if item is deleted			
Code	**Promotion Strategy**	**Corrected Item-Total Correlation**	**Alpha (α)**
Q7.1	Personal selling	0.244	0.891
Q7.2	Participation in trade shows	0.739	0.779
Q7.3	Advertisement in magazines	0.772	0.776
Q7.4	Advertisement in local newspaper	0.777	0.769
Q7.5	Word-of-mouth	0.719	0.788

When question Q1 (personal selling) was eliminated, the recalculated Cronbach's alpha increased to 0.894 (Table 4.14).

Table 4.14 Recalculated reliability analysis of the supplier promotion strategy construct

Code	**Promotion Strategy**	**Cronbach Coefficient Alpha (α)**
Q7.2	Participation in trade shows	0.894
Q7.3	Advertisement in magazines	
Q7.4	Advertisement in local newspaper	
Q7.5	Word-of-mouth	

Factor analysis was preformed and one factor was identified with an eigenvalue greater than 1 (3.071) (Table 4.15). All items load heavily on one factor, suggesting these items collectively describe supplier promotion strategy. Advertising in magazines and newspapers allows the end consumer to pull for the product from the retailer, causing the retailer to purchase from the supplier (Peter and Donnelly 2008). Trade shows and word-of-mouth pushes the product on the consumer and increases sales of the product (Peter and Donnelly 2008).

Table 4.15 Factor analysis for supplier promotion strategy construct

Code	Promotion Strategy	Eigenvalue per component	Factor loading per component	Percent of Variance
		1	1	1
Q7.2	Participation in trade shows	3.071	**0.867**	76.79%
Q7.3	Advertisement in magazines		**0.889**	
Q7.4	Advertisement in local newspaper		**0.896**	
Q7.5	Word-of-mouth		**0.852**	

4.4.1.5 Barriers

The Cronbach's alpha shown in Table 4.15 was higher than 0.60 which shows a high reliability and internal consistency.

Table 4.16 Reliability analysis for items within the barriers construct

Code	Barriers Attributes	Cronbach Coefficient Alpha (α)
Q8.1	Transportation and logistics	0.823
Q8.2	Price	
Q8.3	Language barrier	
Q8.4	Quality of Appalachian forest products	
Q8.5	Delivery on time	
Q8.6	Industry production capacity	
Q8.7	U.S. governmental policies	
Q8.8	International policies	
Q8.9	Knowledge of Appalachian wood products	
Q8.10	Lack of agents/brokers	
Q8.11	Paperwork and bureaucracy	
Q8.12	Payment methods	
Q8.13	Past experience	

The alpha if deleted values for barrier attributes are shown in Table 4.17. The results indicate that the scale reliability can be improved eliminating question Q2 (price) and Q3 (language barrier).

Table 4.17 Individual Cronbach's alpha for barrier attributes construct

Cronbach Alpha if item is deleted			
Code	**Barrier Attributes**	**Corrected Item-Total Correlation**	**Alpha (α)**
Q8.1	Transportation and logistics	0.386	0.817
Q8.2	Price	0.222	0.824
Q8.3	Language barrier	0.256	0.839
Q8.4	Quality of Appalachian forest products	0.557	0.804
Q8.5	Delivery on time	0.467	0.816
Q8.6	Industry production capacity	0.372	0.817
Q8.7	U.S. governmental policies	0.648	0.794
Q8.8	International policies	0.695	0.790
Q8.9	Knowledge of Appalachian wood products	0.431	0.813
Q8.10	Lack of agents/brokers	0.553	0.803
Q8.11	Paperwork and bureaucracy	0.606	0.799
Q8.12	Payment methods	0.490	0.811
Q8.13	Past experience	0.554	0.805

When questions Q2 (price) and Q3 (language barrier) were eliminated, the Cronbach's alpha improved to 0.842 (Table 4.18).

Table 4.18 Recalculated reliability analysis of the barrier attributes construct

Code	Barrier Attributes	Cronbach Coefficient Alpha (α)
Q8.1	Transportation and logistics	0.842
Q8.4	Quality of Appalachian forest products	
Q8.5	Delivery on time	
Q8.6	Industry production capacity	
Q8.7	U.S. governmental policies	
Q8.8	International policies	
Q8.9	Knowledge of Appalachian wood products	
Q8.10	Lack of agents/brokers	
Q8.11	Paperwork and bureaucracy	
Q8.12	Payment methods	
Q8.13	Past experience	

Factor analysis was preformed and three factors were identified with eigenvalues greater than 1 (Table 4.19). The items that load heavily on each factor are shown in **bold**. Factor one includes *knowledge of Appalachian wood products, lack agents/brokers, paperwork and bureaucracy, and payment methods;* these items describe lack information on importing wood products. These items have been found to be a potential barrier when foreign buyers are looking for new source of international wood products (Cossio 2007). Factor two includes *transportation and logistics, U.S. governmental policies, international policies,* and *past experience;* these items describe liability of receiving products. Companies looking for wood products internationally may not be familiar with domestic and global governmental policies on importing products, resulting in a barrier when importing wood products. Also, the distance of suppliers and past experience of doing business overseas may prevent some buyers from looking there to purchase wood products (Cossio 2007). Factor three includes *quality of Appalachian forest products, delivery on time,* and *industry production capacity;* these items describe

company attributes. These items have been found to be important with wood products buyers when purchasing wood products; suppliers need to have quality products, produce the amount needed and deliver on-time (Cossio 2007).

Table 4.19 Factor analysis for barrier attributes construct

Code	Barrier Attributes	Eigenvalues per component			Factor loading per component			Percent of Variance		
		1	2	3	1	2	3	1	2	3
Q8.1	Transportation and logistics	4.423	1.400	1.024	-0.147	**0.610**	0.298	40.21%	12.73%	9.30%
Q8.4	Quality of Appalachian forest products				0.201	0.314	**0.647**			
Q8.5	Delivery on time				0.133	0.120	**0.839**			
Q8.6	Industry production capacity				0.097	0.168	**0.695**			
Q8.7	U.S. governmental policies				0.291	**0.773**	0.235			
Q8.8	International policies				0.377	**0.801**	0.157			
Q8.9	Knowledge of Appalachian wood products				**0.696**	0.169	0.005			
Q8.10	Lack of agents/brokers				**0.843**	0.089	0.109			
Q8.11	Paperwork and bureaucracy				**0.747**	0.277	0.168			
Q8.12	Payment methods				**0.636**	0.127	0.339			
Q8.13	Past experience				0.299	**0.680**	0.096			

4.4.1.6 Company Performance

The Cronbach's alpha shown in Table 4.20 was higher than 0.60 which shows a high validity and internal consistency.

Table 4.20 Reliability analysis for items within the company performance attributes construct

Code	Performance Attributes	Cronbach Coefficient Alpha (α)
Q9.1	Number of orders received	0.700
Q9.2	Sales	
Q9.3	Costs	
Q9.4	Customer satisfaction	
Q9.5	Profit	
Q9.6	Product quality	
Q9.7	Employee satisfaction	
Q9.8	Suppliers relationship	
Q9.9	Competitive price	
Q9.10	Employee turnover rate	

The alpha if deleted values for the company performance attributes construct are shown in Table 4.21. The results indicate that the Cronbach's alpha scale reliability can be improved by eliminating question Q4 (customer satisfaction).

Table 4.21 Reliability analysis for items in the company performance attributes construct

Cronbach Alpha if item is deleted			
Code	**Performance Attributes**	**Corrected Item-Total Correlation**	**Alpha (α)**
Q9.1	Number of orders received	0.439	0.663
Q9.2	Sales	0.393	0.673
Q9.3	Costs	0.322	0.684
Q9.4	Customer satisfaction	0.190	0.700
Q9.5	Profit	0.364	0.677
Q9.6	Product quality	0.384	0.681
Q9.7	Employee satisfaction	0.388	0.674
Q9.8	Suppliers relationship	0.400	0.670
Q9.9	Competitive price	0.379	0.675
Q9.10	Employee turnover rate	0.385	0.677

When question Q4 (customer satisfaction) was eliminated, the scale of reliability improved to 0.703 (Table 4.22).

Table 4.22 Recalculated reliability analysis of the company performance attributes construct

Code	Performance Attributes	Cronbach Coefficient Alpha (α)
Q9.1	Number of orders received	0.703
Q9.2	Sales	
Q9.3	Costs	
Q9.5	Profit	
Q9.6	Product quality	
Q9.7	Employee satisfaction	
Q9.8	Suppliers relationship	
Q9.9	Competitive price	
Q9.10	Employee turnover rate	

Factor analysis was preformed and two factors were identified with eigenvalues greater than 1 (2.761 and 2.376) (Table 4.23). The items that load heavily on each factor are shown in **bold**. Factor one includes *number of orders received, sales, costs, profit, product quality, and competitive price;* these items describe company performance. These items tend to be important attributes of how well a company is performing (Perkins 2009). In order for companies to perform well, they need to offer a better price on their products or increase the quality in order to increase profits. Factor two includes *employee satisfaction, supplier relationship,* and *employee turnover rate;* these items describe internal business relations. Research has found that these items are important for internal business performance. The company's relationship with employees and suppliers strongly related to cost and quality of the products they sell, allowing the companies to improve costs and profit and allow them to be more competitive (Perkins 2009).

Table 4.23 Factor analysis for company performance attributes construct

Code	Performance Attributes	Eigenvalues per component		Factor loading per component		Percent of Variance	
		1	2	1	2	1	2
Q9.1	Number of orders received	2.761	2.376	**0.702**	0.137	30.68%	26.40%
Q9.2	Sales			**0.825**	-0.092		
Q9.3	Costs			**0.749**	-0.138		
Q9.5	Profit			**0.740**	-0.049		
Q9.6	Product quality			**0.491**	0.204		
Q9.7	Employee satisfaction			-0.011	**0.881**		
Q9.8	Suppliers relationship			-0.025	**0.889**		
Q9.9	Competitive price			0.**414**	0.350		
Q9.10	Employee turnover rate			0.060	**0.812**		

4.4.2 Hypothesis Testing and Regression

The hypothesized models to describe company performance and supplier attributes were:

$CP=B_0 +B_1PA +B_2S+ B_3RMP+ B_4B + B_5SP +\xi$

$S= B_0+B_1B+ B_2SP + \xi$

Where:

B_0 = Intersection, B_1, B_2, B_3, B_4, B_5 = Regression coefficients, and ξ = Regression error

4.4.2.1 Regression Model for Dependent Variable Suppliers

Next, hypotheses were tested to identify meaningful relationships. To test hypotheses 5 and 6 (Figure 4.1): When supplier promotion increases and barriers decrease, supplier attributes should increase.

The following relationship among dependent and independent variables was proposed:

$S= B_0+B_1B+ B_2SP + \xi$

Where B_0 is the intersection, B_1, and B_2 are the regression coefficients, and ξ is the

error of the regression. The results of the hypothesis test (Ho: Coefficients do not describe the relationship, i.e., the coefficients = 0, Ha: coefficients do describe the relationship, i.e., the coefficients ≠ 0) can be seen Table 4.24. A p-value of < 0.01 was the result of the regression model; therefore, Ho is rejected suggesting a good model.

Table 4.24 Analysis of variance for hypothesized Supplier Attributes regression model

Analysis of Variance

Source	***D.F***	***Sum of Squares***	***Mean Square***	***F Value***	***Pr > F***
Model	2	8.89418	4.44709	12.74	<.01
Error	131	45.73577	0.34913		
Corrected Total	133	54.62996			

Root MSE	0.59087	R-Square	0.1628
Dependent Mean	0.09761	Adj R-Sq	0.1500
Coeff Var	605.31979		

While only 15% of variability was explained by the model (R-squared value), the results suggest that the model is significant (p-value of < 0.01). The regression coefficients were calculated and their significance was tested. As seen in Table 4.25, the independent variable barriers (B) was significant with p-value of < 0.01. Figure 4.3 shows the portion of the conceptual model describing supplier attributes.

Table 4.25 Supplier Attributes coefficients and significance

Parameter Estimates

Variable	*D.F*	Parameter Estimate	Standard Error	*t Value*	Pr > |t|
Intercept	1	0.11547	0.05120	2.26	0.0258
Barriers	1	0.42650	0.09731	4.38	<.01
Supplier Promotion	1	0.08845	0.05742	1.54	0.1259

As a result, the final model regression was:

Suppliers = 0.11547 + 0.42650B + ξ

Barriers were found to positive influence supplier attributes when marketing to Central America. Appalachian wood products suppliers may have to work harder and invest more time and resources in order to be successful in promoting products to Central America.

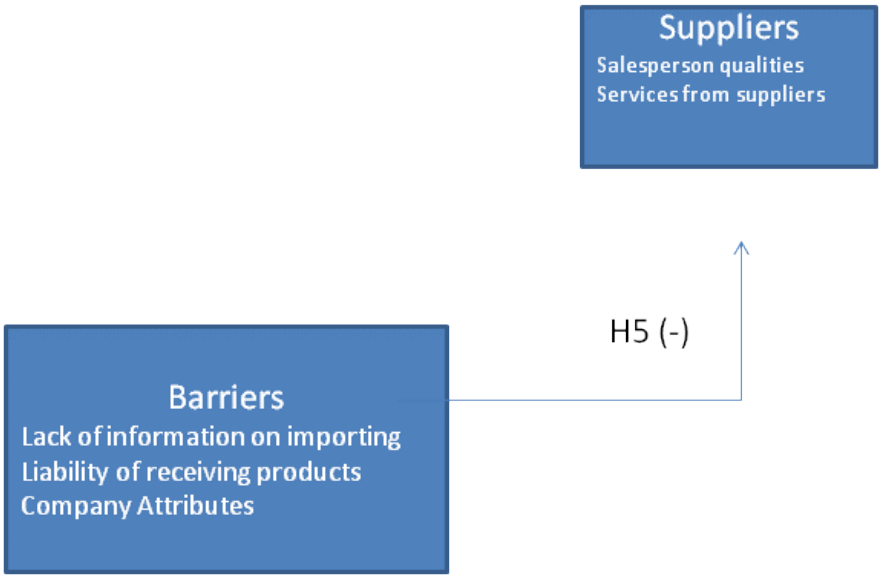

Figure 4.3 Supplier attributes conceptual model (from the overall conceptual model in Figure4.2)

4.4.2.2 Regression Model for Dependent Variable Company Performance

Next, the researchers tested hypotheses 1, 2, 3, 4, and 7 (Table 4.1). The hypothesized relationship was: When supplier promotion, supplier attributes, product attributes, and retailer/manufacturer promotion increase and barriers decrease, company performance should increase. The following relationship among dependent and independent variables proposed was:

$CP=B_0 +B_1PA +B_2S+ B_3RMP+ B_4B + B_5SP +\xi$

Where B_0 is the intersection, B_1, B_2, B_3, B_4 and B_5 are the regression coefficients, and ξ is the error of the regression. The results of the hypothesis test (Ho: Coefficients do not describe the relationship, i.e., the coefficients = 0, Ha: coefficients do describe the relationship, i.e., the coefficients $\neq 0$) can be seen Table 4.26.

Table 4.26 Analysis of variance for hypothesized company performance regression model

Analysis of Variance

Source	***D.F***	***Sum of Squares***	***Mean Square***	***F Value***	***Pr > F***
Model	5	20.60950	4.12190	15.00	<.01
Error	107	29.39520	0.27472		
Corrected Total	112	50.00470			

Root MSE	0.52414	R-Square	0.4122
Dependent Mean	0.01123	Adj R-Sq	0.3847
Coeff Var	4668.21903		

A p-value of < 0.01 was the result of the regression model; therefore, Ho is rejected suggesting a good model. The regression coefficients were calculated and their significance was tested. As

seen in Table 4.27, the barriers (B) as an independent variable was significant with p-value of 0.0258 and retailer/manufacturers promotion (RMP) as an independent variable was also significant with p-value of 0.0064. Figure 4.4 shows the new conceptual model for supplier attributes.

Table 4.27 Company performance regression coefficients and significance

Parameter Estimates

Variable	***D.F***	**Parameter Estimate**	**Standard Error**	***t Value***	**Pr > |t|**
Intercept	1	-0.04546	0.05161	-0.88	0.3804
Barriers	1	0.24963	0.11046	2.26	0.0258
Supplier Promotion	1	-0.05770	0.05828	-0.99	0.3244
Suppliers	1	0.18707	0.10839	1.72	0.0873
Product Attributes	1	0.18776	0.13264	1.42	0.1598
Retailer/Manufacturers Promotion	1	0.30694	0.11034	2.78	0.0064

As a result, the final regression model was:

$CP= -0.04546+ 0.30694RMP+ 0.24963B +\xi$

Company performance is influence positively by retailer/manufacturers promotion and barriers. Retailer/manufacturer promotion is important when marketing products to increase company sales and performance. Central American companies need to overcome barriers when performing businesses domestic and international in order for them to be successful.

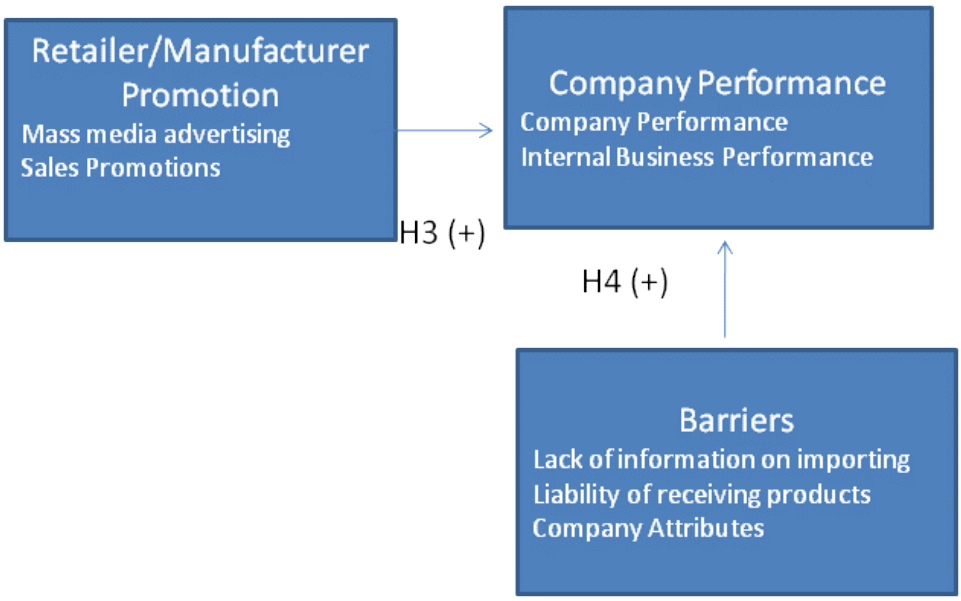

Figure 4.4 Company performance conceptual model (from the overall conceptual model in Figure 4.2)

4.5 Discussion and Conclusions

This research builds on earlier chapters to characterize success factors for marketing Appalachian forest products into Central America. Perceptions of wood products retailers and manufacturers from Central America regarding supplier attributes, product attributes, retailer/manufacturer promotion strategy, supplier promotion strategy, potential importing barriers, and company performance were tested against a conceptual model based on the literature.

Factor analysis was used to explore relationships of items that comprise each construct. The results of factor analysis suggested meaningful groupings within many of the constructs, including factors such as product attributes, purchasing attributes, and supplier services. These factors may be important to consider when Appalachian wood products companies are interested in exporting to Central American countries.

To better understand the factors that affect marketing of Appalachian wood products to Central America, a conceptual model was proposed and tested through the use of statistical tools, including Cronbach's alpha, factor analysis, ANOVA, and multiple regression analysis. The first hypothesized model suggested that supplier attributes would be predicted by supplier promotion and barriers. Although supplier promotion did not appear to be driving supplier attributes (Hypothesis 6), barriers (i.e., language barrier, quality of Appalachian wood products, transportation and logistics) was found to be a significant predictor (Hypothesis 5).

These findings of supplier promotions contradict other studies that find promotion such as personal selling to be an important supplier's attributes (Szymanski 1988). Barriers were found to be a significant predictor of supplier attributes (Hypothesis 5). While literature suggests a negative relationship of barriers to supplier attributes, this model suggests that the relationship with barriers is positive. It is possible that suppliers may have to work harder to overcome the barriers, which, in turn, provides a positive impact on the supplier attributes. Some studies have found that companies entering a new export market need to overcome barriers (i.e. specific product design and promotion strategy). These companies have an advantage over their competition and their company performance improves by the increase of sales (Douglas and Wind 1987; Jain 1989; Cavusgil et al.1993; Cavusgil and Zhou 1994). For instance, if Appalachian wood products companies produce lumber in the dimensions required by Central American customers, then they may have competitive advantage over companies that do not produce to the desired product attributes.

The second hypothesized model suggested that company performance of Central American retailers/manufacturers was predicted by Product Attributes (Hypothesis 1), Supplier

Attributes (Hypothesis 2), Retailer/manufacturer promotion (Hypothesis 3), Barriers (Hypothesis 4) and Supplier Promotion (Hypothesis 7).

Retailer/manufacturer promotion and barriers were the only constructs that significantly contributed to company performance of Central American wood products retailers/manufacturers (Hypothesis 3 and 4). Company performance was measured through a series of Likert Scale questions in the retailer/manufacturer survey (Appendix C). Retailer/manufacturer promotion had a positive relationship with company performance. These findings support previous research that suggests retailer/manufacturer promotion is important when marketing products to increase company sales and performance (Walter and MacKenzie 1988). Appalachian wood products companies need to adjust their promotion strategy in order to help increase the promotion strategy for Central America retailers/manufacturers and to increase their company performance. Appalachian wood products companies should provide point-of-purchase product literature, display racks, offer sales and product discounts in-order for Central American retailers/manufacturers to be successful in selling or using Appalachian wood products. Product literature and display racks from the Appalachian region should be in Spanish since this is the native language of the majority of consumers.

Barriers were found to be a significant predictor of supplier attributes (Hypothesis 4). While literature suggests it is a negative relationship with company performance, this model suggests that barriers have positive impact with company performance (Parhizkar 2008). It may be the challenge of breaking down barriers that improves company performance. Product attributes (Hypothesis 1), supplier promotion (Hypothesis 7), and supplier attributes (Hypothesis 2) did not predict company performance. These findings seem to be contradictory to other research in the field (Swan and Combs 1976; Anderson and Weitz 1992; Abad 2003).

Barriers preventing trade of products (e.g., governmental policies) were significant independent variables in both models (Hypothesis 4 and Hypothesis 5). This suggests that companies may need to invest more time and resources focusing on barriers to increase company performance and supplier attributes.

More research is needed to develop models that identify other factors predicting company performance and supplier attributes. It is possible that other items may be better predictors of company performance and supplier attributes that were not covered in this questionnaire. Other studies have successfully developed models that describe attributes such as company performance and supply chain performance (Perkins 2009; Sanchez 2011).

Models that explain a greater proportion of the variability would help individuals and companies in the wood products industry and research sectors understand the important driving factors predicting company performance and supplier attributes. If these drivers are known, then companies in the wood products industry can develop strategies to address the areas that would improve their company performance. For example, a friendly salesperson who maintains a relationship with the customer may be an important driver for positive company performance. If companies are aware of this relationship, they can focus on this area in their strategic marketing plan. Companies may need to focus on breaking the barriers to better conduct international business.

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Chapter 5. Summary

While Central American countries are growing due to increasing population size, deforestation has resulted in a lack of building materials to meet the growing demand. This lack of building materials may increase the demand for importing wood products into Central America.

5.1 A Case Study of the Central American Forest Products Industry

The purpose of the research in Chapter 2 was to determine the strengths and weaknesses of Appalachian wood product competitors in Central America by using a case study. To understand the forest products market in Central America, an extensive market analysis was performed using interviews and observation of the forest products industry and government agencies in Central America. Interviews were conducted with 4 top forest product importers and 2 forestry-related government and non-government agencies in each of four countries (i.e., Costa Rica, Guatemala, El Salvador, and Panama). The objectives of this chapter were to: (1) Identify main competitors of forest product companies in Central American countries, (2) Investigate distribution channels of forest products, and (3) Investigate local production, demand, and policy of forest products in Central American countries.

The main countries exporting wood products to Central America were China, Chile, Brazil, Argentina, Canada and the U.S. United States forest products companies need to offer high quality wood products at a competitive price in order to compete with current exporters from South America.

Distribution of wood products seemed to be challenging for some countries, but was not an issue for others. In Costa Rica and Panama, hardware stores and lumber deposits offer wood products to customers. Guatemalan wood product distribution is currently a problem because of

the lack of retail stores stocked with treated, dried and proper dimension lumber. A clearly defined supply chain needs to be implemented in Guatemala to target markets effectively.

Local production has been limited due to lagging technological advances and an unreliable source of raw materials. Plantations seem to be the main source of raw materials for wood products in Central America. But most of these plantations receive limited reforestation because of an increase of pineapple, bananas and other fruit plantations taking over valuable land for forest plantation development. Most trees available for production are low quality, with small diameters and defects present (i.e., knots). The Central American governments do not seem to support the forest products industry and only a handful of large wood products firms exist in each country.

The companies interviewed largely imported pressure treated lumber, softwood lumber, panels, hardwood lumber, hardwood veneer, flooring, and furniture/parts. Some of the wood product wholesalers interviewed have interacted with wood product brokers in the U.S. for softwood lumber (Southern yellow pine) and panels, but all of the buyers were familiar with Southern yellow pine lumber from the United States. Companies in Guatemala and El Salvador imported softwood lumber and other building materials primarily from Chile, United States and Canada, as well as purchased softwood from local sawmills. Pine lumber is also used in Costa Rica, Panama, Guatemala, and El Salvador in furniture production, so Eastern white pine (*Pinus strobus*) may be a substitute for the current species being used in furniture. Imported panel products consisted of oriented strand board (OSB), plywood, medium-density fiberboard (MDF), particle board, and concrete plyform. The buyers frequently purchased certified wood products, but they believe that their customers take into account the price and quality of the product and are less interested in buying certified. A few buyers claimed that the market for certified forest

products has improved over the past few years and they expect it to increase because of environmental concerns.

The majority of the buyers were familiar with Appalachian hardwoods and they were willing to import them if they were priced similarly to the native tropical species in the region. Appalachian hardwoods can be used in doors, mouldings, cabinets, furniture, flooring, and ceiling panels. Lighter colored hardwood species are found in many kitchen cabinets since customers can easily match appliances and other kitchen items to them.

Some of the interviewers had trouble understanding engineered wood products when asked about specialized products that their country may benefit from now and in the future. Photos of Appalachian products such as engineered wood products (I-joist beams, glulam beams, and laminated veneer lumber) would have been appropriate to show companies when surveying about specialized wood products to give them a better understanding of what was being asked.

5.2 Survey of Central American Wood Products Retailers/Manufacturers

The purpose of Chapter 3 was to identify market drivers and barriers for the sale of Appalachian wood products companies to the Central American market. A survey was implemented with wood products retailers and manufacturers in Panama, Costa Rica, Nicaragua, Honduras, Guatemala, and El Salvador. Companies predicted that there will be neither a high nor low demand for Appalachian wood products in the future. Because the forest product industry in the Appalachian region offers products that are similar to those currently imported in Guatemala, El Salvador, Costa Rica, Honduras, and Panama, they have a unique opportunity to expand their markets into Central America. Within the next five years, the need for certified forest products and composite wood products may increase with new laws enforcing

environmental regulations. Also, termite resistant lumber/panels may be needed now and in the future in Central America because of the high population of wood deteriorating insects.

Appalachian wood products companies may need to market quality wood products at prices competitive to other countries that sell to Central American companies. Most of the wood products are purchased from Chile and neighboring Central American countries. Companies indicated they preferred doing continuous business with suppliers that met delivery times, and neighboring countries are in close proximity to do so. To market products to Central American companies, the most successful promotional strategy identified by respondents was personal selling. Appalachian wood product companies need to take time and personally visit companies to promote products with potential customers in Central America.

5.3 Factors Affecting Marketing of Appalachian Wood Products into Central America

The fifth objective (covered in Chapter 4) was to understand different factors that affect marketing of Appalachian wood products into Central America. Cronbach's alpha was used to examine the internal consistency of items within each construct. Factor analysis was performed to validate the data. The average of the factor scores for each construct was used to represent the variables in the model. Average factor scores were used in ANOVA and in multiple linear regressions to test for significant relationships. Two hypothetical models were developed based on preliminary studies and applied to perceptions of wood products retailers and manufacturers from Central America using multiple linear regressions. These results may help guide Appalachian wood products companies that are interested in exporting to Central American countries.

Barriers preventing trade of products were significant independent variables for both models. The company performance model better describes the relationship between the

independent and response variables because of the higher R-squared value. The results suggested meaningful groupings within many of the constructs, including factors such as product attributes, purchasing attributes, and supplier services. These factors may be important to consider when Appalachian wood products companies are interested in exporting to Central American countries. This may suggest companies need to focus on breaking the barriers to conduct better international business.

5.4 Strategy for Appalachian Wood Products Companies Entering the Central American Market

The recommended strategies for Appalachian wood products companies entering the Central American market are shown in Figure 5.1. Because company responses from all countries were not significantly different, these recommendations generally can be applied to all 5 countries, unless noted below. Appalachian companies trying to market to Central American countries should contact the U.S. Commercial Service in their state and also in country they are looking to whom they are wanting to sell. The U.S. Commercial Service provides the Gold Key Matching Service, where they provide companies a chance to meet with potential buyers to promote products. The Appalachian region states may also have an international marketing service that maybe able to provide trade leads and market information to whom they are wanting to sell.

1. Offer high quality wood products.
2. Provide an assortment of colors, dimensions, and grades
    a. Panama and Costa Rica believed certified forest products and kiln dried wood products were more important than other Central American countries.
3. Back products with a warranty to help gain a strong relationship with customers.
4. Develop a supplier customer relationship to promote personal selling.

a. Panama and Costa Rica believed sales and volume discounts to promote products was more important than other Central American countries.

5. Partner with local distributors in the Central American countries to be able to deliver products on-time and to disseminate information about the qualities and advantages of Appalachian wood products.
    a. Promoting products at trade shows was found to be more important in Costa Rica than the other Central American countries.
6. Maintain the ability to conduct business in Spanish, either through a translator or hiring salespersons with knowledge of the language.
7. Price wood products similarly to local and export markets.

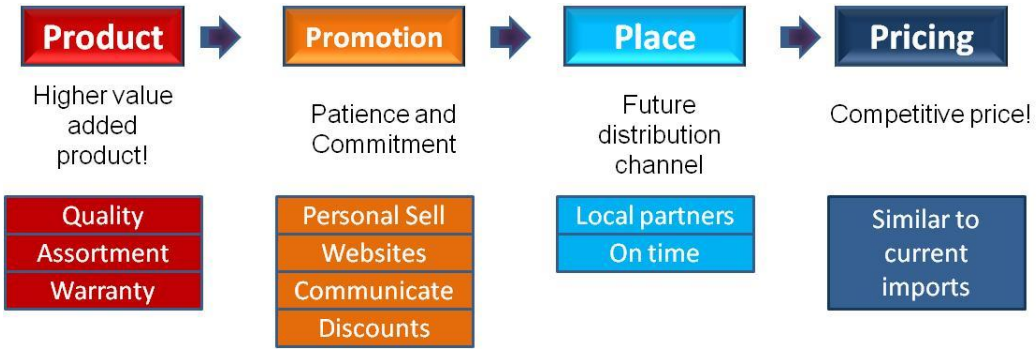


Figure 5.1 Marketing strategy for Appalachian wood products into Central America

5.5 Conclusions and Future Research

Overall, the research findings support the claim that United States forest product companies have not put enough effort into entering the forest product market in Guatemala, El Salvador, Panama and Costa Rica. Forests in El Salvador, Panama and Costa Rica are harvested infrequently and the industry lacks support from the government, causing a reduction in the amount of raw material and production. An outside source of wood is needed to meet the needs of growing region infrastructure. In this region, there is a current and future demand for wood

products as building materials due to the increased population size, growth in tourism, and lack of raw resources.

In conclusion, this study has shown that Appalachian wood products companies may have potential market opportunities in Central America. A potential study with Appalachian wood products companies should focus on determining why these companies currently are not marketing products to a potentially high demand market for wood products.

5.6 Limitations and Future Research

Due to time and finances, only a small sample size of companies and agencies could be studied. Although this sample of companies and agencies gives us an idea of some of the issues facing trade, the selection of companies and agencies is not representative of all wood products companies and natural resource agencies in Central America. However, the information gained from these companies and agencies will help to inform further trade between Central America and the Appalachian region in the U.S.

Due to time constraints, large supply of raw materials and politically unstable governments, the researchers did not perform case studies in Nicaragua or Honduras. The researchers did not examine Belize as a potential country to export because of the country's affiliation with the Caribbean Community and Common Market (CARICOM). Other Central American countries are members of the Central American Common Market (CACM).

Some of the interviewers had trouble understanding engineered wood products when asked about specialized products that their country may benefit from now and in the future. Photos of Appalachian products such as engineered wood products (e.g., I-joist beams, glulam beams, laminated veneer lumber) would have been appropriate to show companies during interviews to give them a better understanding of the products.

Appendix A

Interview Questionnaire for Central American Forest Products Companies

Marketing Opportunities In Central America Survey

Company: _____ Location: _____

Date: _____

1. From what countries do you import wood products? Please specify country, state, and city.

_____

_____

_____

2. If currently not importing forest products, Why not?

_____

_____

_____

3. Now I'd like to ask you about the products you import. Do you currently import the following products? Please answer "yes" or "no."

	Yes	No
Logs	❑	❑
Treated lumber	❑	❑
Hardwood Lumber	❑	❑
Sothern Yellow Pine Lumber	❑	❑
Panels	❑	❑
Pallets	❑	❑
Flooring	❑	❑
Veneer	❑	❑
Furniture/Furniture Parts	❑	❑
Moulding (Hardwood)	❑	❑
Moulding (Softwood)	❑	❑
Fuel Wood	❑	❑
Other_____	❑	❑

4. When purchasing from suppliers what qualities do you consider the most? Please rank the following options from 1 to 4, with 1 being the "most important" and 4 being the "least important".

Cost _____

Service _____

Quality of Products _____

Variety of Products _____

5. On a scale of 1 to 5, where 5 is very high quality and 1 is very low quality, how would you rate the quality of wood products that you currently import?

❑ 1 Low ❑ 2 ❑ 3 ❑ 4 ❑ 5 High

6. What are the criteria taken into account when selecting a wood supplier?

_____

_____

_____

7. What would increase imports of hardwoods or softwoods to your country?

_____

_____

_____

_____

8. How many cubic meters of wood do you import? _____

9. As an importer, what are the main physical properties that hardwood lumber must have in order for you to consider it "good quality"?

_____

_____

_____

10. Where do you purchase your hardwood lumber coming from? Please specify country and state.

_____

_____

_____

11. Are you familiar with Appalachian Hardwoods?

❑ Yes ❑ Uncertain ❑ No

12. Would you be willing to import Appalachian Hardwoods (red oak, white oak, yellow-poplar, black cherry, and maple) if prices for these products were economically competitive?

❑ Yes ❑ No

13. In your opinion, what will be a competitive price for hardwood lumber? _____

14. Are you familiar with Southern Yellow Pine?

❑ Yes ❑ Uncertain ❑ No

15. Kiln drying lumber reduces the moisture content in wood to a target point by controlling air circulation, relative humidity, and temperature in a controlled chamber. This process reduces shipping costs, kills insects, increases strength, allows better usability, easier to finish, and adds value to a product. As an importer would you be willing to import either hardwood or softwoods that have been kiln dried?

❑ Yes ❑ Uncertain ❑ No

16. Does your company import certified forest products?

❑ Yes ❑ Uncertain ❑ No

17. If yes, what certified forest products do you import?

_____

_____

_____

18. Where is most of the wood for construction/building products coming from?

_____

_____

_____

_____

19. There are many specialized wood products that may be useful for building projects in Central America now or in the future. Please indicate on a scale from 1 to 5, where 5= strongly agree, 1= strongly disagree, and 3 = neutral, your opinion regarding the need for increased use of the following specialized products for building projects in Central America.

	Low High
Fire-Treated Lumber	1 2 3 4 5
TermiteTreated Lumber	1 2 3 4 5
Certified Forest Products	1 2 3 4 5
Composite Wood Products (medium density fiberboard, plywood, oriented strand board)	1 2 3 4 5
Engineered Wood Products (I-joist beams, laminated veneer lumber, glu-lam beams)	1 2 3 4 5
Appalachian Hardwoods	1 2 3 4 5
Southern Yellow Pine	1 2 3 4 5

20. Who in the government do you go for help for importing or exporting?

21. Is your company currently exporting? Where to and what products?

TRANSPORTATION

22. How does the wood product supply chain work in your country?

23. What logistical issues does your company encounter when importing wood products?

24. What credit and payment terms are used when purchasing wood products from exporters?

25. What trade barriers has your company been encountering when importing forest products?

CULTURAL OPINIONS

Please indicate your opinion on a scale from 1 to 5, where 5= strongly agree, 1= strongly disagree, and 3 = neutral.

26. In my country, sustainability is an important consideration for the wood products industry.

❑ 1 Low ❑ 2 ❑ 3 ❑ 4 ❑ 5 High

27. I think my country would benefit from increasing wood-frame construction.

❑ 1 Low ❑ 2 ❑ 3 ❑ 4 ❑ 5 High

COMPANY DEMOGRAPHICS

28. What type of customers does your company currently sell to? Check all that apply.

❑ Retailers (e.g. Home Depot, Lowes)
❑ Homeowners
❑ Contractors
❑ Other_____

29. The number of employees in your firm is:

❑ Less than 50
❑ 50-100
❑ 100-250
❑ 250-500
❑ 500-1000
❑ 1000-1500
❑ 1500-2000
❑ Over 2000

30. What is your company's main product line? Please check one.

❑ Cabinetry
❑ Flooring
❑ Furniture
❑ Home Improvement
❑ Millwork
❑ Other_____

31. What current product lines does your company sell? Please check all that apply.

❑ Cabinetry
❑ Flooring
❑ Furniture
❑ Home Improvement
❑ Millwork
❑ Other_____

32. The Average annual sales (in U.S. $ millions) of your firm in the last year is

❑ Less than 10 ❑ 10-49 ❑ 50-99 ❑ 100-249 ❑ 250-499 ❑ 500-999 ❑ 1000 and above

33. What Percentage of your firm's total monthly business transactions with your **customers** are conducted electronically?

❑ Less than 10% ❑ 10-30% ❑ 30-50% ❑ 50-80% ❑ Over 80%

34. What percentage of your firm's total monthly business transactions with your **suppliers** are conducted electronically?

❑ Less than 10% ❑ 10-30% ❑ 30-50% ❑ 50-80% ❑ Over 80%

35. What are the major trade associations promoting forestry/wood in your country?

36. Who are your major competitors? Please provide company names.

Appendix B

Interview Questionnaire for Central American Forest Agencies

Forest Product Marketing Opportunities in CA
Government Official Survey

Country: _____ Location _____

Agency _____ Date _____

1. How does your government promote the use of forest products?

_____

_____

_____

_____

2. Does your country have trade association(s) for forest products? . . . . . ❑ Yes ❑ No

3. If yes, please explain what the trade associations are:

_____

_____

_____

4. What current forestry management practices are being used on Natural Forests?

_____

_____

_____

_____

5. Who manages forestlands in your country?

_____

_____

_____

_____

6. How many hectares of forestland are harvested a year? _____

7. If replanting on Natural Forests, what species of trees are being planted and how often?

_____

_____

_____

8. What current forestry management practices are being used on plantations?

9. What species of trees are being grown on plantations?

10. How many hectares are planted annually on plantations in your country? _____

11. Please tell us the state of the forest product industry in your country.

12. Does your country have a sustainable forest certification process? If so, what is it and how does it work?

13. Please name your country's major forest product companies.

14. What forest products do you think will be important to your country in the future?

15. What trade barriers might new exporters have when exporting to your country?

Please indicate your opinion on a scale from 1 to 5, where 5 = strongly agree, 1 = strongly disagree, and 3 = neutral.

16. In my country, sustainability is an important consideration for wood products industry:

❑ 1 Low ❑ 2 ❑ 3 ❑ 4 ❑ 5 High

17. I think my country would benefit from increasing wood-frame construction:

❑ 1 Low ❑ 2 ❑ 3 ❑ 4 ❑ 5 High

18. What type of marketing is done by U.S. forest product companies in your country?

19. What are the most frequent problems that companies face when importing to your country?

20. What adjustments can U.S. forest product companies make to improve shipping to your country?

Appendix C

Surveys for Central American Wood Products Retailers and Manufacturers

VirginiaTech
Invent the Future

The Department of Wood Science & Forest Products
at Virginia Tech

Opportunities for Appalachian Wood Products Companies in Central America and Panama

- The purpose of this questionnaire is to identify incentives and barriers to exporting Appalachian wood products to Central America.

- **Appalachian wood products** are found in the eastern the United States (see map below). These products include: **hardwood lumber** (red oak, white oak, black cherry, maple, yellow-poplar, American beech, American basswood, birch, and black walnut), **softwood lumber** (southern yellow pine and eastern white pine), panels (oriented strand board, plywood, meduim density fiberboard), and **secondary wood products** such as cabinets, doors, flooring, mouldings, furniture and/or furniture parts.

- The collection and analysis of data from this study will be conducted with absolute confidentialality and will only be used in this study and related reports.

-This research is being conducted by Dr. Henry Quesada, assistant professor, and Scott Lyon, graduate research assistant, from the Department of Wood Science and Forest Products at Virginia Tech. (Virginia, United States)

- This survey is voluntary and there is no more than minimal risks associated with your participation. If you are not sure of an answer to a question, please provide your best estimate.

- If you have any questions, please contact Scott Lyon by email at swlyon@vt.edu or by phone at 1-540-231-5219

1. Does your company import forest products? . . . . . ❑ Yes ❑ No (Go to Question 3)

2. If yes, what products does your company **import**? Please check all that apply.

❑ Logs	❑ Oriented Strand-board	❑ Veneer	❑ Hardwood furniture
❑ Softwood Lumber	❑ Meduim density fiberboard	❑ Hardwood moulding	❑ Softwood boards
❑ Hardwood Lumber	❑ Particle board	❑ Softwood moulding	❑ Cabinets
❑ Pressure Treated Lumber	❑ Hardwood flooring	❑ Fuel wood	❑ Doors
❑ Plywood	❑ Softwood flooring	❑ Softwood furniture	
❑ Other:			

3. What products does your company **sell**? Please check all that apply.

❑ Logs	❑ Oriented Strand-board	❑ Veneer	❑ Hardwood furniture
❑ Softwood Lumber	❑ Meduim density fiberboard	❑ Hardwood moulding	❑ Softwood boards
❑ Hardwood Lumber	❑ Particle board	❑ Softwood moulding	❑ Cabinets
❑ Pressure Treated Lumber	❑ Hardwood flooring	❑ Fuel wood	❑ Doors
❑ Plywood	❑ Softwood flooring	❑ Softwood furniture	
❑ Other:			

A. Suppliers

4. Please rate the importance of the following attributes of your current primary suppliers.

	Low Importance				High Importance
Honesty	1	2	3	4	5
Patience	1	2	3	4	5
Commitment	1	2	3	4	5
Compromise	1	2	3	4	5
Cultural Sensitivity	1	2	3	4	5
Visits	1	2	3	4	5
Communication	1	2	3	4	5
Information Sharing	1	2	3	4	5
Offer Quality Products	1	2	3	4	5
Other _____	1	2	3	4	5

B. Product Attributes

5. Please rate the importance of the following attributes when purchasing wood and/or wood products.

	Low Importance				High Importance
Machinability	1	2	3	4	5
Availability of a range of species	1	2	3	4	5
Availability of a range of grades	1	2	3	4	5
Availability of a range of sizes	1	2	3	4	5
Color	1	2	3	4	5
Density (Specific Gravity)	1	2	3	4	5
Kiln-dried	1	2	3	4	5
Environmentally certified	1	2	3	4	5
Price	1	2	3	4	5
Volume Discounts	1	2	3	4	5
Product Quality	1	2	3	4	5
Reputable Supplier	1	2	3	4	5
Geographic closeness to supplier	1	2	3	4	5
Warranty on product	1	2	3	4	5
Brand	1	2	3	4	5
Packaging	1	2	3	4	5
Delivery on time	1	2	3	4	5
Other (Please Specify)_____	1	2	3	4	5

C. Retailer/Manufacturer Promotion Strategy

6. Please rate how important to you the following promotional strategies for selling wood products.

	Low Importance				High Importance
Personal Selling	1	2	3	4	5
Trade Shows	1	2	3	4	5
Magazines	1	2	3	4	5
Radio Commercials	1	2	3	4	5
TV Commercials	1	2	3	4	5
Advertisement in local newspaper	1	2	3	4	5
Advertisement in store flyer	1	2	3	4	5
Store Web site	1	2	3	4	5
Attractive Display rack	1	2	3	4	5
Point of purchase product literature	1	2	3	4	5
Sales and products discounts	1	2	3	4	5
Word-of-mouth	1	2	3	4	5
Other _____	1	2	3	4	5

D. Supplier Promotion Strategy

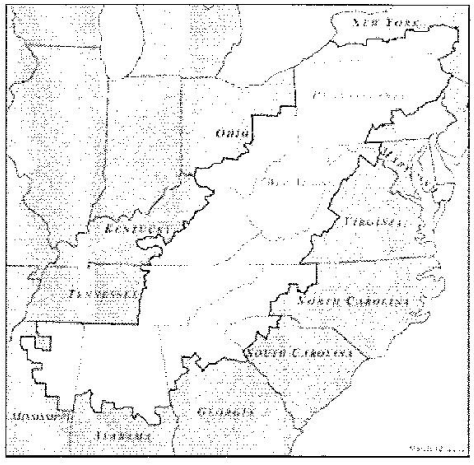
7. Please rate how important are the following promotional strategies when your company is purchasing wood and wood products from suppliers.

	Low Importance				High Importance
Personal selling	1	2	3	4	5
Participation in trade shows	1	2	3	4	5
Advertisement in magazines	1	2	3	4	5
Advertisement in local newspaper	1	2	3	4	5
Word-of-mouth	1	2	3	4	5
Other_____	1	2	3	4	5

E. Barriers

8. Please rate the importance of the potential barriers to importing Appalachian forest products? (see below map)

	Low Importance				High Importance
Transportation and logistics	1	2	3	4	5
Price	1	2	3	4	5
Language Barrier	1	2	3	4	5
Quality of Appalachian products	1	2	3	4	5
Delivery on time	1	2	3	4	5
Industry production capacity	1	2	3	4	5
U.S. Governmental policies	1	2	3	4	5
International policies	1	2	3	4	5
Knowledge of Appalachian wood products	1	2	3	4	5
Lack of agents/brokers	1	2	3	4	5
Paperwork and bureaucracy	1	2	3	4	5
Payment methods	1	2	3	4	5
Past experience	1	2	3	4	5
Other_____	1	2	3	4	5



F. Company Performance

9. Companies measure performance in many different areas. Below is a list of performance measures. Please rate from high to low how well your company performed within the last 5 years on each measure.

	Low Performance				High Performance
Number of orders received	1	2	3	4	5
Sales	1	2	3	4	5
Costs	1	2	3	4	5
Customer satisfaction	1	2	3	4	5
Profit	1	2	3	4	5
Product quality	1	2	3	4	5
Employee satisfaction	1	2	3	4	5
Suppliers relationship	1	2	3	4	5
Competitive price	1	2	3	4	5
Employee turnover rate	1	2	3	4	5
Other_____	1	2	3	4	5

G. Products

10. If your company purchases hardwood lumber please check which thicknesses are purchased. Please check all that apply.

❑ 1 inch ❑ 1.25 inches ❑ 1.5 inches ❑ 2 inches ❑ 2.5 inches
❑ Other: _____

11. If your company purchases softwood lumber, please check which dimensions are purchased. Please check all that apply.

❑ 2" x 4"-8'	❑ 2" x 4"-16'	❑ 2" x 6"-14'	❑ 2" x 8"-12'	❑ 4" x 4"-10'	❑ 6" x 6"-8'	❑ 6" x 6"-16'
❑ 2" x 4"-10'	❑ 2" x 6"-8'	❑ 2" x 6"-16'	❑ 2" x 8"-14'	❑ 4" x 4"-12'	❑ 6" x 6"-10'	
❑ 2" x 4"-12'	❑ 2" x 6"-10'	❑ 2" x 8"-8'	❑ 2" x 8"-16'	❑ 4" x 4"-14'	❑ 6" x 6"-12'	
❑ 2" x 4"-14'	❑ 2" x 6"-12'	❑ 2" x 8"-10'	❑ 4" x 4"-8'	❑ 4" x 4"-16'	❑ 6" x 6"-14'	

❑ Other: _____

12. If your company purchases softwood boards, please check which dimensions are purchased. Please check all that apply.

❑ 1" x 2"-4'	❑ 1" x 3"-10'	❑ 1" x 4"-14'	❑ 1" x 6"-14'	❑ 1" x 8"-14'	❑ 1" x 10"-14"
❑ 1" x 2"-6'	❑ 1" x 2"-10'	❑ 1" x 4"-16'	❑ 1" x 6"-16'	❑ 1" x 8"-16'	❑ 1" x 10"-16"
❑ 1" x 2"-8'	❑ 1" x 4"-6'	❑ 1" x 6"-6'	❑ 1" x 8"-6'	❑ 1" x 10"-6'	
❑ 1" x 3"-4'	❑ 1" x 4"-8'	❑ 1" x 6"-8'	❑ 1" x 8"-8'	❑ 1" x 10"-8'	
❑ 1" x 3"-6'	❑ 1" x 4"-10'	❑ 1" x 6"-10'	❑ 1" x 8"-10'	❑ 1" x 10"-10"	
❑ 1" x 3"-8'	❑ 1" x 4"-12'	❑ 1" x 6"-12'	❑ 1" x 8"-12'	❑ 1" x 10"-12"	

❑ Other: _____

13. If your company purchases panels, what thickness do you purchase? Please check all that apply.

❑ 1/4" (6 mm)	❑ 3/8" (9.5 mm)	❑ 1/2" (12.5 mm)	❑ 23/32" (18 mm)
❑ 5/16" (8 mm)	❑ 7/16" (11 mm)	❑ 19/32" (15 mm)	❑ 3/4" (19 mm)
❑ 11/32" (8.5 mm)	❑ 15/32" (12 mm)	❑ 5/8" (16 mm)	❑ 1-1/8" (28.5 mm)

❑ Other: _____

14. If your company purchases panels, what dimensions do you purchase? Please check all that apply.

❑ 2' x 2' (610 mm x 610 mm)	❑ 4' x 4' (1220 mm x 1220 mm)	❑ 4' x 10' (1220 mm x 3050 mm)
❑ 2' x 4' (610 mm x 1220 mm)	❑ 4' x 8' (1220 mm x 2440 mm)	

❑ Other: _____

15. If your company purchases hardwood lumber, please rank the following color preference options from 1=most preferred to 4=least preferred. (If your company does not purchase hardwoods, continue to question 16).

Dark brown (example:Teca, Caobilla, Cenízaro)	
Light brown (example: Pinillo, Cedro macho)	
Red (example: Santa maría, Roble Coral)	
White (example: Gmelina)	

16. Please predict the future demand for the following wood products within the next 5 years.

	Low Demand				High Demand
Fire retardant lumber/panels	1	2	3	4	5
Termite resistant lumber/panels	1	2	3	4	5
Certified forest products (FSC or PEFC)	1	2	3	4	5
Composite wood products (medium density fiberboard, plywood, oriented strand board)	1	2	3	4	5
Engineered wood products (I-joist beams, laminated veneer lumber, glu-lam beams)	1	2	3	4	5
Appalachian hardwoods (black cherry, oak, maple, walnut)	1	2	3	4	5
Southern Yellow Pine	1	2	3	4	5
Furniture and furniture parts	1	2	3	4	5
Cabinets	1	2	3	4	5

17. Where do you get information on new imported wood products? Check all that apply.

- ❑ Trade associations
- ❑ Web sites
- ❑ International Trade Shows
- ❑ Trade Shows in your country
- ❑ Direct Contact with Suppliers
- ❑ Trade Magazine advertisements
- ❑ Newsletters
- ❑ Catalogs
- ❑ Word of mouth
- ❑ Distributors
- ❑ E-mail
- ❑ Other: _____

18. What type of supplier do you purchase wood products from? Check all that apply.

- ❑ Wholesaler
- ❑ Direct from manufacturer
- ❑ Broker
- ❑ Government/State
- ❑ Other: _____

19. How often does your company place orders with wood products suppliers?

- ❑ Once a week
- ❑ Twice a month
- ❑ More than twice a month
- ❑ Once a month
- ❑ Bimonthly
- ❑ Once every 6 months
- ❑ Other: _____

20. Please estimate the number of 20-foot containers of hardwood lumber that your company purchased in 2009. (Check one)

❑ 0 ❑ 6-10 ❑ 16-25 ❑ 51-75
❑ 1-5 ❑ 11-15 ❑ 26-50 ❑ More than 75
❑ Other: _____

21. Please estimate the number of 20-foot containers of softwood lumber that your company purchased in 2009. (Check one)

❑ 0 ❑ 6-10 ❑ 16-25 ❑ 51-75
❑ 1-5 ❑ 11-15 ❑ 26-50 ❑ More than 75
❑ Other: _____

22. Please estimate the number of 20-foot containers of panels (plywood, osb, mdf) that your company purchased in 2009. (Check one)

❑ 0 ❑ 6-10 ❑ 16-25 ❑ 51-75
❑ 1-5 ❑ 11-15 ❑ 26-50 ❑ More than 75
❑ Other: _____

23. Please list the top 5 countries from where you purchase wood products in decending order.

1. _____
2. _____
3. _____
4. _____
5. _____

H. Price

24. If Appalachian wood products were available in your country that were good subsitutes for products you currently purchase, how much more would you be willing to pay for that product? (check one)

❑ 0% (do not pay more) ❑ 5-10% more ❑ 16-20% more
❑ 1-5% more ❑ 11-15% more ❑ > 20%

25. If certified wood products were available in your country that was a good subsitute for a product you currently purchase, how much more would you pay for that product? (check one)

❑ 0% (do not pay more) ❑ 5-10% more ❑ 16-20% more
❑ 1-5% more ❑ 11-15% more ❑ > 20%

I. Demographics

Please tell us a little more about your company. Your responses are strictly confidential.

26. What type of business best describes your company? (check one)

❑ Retailer ❑ Manufacturer ❑ Distributor
❑ Other: _____

27. If your company is a manufacturer, which of the following manufacturing processes best describe your operation? (Please choose only one, which constitutes the majority of your operation!)

❑ Door Manufacturer ❑ Dimension ❑ Flooring
❑ Window Manufacturer ❑ Furniture ❑ Pallet
❑ Molding / Millwork ❑ Cabinets ❑ Retailer
❑ Other: _____

28. What type of customers does your company sell to? Please check all that apply.

❑ Homeowners ❑ Retailers ❑ Contractors ❑ Manufacturers
❑ Other: _____

29. Please indicate your company's number of locations. (Please Check One)

❑ 1 Location ❑ 2-5 ❑ 6-15 ❑ 16-30 ❑ 31-50

30. On average how many full-time employees did you have in 2009? Include all company locations (check one).

❑ Fewer than 25 ❑ 25-50 ❑ 51-75 ❑ 76-100 ❑ 101-150 ❑ 151-200 ❑ Greater than 200

31. What were your wood products total sales in 2009? (Check one)

❑ Less than $500,000 ❑ $5,000,001 - $10,000,000 ❑ $30,000,001 - $40,000,000
❑ $500,000 - $1,000,000 ❑ $10,000,001 - $20,000,000 ❑ $40,000,001 - $50,000,000
❑ $1,000,001 - $5,000,000 ❑ $20,000,001 - $30,000,000 ❑ Great than $50,000,000

What is your title/position _____

City _____ Country _____

Thank you for completing this survey! Your opinions are valuable to us and will help us better understand opportunities for wood products from the Appalachian Region of the United States. If you have any questions please, email Scott Lyon at swlyon@vt.edu or call Scott at 1-540-231-5219

Please write any comments here:

Appendix D

Internal Review Board Approval for Interview Questionnaire for Central American Forest Products Companies and Agencies

Office of Research Compliance
Institutional Review Board
2000 Kraft Drive, Suite 2000 (0497)
Blacksburg, Virginia 24060
540/231-4606 Fax 540/231-0959
e-mail irb@vt.edu
Website: www.irb.vt.edu

MEMORANDUM

DATE: February 7, 2011

TO: Henry Quesada Pineda, Robert L. Smith, Scott Lyon

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires October 26, 2013)

PROTOCOL TITLE: Central American Wood Products Retailers/Manufacturer Survey

IRB NUMBER: 10-922

Effective February 7, 2011, the Virginia Tech IRB Administrator, Carmen T. Green, approved the amendment request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at http://www.irb.vt.edu/pages/responsibilities.htm (please review before the commencement of your research).

PROTOCOL INFORMATION:
Approved as: **Exempt, under 45 CFR 46.101(b) category(ies) 2**
Protocol Approval Date: **11/2/2010**
Protocol Expiration Date: **NA**
Continuing Review Due Date*: **NA**
*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:
Per federally regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

Date*	OSP Number	Sponsor	Grant Comparison Conducted?
11/2/2010	09163202	USDA	Not Required (exempt protocol)

*Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.

cc: File

Appendix E

Internal Review Board Approval for Surveying Central American Forest Products Companies

VirginiaTech

Office of Research Compliance
Carmen T. Green, IRB Administrator
2000 Kraft Drive, Suite 2000 (0497)
Blacksburg, Virginia 24061
540/231-4358 Fax 540/231-0959
e-mail ctgreen@vt.edu
www.irb.vt.edu

DATE: February 19, 2010

MEMORANDUM

TO: Henry Quesada Pineda
Scott Lyon
Robert L. Smith

FROM: Carmen Green

SUBJECT: **IRB Exempt Approval:** "Market Opportunities for Virginia's Wood Products in Central America" , IRB # 10-144

I have reviewed your request to the IRB for exemption for the above referenced project. The research falls within the exempt status, CFR 46.101(b) category(ies) 2.

Approval is granted effective as of February 19, 2010.

As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in the research protocol. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.

2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

cc: File