

**The Influence of Promotional Brochures and Pricing Strategies on
Consumer Purchase Decisions for Forest Stewardship Council Certified
Hardwood Boards in Home Centers**

by

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Dr. Robert Smith, Chairman

Abstract

This study is one of the first of its kind to examine actual consumer purchasing decisions for forest products certified by the Forest Stewardship Council (FSC). Consumer purchasing was examined based on the presence or absence of a promotional brochure and a price premium for red oak and yellow poplar surfaced-four-sides (S4S) boards. This research also compared typical demographic factors for purchasers and non-purchasers of FSC certified S4S boards. Finally, the study examined subscales from a previously designed ecoscale to determine whether two of the subscales were effective predictors of the sale of FSC certified boards.

Due to significant interactions between the price premium and the promotional brochure, Analysis of Variance (ANOVA) statistics could not be interpreted. However, these strong interactions indicate that these two factors are interdependent. Examining respondents' understanding of the trade term, "certification," showed that most did not understand the term as it is used by the forest products industry. Respondents did not link certification directly with the environment, but rather stated that it was a measure of quality excellence. This illustrates that the forest products industry must use more specific descriptions that consumers will understand when referring to certification.

Based on survey results from this study, a large proportion of respondents who paid more for FSC certified boards were unable to recall whether they had cost any more than the alternative product. Respondents of this study were not found to have a high level of confidence in the environmental claims of any group. These included forest products companies, industry associations, and independent organizations. The subscales of a previously designed ecoscale were not found to be strong indicators of a respondents' likelihood to purchase FSC certified S4S boards.

This project should be seen as a starting point for additional researchers interested in studying actual purchase decisions of consumers of environmentally conscious products, such as certified hardwood boards.

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Dedication

To my grandfather, Chester Ledger, who first introduced me to the great outdoors and all of the possibilities to make it into a career. And to my mother, Lynn Ledger, who always told me I could do whatever I set my mind to do. I love you both very much.

Preface

This thesis is broken into five chapters. Chapter one defines the questions posed, organizes objectives to address these questions, and reviews the important literature relevant to this research. Chapter two describes the methods used to set up this research, including both the creation and execution of the questionnaire, as well as the in-store research. Chapters three, four, and five were written as freestanding articles addressing different areas of this research. This format relies on some duplication between chapters. I apologize for any inconvenience this may cause the reader of this thesis as a whole.

Chapter three focuses on the consumer demographics of the environmentally conscious consumer. This involved both a compilation of research from over a dozen other researchers and review of the findings in this research. Chapter four examines the effects of a promotional brochure on the purchase of FSC certified wood products, as well as consumer understanding of forest certification. Chapter five is an investigation into consumer reactions to charging a price premium for FSC certified wood products. Finally, chapter six is the final conclusions made from this research, with recommendations for future research.

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Chapter One: Overview and Literature Review

Introduction

In recent years, environmental issues have received a great deal of attention, reflecting increased public awareness and concern. Environmental groups have campaigned vigorously for higher environmental standards. Media reporting on these issues has increased considerably and numerous regulations and laws have been passed that address the natural environment. In addition, some companies have felt the impact of consumers' concerns through product boycotts.

As a result of these trends, forestry practices in the United States have received increased scrutiny. The first highly publicized event was the halt of harvesting old-growth timber in the Pacific Northwest during the early 1980's, resulting in increased regulation of forest practices. These factors may have influenced the increased popularity of environmentally sensitive wood products. Environmental issues specific to forestry have been of interest throughout the 1990's. These include the controversy between endangered species conservation and personal property rights (e.g. the spotted owl), the debate concerning multiple use forest policies, as well as the federal Salvage Rider legislation (Gronroos and Bowyer 1999).

One response to environmental issues has been the formation of various forestland and forest products certification programs. Certification involves creating a verification scheme that can ensure that wood products come from a sustainably managed forest, based on a set of environmentally-sound criteria. A trend by some forest products companies in recent years is to "certify" forestlands, manufacturing, and/or distribution facilities. Some of the larger forest products companies in the United States have completed various types of certification processes. These include manufacturers such as Anderson-Tully Lumber Company, Weyerhaeuser Company, MacMillan-Bloedel, Kane Hardwoods, and Columbia Forest Products (Hansen and Panches 1998).

In response to increased environmental awareness, some retail stores are addressing certified materials. The Home Depot, Lowe's Home Improvement Warehouse, and 84 Lumber have all announced new purchasing policies to address the

public's environmental concerns (Blackman 2000). Many current suppliers of Lowe's Home Improvement Warehouse and The Home Depot have shown a preference for vendors that are third-party certified. The first companies to take these steps were J.D. Irving and Columbia Forest Products in 2000. Each gained recognition for their certification efforts. In addition, a popular retail store, The Gap is specifying certified wood in construction of new retail stores and new corporate buildings (The Gap 2004). Municipalities, such as Los Angeles and Washington D.C., have given purchasing preferences to certified wood products (Goldman 1999). These trends indicate an increased interest by the forest products industry and the general public to how forestland is managed.

Rationale

There are a number of factors that will affect the acceptance of certified forest products. Currently, there is limited consumer demand for these products. The lack of demand is believed to be partially due to consumers' lack of understanding about forest management issues or the significance of certification (Hansen 1997). Without education and promotional efforts, consumers are unlikely to recognize the value of a certification eco-label, or to understand its' significance (Hansen 1997). Lamson (1997) agrees with Hansen that there is a lack of consumer understanding of "certified" products or the significance of a sustainable forestry logo placed on a product. He argues that the public needs more detailed information that empowers them to "do the right thing." Although this is his opinion, it points out the need for making additional information available to consumers. In their recommendations for future research Banerjee et al. (1995, p 31) state, "there is virtually no research done on the effectiveness of green advertising" and there is a need for research in this area.

Despite the agreement by leading researchers that promotion could increase the success of certified forest products in the marketplace, to date no research has been done in this area. This research addresses previous assumptions by researchers and examines how promotion of forest product certification influences consumer purchase decisions.

Purpose of Research

The primary goal of this study was to examine how providing consumers with a promotional brochure about forest product certification impacted consumer purchase decisions. In addition, the influence of price was examined to determine the potential for companies to charge a premium for these products. Finally, a comparison was done between this research and previous studies of the typical demographic factors for green consumers.

The study concentrated on home centers in the southeastern United States. Overall, this industry provides a full range of home improvement and construction materials to both homeowners and professional contractors. The home center industry is an excellent area to study because of the growing popularity of home centers. This is the primary channel through which wood products are sold for the growing repair and remodeling market. This is also an industry that has experienced continued growth since 1991. Total retail sales by home improvement retailers in 2003 were \$208.4 billion, an increase of 11.5% over 2002. The latest projections show the home improvement retailers segment totaling \$254.8 billion in annual sales by 2007 (Johnson and Wright 2003). During this time, do-it-yourself sales are expected to grow more than twice as fast as professional / remodeler sales (Johnson and Wright 2003).

This study stocked both FSC certified and non-certified hardwood boards in selected home center stores. Consumer purchasing was examined based on two different levels of promotion and price for red oak and yellow poplar surfaced-four-sides (S4S) boards. The dependent variables used in this study were the percent sales share and occurrence of sales of FSC certified S4S red oak and yellow poplar boards. In addition, this research compared the typical demographic factors for green consumers to those from this study.

Literature Review

Certified Wood Products – Defined and History

Defining certification is challenging. Definitions for wood products certification are difficult to find in the existing literature. Those involved in certification are currently debating what the definition should encompass. Webster's Dictionary (Merriam Webster 2002) defines 'to certify' as . . . "to attest as being true or as meeting a standard," or "to guarantee . . . usually applying to a written statement, especially one carrying a signature or seal." Hansen (1997) described certification as a system of identifying forestland and those products that are well managed with a goal toward sustainability. Stevens et al. (1998) defined forest certification as an instrument used to communicate credible environmental information to consumers about the forest resource. The working definition for this research is that *certification involves creating a verification scheme that can be used to ensure that wood products come from a sustainably managed forest, using a predetermined set of environmentally-sound criteria.*

There are many different certification systems that have been developed through various agencies. It has been widely debated over who is responsible for certifying forestland and the resulting wood products from those lands. Various certification systems exist, including first-, second-, and third-party certification. All of these systems are still in their infancy and are constantly evolving. This makes many people skeptical of each program's long-term viability. First-party certification is "an internal assessment by an organization of its own systems and practices" (Hansen 1997). Second-party certification involves an assessment by an outside party, such as a trade association. Third-party certification typically includes an on-site assessment by a neutral party not affiliated with a company or trade association (Vlosky and Ozanne 1997).

Most research shows that first-party certification is not seen as a viable alternative at this time due to the past experiences of untrue company claims, consumers are unwilling to trust a company's claim of environmentally-sound practices (Hansen 1997). Consumer research indicates that consumers are often suspicious of company claims or advertisements, environmental or otherwise (Bass 1996; Hansen 1997; Coddington 1993).

The most prominent example of second-party certification is the Sustainable Forestry Initiative (SFI) of the American Forest and Paper Association (AF&PA). The major goal of SFI is “to ensure that future generations of Americans will have the same abundant forests that we enjoy today” (Anonymous 2001). SFI is composed of a group of principles and guidelines that companies must follow. Companies must report annually on their activities, explaining in detail their compliance with SFI. A panel of experts composed of public officials, university deans of forestry, and conservation groups, review these company reports. However, no on-site inspections are done. After review by the panel, the company is given suggestions for improvements for the next year.

Due to company and public input on the SFI system, many changes continue to be made in the system each year. Recognizing that many were uncomfortable without a third-party review, AF&PA also introduced a third-party audit option in early 1999. This is voluntary at this time. As of 2001, more than 28 million acres of AF&PA member companies and SFI program licensee forestlands have undergone third-party certification audits, representing almost one-third of the total amount of SFI program lands. No labeling is currently available for SFI certified products. However, a labeling system is being developed and is in the process of being introduced. This on-product labeling system will be available for use only to those companies that have undergone third-party certification audits (Anonymous 2001).

The Forest Stewardship Council (FSC) is the largest third-party certifying organization. Founded in 1993, FSC “has positioned itself as the all-encompassing body for accrediting third-party certifiers” (Hansen 1997 p. 20). FSC evaluates and accredits forest management certifiers throughout the world. All certifiers follow FSC’s 10 principles and criteria for forest management to assure performance-based evaluation based on regionality.

FSC has accredited seven certifiers throughout the world. The two popular U.S. based FSC certifying organizations are Scientific Certification Systems and SmartWood. The FSC system carries a label to communicate certification to consumers. The FSC logo can be used alone or in conjunction with the certifier’s own brand label. The Forest Stewardship Council (FSC) defines certification as a voluntary way that forest managers and forest products companies can be recognized in the marketplace for “careful and long

term forest management.” The resulting label provides consumers with assurance that their purchases of forest products come from a well-managed forest (FSC 2002).

One response to the proliferation of standards is the work of the International Organization for Standardization (ISO). The ISO is recognized throughout the world, but is especially prominent in the U.S. They have developed a series of environmental management systems called ISO 14000 Standards that are intended to become international standards for environmental certification. This system addresses standards in five areas: environmental management systems; environmental performance evaluations; environmental auditing; life cycle assessment; and environmental labeling (Kinsella 1994; Anonymous 1999). This series of management systems has been supported by the wood products industry, but has been met with criticism from environmental groups.

In a study released by the Worldwide Fund for Nature (1999), forest products companies that were not operating with FSC certification in the European Union were losing sales share. Francis Sullivan, a spokesperson for FSC said, “the writing was on the wall from a consumer and investor point of view” (Worldwide Fund for Nature 1999). In a discussion regarding potential mutual recognition of environmental certification systems, Sullivan specifically excluded recognizing forests certified by an industry certification scheme, the Pan-European Forest Certification scheme, the main European rival to FSC’s system. The Worldwide Fund for Nature study reinforces the idea that third-party certification may be the best alternative because of its’ credibility, as well as providing companies with a number of options in implementation of environmental marketing strategy (Hansen 1997).

Forest Product Manufacturer Perspectives on Certification

Stevens et al. (1998) compared the perspectives from two groups of secondary manufacturers in the forest products industry: non-certified versus certified. The majority of non-certified companies weren’t certified because their customers didn’t demand it. Seventeen percent of the non-certified respondents were confident that they were already purchasing wood products that originated from well-managed forests, while 13% believed that they didn’t need to sell certified material to maintain sales share. Forty-eight

percent of this same group indicated that they would be motivated to sell certified wood products if it could increase sales share. This research will add important information to this area by further exploring market potential.

Certified manufacturers felt much differently about certification than non-certified companies. When asked why they became certified, 23% of the respondents did it to gain market access, while 15% sought higher customer demand, and 21% thought it was “just the right thing to do.” All of the respondents stated that they could increase sales if a greater supply of certified material existed (Stevens et al. 1998).

Average premiums paid when purchasing certified wood were 6.6%, with a larger proportion of companies paying less than three percent. When selling this material after further manufacturing, the average premium was 4.6%, again with the majority of respondents selling this for less than three percent. Respondents also shared their belief that approximately 18% of their customers are potential purchasers of certified wood products, while another 20% are interested in them (Stevens et al. 1998).

Home Center Retailer Perspectives

In addition to examining the forest products manufacturer, studies have also sought to examine home center retailers. For instance, a study by Vlosky and Ozanne (1997) examined the perceptions and activities of architects, building contractors, and home center retailers in regard to environmentally certified wood products. Specifically, the study examined environmental perceptions and levels of awareness for key corporate forest products purchasers. The study also sought to identify which entities business-to-business customers would trust to certify wood products, while assessing the willingness to pay a premium for environmentally certified wood products for the three respondent groups.

Important results from Vlosky and Ozanne (1997) include respondents’ trust in an independent third-party certifier as the best source of certification. Although the majority of all three respondent groups believed that management within their companies had strong environmental support, few indicated that company policies on environmental issues existed. The authors felt that this led to a breakdown in translating management concerns into corporate philosophy and practice. Companies seemed to take a nonchalant

approach to tracking environmental improvements within the company. Among respondents who stated that their companies are committed to the environment, the highest ranked reasons were a commitment from top management and consumer concern for the environment. However, all three respondent groups indicated that their customers didn't appear to be demanding green or certified wood products at the time of the study (Vlosky and Ozanne 1997).

When respondents' perceptions of environmental certification were examined, Vlosky and Ozanne (1997) found that all business sector respondents believe that they have a good understanding of environmental certification. The majority of respondents felt that environmental certification of the harvesting of tropical forests was needed. However, home center retailers felt that there wasn't as much of a need for this same verification in temperate forests. All respondent groups stated that there was a low number of purchases or specifications of environmentally certified wood products.

This study also examined the respondents' willingness to pay for certified wood products. Home center retailers were found to be the least willing to pay a premium for certified wood. Architects showed a moderate willingness and building contractors fell in between these two levels. This part of the study also investigated what costs the home center respondents were willing to incur to maintain chain-of-custody certification. Thirty percent of home center respondents indicated a willingness to contribute to the cost for chain-of-custody audits and procedures, with 10% of these willing to pay an additional \$5,000 to \$10,000 and the remaining three percent willing to pay over \$10,000 in assistance. When asked their opinion on whether consumers would pay a premium for these products, none of the groups felt that consumers would pay more. Home center retailers felt very strongly that customers wouldn't pay any more for certified wood products (Vlosky and Ozanne 1997).

Since Vlosky and Ozanne collected their data in 1996, there have been many changes made by home center retailers. In 1999, The Home Depot announced that it would be phasing out the sales of wood products from environmentally sensitive areas and would be giving preference to suppliers who became certified. In 2000, Lowe's announced a goal of ensuring all wood products sold in their stores originate from well-managed, non-endangered forests.

In their Social Responsibility Report, The Home Depot states that because they are the largest retailer of wood products, they have a responsibility to understand the products they sell to ensure they are “doing the right thing.” This report also contained the following wood purchasing policy (The Home Depot 1999):

Home Depot Purchasing Policy

1. The Home Depot will give preference to the purchase of wood products originating from certified well-managed forests wherever feasible.
2. The Home Depot will eliminate all purchase of wood and wood products from endangered regions around the world by year-end 2002.
3. The Home Depot will promote the efficient and responsible use of wood and wood products.
4. The Home Depot will promote and support the development and use of alternative environmental products.

The Home Depot expects its vendors and their suppliers of wood and wood products to maintain compliance with laws and regulations pertaining to their operations and the products they manufacture.

Lowe’s Home Improvement Warehouse released a wood purchasing policy in August of 2000 which states a long-term goal to ensure all wood products sold in their stores originate from well-managed, non-endangered forests. In order to meet this goal, Lowe’s created a purchasing policy that states (Lowe’s 2000):

Lowe’s Home Improvement Warehouse Purchasing Policy

1. Aggressively phase out the purchase of wood products from endangered forests as these areas are identified and mapped. This includes an immediate ban on wood coming from the Great Bear Rainforest of British Columbia.
2. Work with vendors to encourage the maintenance of natural forests and environmentally responsible forest practices.
3. Give preference to the procurement of wood products from independently certified, well-managed forests. The Forest Stewardship Council (FSC) is recognized as having the highest certification standards available today and will be given preference over other certification systems.
4. Work with our customers to increase the efficiency of wood use, including the promotion of wood reuse, recycling, and advanced framing techniques.
5. Work with our suppliers to increase the procurement of quality recycled, engineered and alternative products, when their environmental benefits are clearly demonstrated, including alternative fiber and tree-free paper products used for printing and packaging.

Many current suppliers of Lowe's Home Improvement Warehouse and The Home Depot have chosen to become third-party certified. The first companies to take these steps are J.D. Irving and Columbia Forest Products, who each gained recognition in the annual reports of the home centers for their certification efforts.

Many industry sources feel that The Home Depot is taking advantage of its' purchasing power to require certified products without a price premium. This reinforces the results found in Vlosky and Ozanne's (1999) study, which showed that home center retailers stated they were unwilling to pay a premium for these products. What The Home Depot and other organizations have failed to examine is how their consumers will react to these products. Both retailers and consumers must understand the importance of certification and the affect that it has on forest management (Bull et al. 2001). Although an immediate competitive advantage may not result for companies producing or selling certified wood products, Hansen (1997) argues that in the future, it may be a competitive disadvantage if companies are not certified, in effect becoming a cost of doing business.

Product Analysis

As public concern of environmental issues has increased over time, companies selling environmentally sensitive products have used this as a competitive advantage in the marketplace. This is seen as an avenue for market growth for companies interested in this area. Green markets have not gone mainstream, but continue to grow and flourish in many industries. This is reinforced by the fact that green offerings represented 20-40% of all new products introduced in 1991 in health-beauty aids, pet care, and household and laundry product categories (Ottman 1992). With continued consumer interest in green products, certified forest products play an important role in today's marketplace, as well as the future of the forest products industry.

"Forest products have always been perceived by the general public as a product that damages our environment, with an idealization that the industry is destroying the last of our old-growth forests" (Peterson 1994 p. 1). Certification provides an opportunity to communicate to consumers about responsible forestry practices and promote the forest products industry as the best material choice for sustainability. Certification is also a tool that can be used to counteract environmental advertising campaigns for competing

products. Environmental advertising has been used successfully for materials like plastics and steel, and resulted in an increase in sales share for these products. Finally, certification provides niche markets for U.S. companies in both domestic markets as well as European markets.

At the present time certified forest products are in their infancy. Public interest is increasing. However, before these products are accepted by consumers, they must understand what “certified” means and why they should care. Various studies have found this to be the largest barrier that these new products must overcome (Kangun et al. 1991; Ozanne and Smith 1998; Stevens et al. 1998; Michael and Smith 1994).

Assessments of market potential for various specific certified wood products have been conducted in the past five years. These products have included new homes, wooden household furniture, veneer, and softwood studs. The examination of market potential for certified wood products in new home construction was studied by Gronroos and Bowyer (1999) in two major metropolitan areas: the Chicago and Minneapolis/St. Paul areas. The specific objectives of the study were to determine attitudes of buyers of new homes and assess whether buyers would be interested in purchasing third-party certified lumber and wood products. The study by Gronroos and Bowyer (1999) was somewhat different than other studies examining willingness to pay more because it examines a product that the consumer was actively interested in purchasing. Other studies have used an approach of asking randomly chosen respondents how much more, if anything, they would be willing to pay for a product. However, they fail to take into account whether the respondents typically purchase that product (Gronroos and Bowyer 1999). The authors argue their study produces a better estimation of willingness to pay. This would seem to be the case since their estimates for green sales share were close to those estimated by Coddington (1993).

Results of Gronroos and Bowyer’s study showed that 36% of respondents in Chicago and 24% of respondents in Minneapolis/St. Paul stated they were willing to pay more for inclusion of certified lumber and wood products in their homes. The estimated premium consumers were willing to pay was between one and two percent of the total home purchase price. In addition, results indicated that consumers were more interested in purchasing environmentally certified lumber and wood products for features that they

can see in the home after it is built, such as flooring, doors, cabinets, and furniture. Forty percent of Chicago respondents and 25% of Minneapolis/St. Paul respondents indicated that they would be more likely to buy furniture that is made of certified wood than building materials or other less visible products. These results have been verified by other studies (Gronroos and Bowyer 1999).

John McNulty, Vice President of Seven Islands Land Company, a company producing certified lumber, stated, “consumers relate best to wood products they can see, such as flooring, moulding, doors, and stairways (Hammel and Ward 1996, p. 167). Consumers will request these items while not even considering the 2x4s, studs, and framing which make up their homes.” Stevens et al. (1998) found that companies selling certified wood products indicated that certified flooring materials, furniture, architectural panels and mouldings were the certified products in the highest demand. Stevens et al. (1998) also found that secondary manufacturers were better able to charge their buyers a higher premium than the percentage they paid to the supplier.

However, it should be noted that studying consumers’ willingness to pay typically overestimates the actual quantity of consumers that will pay more for this product. Likewise, the amount of a price premium that consumers will pay is also often overestimated, especially in items where it is considered socially desirable to answer that way. In general, with any socially desirable answer based on willingness, people are likely to overstate their willingness to take action (Spangenberg and Greenwald 1999).

Hammel and Ward use case studies to describe companies that became third-party certified in the early 1990’s and how the companies used certification as a marketing tool. Collins Pine Company initially sought certification to be a pro-active leader on environmental issues. The company hoped to gain a marketing advantage over larger competitors as a result of certification and attribute their increases in sales to certification. In 1995 Collins Pine saw a 25% increase in their sales to retailers, 22% sales increase to furniture manufacturers and a three to four percent increase to commodity dealers. The initial increase in cost was between two and three percent, but they expected that to fall over time. Collins Pine sold this certified material mainly to The Home Depot, Lexington Furniture Manufacturers, and Freeman Corporation (Hammel and Ward 1996).

Another case study featured is the Seven Islands Land Company. The company stated that no initial price return was expected on their certified lumber because they felt that consumer recognition must build over time. Despite this assumption, a 10% premium was immediately received on their logs, as well as a five percent increase on the veneer and shingles sold. Seven Islands stated that an additional benefit of certification has been increased yield because they are able to move lower grade material into new markets.

Other Examples of Environmentally Sensitive Products

There are many examples of environmentally sensitive products in the marketplace. These can be used to draw parallels and help predict consumer reactions to certified forest products based on previous reactions. This would include products such as paper with recycled content and plastic packaging products, chemical free and phosphate free products, and air and water filtration systems. There has been large growth in natural and organic food and beauty products, as well as a boom in bottled water, all-natural soft drinks and energy drinks. These now represent multi-billion dollar industries.

Other excellent parallels to certified wood products are the organic produce industry, green electricity, and the evolution of dolphin-free tuna. These industries all have similar manufacturer concerns about the future of these environmentally friendly products in their markets, as well as similar consumer purchasing characteristics. These similarities will be useful for comparison.

When the produce industry was first introduced to organic certification, both the farmer and the seller expected a premium for the additional costs they incurred. However most companies felt that these new green products would not affect their firm if they chose not to become certified. Both the forest products and produce industries have numerous processes for becoming certified, including first-, second-, and third-party certification.

Another commonality between certified forest products and organic produce is the reluctance of companies to accept these new products. Throughout the history of organic produce in the marketplace, producers and wholesalers have seen several barriers to expansion, typically related to quantity and price (Park and Lohr 1996). Examples of their concerns include: temporary supply shortages and surpluses; limited distribution

channels; and consumer premiums too low to recover the additional costs of production. A study by Park and Lohr (1996) examined the factors that influenced supply and demand factors for organic produce. They found that producers typically believe demand factors are the key constraint to market development, while wholesalers and retailers believed supply factors dominate demand. These are almost exactly the same concerns voiced by similar players in the forest products industry (Ozanne and Smith 1998). However, the organic produce market has now changed marketing strategies, with companies emphasizing health and nutritional benefits (Fonda 2002).

The evolution of the green energy and energy services market is another pertinent example to use as a guide for the forest products industry. This industry's experience with green certification started at approximately the same time as the forest products industry's, with many of the same initial reactions (Paulos 1998).

At the current time, a number of groups are developing certification standards, with no single standard. These include first-, second-, and third-party certification systems. Some industry groups now offer certification to their members. These include the Air-Conditioning and Refrigeration Institute and the National Fenestration Ratings Council (Paulos 1998). This type of certification is usually based on clearly defined standards. Some of these certification programs boast participation rates as high as 90%. There is also a third-party certifying organization, the Center for Resource Solutions "Green-e" program. This program is certified through two private eco-labels, Green Seal and Scientific Certification Systems (SCS). These eco-labels have only been successful in niche markets to this point in time and have had trouble attracting applicants. Major companies in the U.S. have shunned these labels and have actively opposed their existence. The industry has complained that the method for judging environmental effects is inadequate and tends to be too subjective (Paulos 1998). Within the industry, the credibility of these systems has been debated, as well as what role the government should play in certification. A 1990 study examined which source consumers perceived as the least biased source for environmental information. Environmental groups were seen as much more unbiased than the government by consumers (Paulos 1998).

Another issue that has arisen in certification in the energy field is how to define green-power and green-power products. The first hurdle in defining these is the

disagreements between environmental groups, corporations, and industry associations. Without an agreed upon definition, it is difficult to communicate a consistent message to consumers. In other segments of environmentally green products, this has caused consumer confusion and skepticism (Mohr et al. 1998, Mendleson and Polonsky 1995). Another problem with environmental claims is that although they allow for consumer education, they may mislead or confuse the public. Market communications can be truthful but be misinterpreted by consumers (Paulos 1998).

Consumer Characteristics

Many researchers have tried to identify key consumer characteristics that will help companies identify the green consumer. “Market segmentation is based on the idea that consumers will have differing demand elasticities to the marketing variables of a firm” (Ozanne and Smith 1998, p. 387). They may react differently to new product offerings, changes in price, advertising themes, or promotional offers.

According a study done by Roper Starch Worldwide (1999), consumers differ by their concern and knowledge of the environment. Green consumers can be classified by their degree of commitment to the environment according to attitudes and behaviors (Roper Starch Worldwide 1999). Other research has suggested identifying green consumers through correlation with environmental concern, personality traits, and demographic variables (Ozanne and Smith 1998). Other studies have examined the relationship between environmental attitudes and product purchase or usage intentions (Balderjahn 1988).

A study conducted by Ozanne and Smith (1996) examined whether a potential market segment for environmentally wooden household furniture exists and profiled this market. Profiles were based on demographic, socioeconomic, and psychographic variables. They studied a population of 140 million American single-family homeowners throughout the United States. When asked to identify the most important furniture attributes, the most common answers were quality construction, durability, and quality materials. Of the 24 furniture attributes measured in the study, the four dealing with environmental impacts were rated as 18th, 20th, 22nd, and 23rd in importance. While environmental considerations were not seen as a primary criterion for purchasing

furniture, subgroups were identified that were more likely to consider environmental attributes in their purchase decisions.

Based on these findings, the respondents were then divided into clusters. Two clusters were seen as having market potential for certified wooden household furniture. The first group was described as “Environmentally Conscious But Not Price Sensitive.” Respondents in this group were typically members of the Democratic Party and had the highest education level (college graduate or higher) and had the highest income level (\$60,000 or more). These individuals were also more concerned about the quality of the environment than several other issues, and were typically members of environmental organization(s) (Ozanne and Smith 1996).

The other cluster of respondents was identified as “Environmentally Conscious but Price-Sensitive.” Respondents within this group were still typically members of the Democratic Party. However, they had moderate education levels (some college) as well as moderate-income levels (\$40,000 to \$59,999). This group was also more concerned about the environment than several other issues and participated in environmentally related behaviors, such as hiking and fishing. These two consumer segments combined represented 39% of respondents. These are identified as good prospects for purchase and help to illustrate the market potential of environmentally certified wood products, such as household furniture (Ozanne and Smith 1996).

Studies on the typical consumer characteristics for purchasers of organic produce also cite similar findings. Both product categories have similar target markets, which are aimed at higher income consumers, with women much more likely to purchase these products. The effect that level of education has on purchase decisions is debated in the research. Thompson and Kidwell (1998) argued that a consumer with a graduate or professional degree decreased the probability of choosing organic produce. However in an earlier study, Goldman and Clancy (1991) found that at least 55% of their population purchasing organic produce had some post-graduate education. Initial research of certified forest products consumers indicate that they are more likely to be females who are older with a higher level of education (Ozanne and Smith 1998).

Shrum et al. (1995) define a green consumer as anyone whose purchase behavior is influenced by environmental concerns. Their research examined the consumer factors

that contribute to green purchase behavior. Consumers that make a special effort to purchase green products typically had a greater interest in products, take more care in shopping, have a greater perception of being an opinion leader, and have a greater interest in written media than television. These consumers also have the tendency to not buy products when they dislike the advertisements for that product or brand. The study found that these consumer variables of green buying were independent of the influence of demographic variables. These study results suggest that women are more skeptical of green advertising, while men's skepticism toward advertising appears to be unrelated to their green buying behavior.

The typical green consumer profile based on consumer characteristics is an individual with an interest in new products, an information seeker who talks with others about products. They are careful shoppers and not prone to impulse purchasing. They are more likely to put importance on price and less likely to be brand loyal. However, a variety of studies have also found results contrary to other studies in this area. Cornwell and Schepker's (1985) results indicated that the environmental consumer tends to be white, urban, better educated and have a higher income and occupational status. Dunlap (1991) found that younger, urban, well-educated, politically liberal consumers affiliated with the Democratic party tend to be more concerned about environmental protection.

While Ozanne and Smith (1998) found that the most likely purchaser of a green product, environmentally certified wood products, would be a woman with liberal political views, older, higher educated, and a member of an environmental organization. Ozanne and Smith's study also found that 18% of the respondents are very likely to seek out environmentally certified wood products, while another 40% of respondents may be potential consumers of certified wood products. Total market potential for certified wood products equates to 58% of single-family homeowners or 56 million Americans. Consumer concerns listed in the study are protection of forest resources, quality of the environment, and the availability of health care.

The latest Green Gauge Report produced by Roper Starch Worldwide (Crispell 2000) reports that there are currently 15% of adults in the United States who are the most environmentally involved. This report describes all individuals as fitting into one of five categories: true-blue greens, greenback greens, sprouts, grouzers, or basic browns (Figure

1.1). True-blue greens are the most environmentally concerned and active group, while greenback greens are the most willing to pay extra for green products. Sprouts are “on the fence” regarding the environment. Grouzers are concerned about the environment and participate in the easier environmental activities but also make excuses for not doing more. Basic browns don’t do anything about the environment because they don’t consider it their problem.

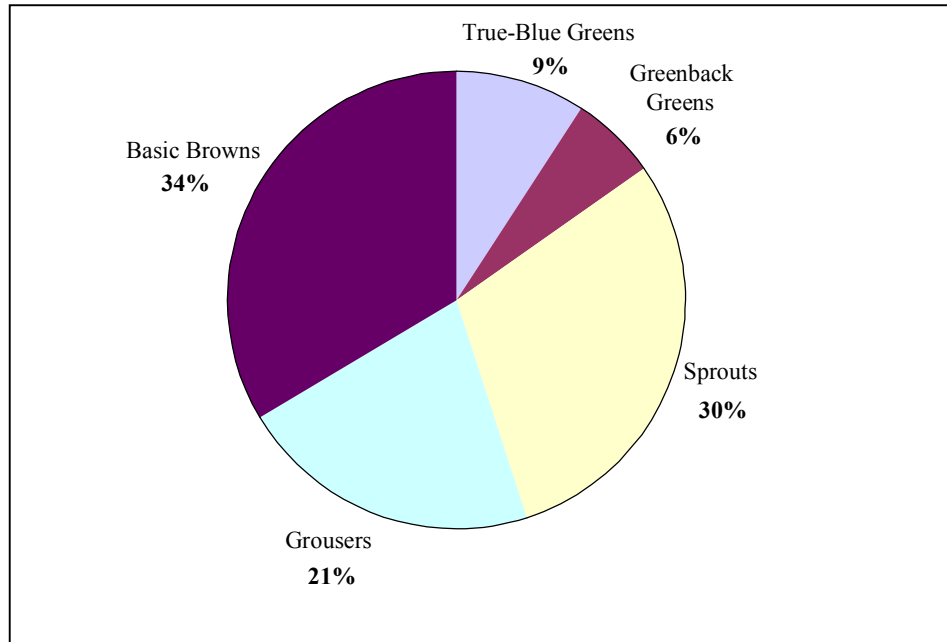


Figure 1.1. Current make-up of U.S. population according to Roper Green Gauge Report (Roper Starch Worldwide 1999)

In summary, there are a number of consumer traits that each study ranked as important in affecting consumer purchase decisions. The study cited a higher level of education and higher income levels as important factors in purchasing decisions. Political affiliation with the Democratic Party or a liberal party also increased the probability of purchasing certified wood products. Consumers who were members of an environmental organization and concerned about environmental conservation were also more likely to be green consumers. Finally, some studies found that the likelihood of environmental-based purchasing habits seemed higher for white, urban individuals. Based on the previous studies’ identification of a green consumer, this research will compare this

profile with the results of the consumer survey and further explore any discrepancies between the two sets of data.

Stone et al. (1995) used a series of Likert scale statements to assess individuals and segment a subset of environmentally responsible consumers. The purpose of developing this scale was to identify the environmentally concerned consumer as a market segment. The authors first reviewed the previous work of 20 studies and established a working definition of what “environmentally responsible” encompassed. Environmental responsibility was defined as *“a state in which a person expresses an intention to take action directed toward remediation of environmental problems, acting not as an individual concerned with his / her own economic interests, but through a citizen consumer concept of societal-environmental well-being. Further, this action will be characterized by awareness of environmental problems, knowledge of remedial alternatives best suited for alleviation of the problem, skill in pursuing his or her chosen action, and possession of a genuine desire to act after having weighed his / her own locus of control and determining that these actions can be meaningful in alleviation of the problem”* (p. 601).

Based on this definition, dimensions of environmental responsibility were constructed and tested. An initial pool of 50 questions was developed. Based on the previous studies five dimensions were identified as part of environmental responsibility. These included consumer’s knowledge and awareness, desire and willingness to act, ability to act, opinions and attitudes concerning the environment, and behavior. This questionnaire was then administered to student volunteers at a major southeastern state university. Although no demographic information was actually collected, it was assumed that the sample was representative of the general population (Stone et al. 1995).

After the survey was conducted, factor analysis was used to determine and confirm the number of dimensions of environmental responsibility. Factor analysis is a statistical technique used to determine how many latent variables underlie a set of factors that are interrelated (Norusis 1985). Based on these results, a total of 19 items were deleted from the analysis. Fourteen were deleted because of low item-to-total correlations, while another five were deleted because further analysis showed that combined the five questions only explained five percent of the variance. The end result

was a 31-item scale with a coefficient alpha of 0.9288 that accounts for 86.3% of the variance. The items were divided into 7 factors. These were: (1) opinions and beliefs, (2) awareness, (3) willingness to act, (4) attitude, (5) action taken, (6) ability to act, and (7) knowledge. These subscales were later tested for correlation with behaviors and were found to be correlated with six behaviors: boycotting, recycling, educating others, lifestyle changes, personal sacrifice, and changes in strategy. The implications of this research are in using this scale to identify green consumers that are likely to act. For example, this could be used to target consumers in a green advertising campaign (Stone et al 1995).

Measures of consumer demand for certified wood products vary widely. Hansen (1997) stated that to date there is little evidence to suggest there will be mass-market demand for these products. This is a major concern for forest products companies that are considering producing or supplying certified products. Many companies questioned whether sufficient demand exists (Ozanne and Smith 1998). Hansen (1997) suggests that only limited demand currently exists partly because few consumers understand forest management issues and without education are unlikely to recognize the value of certification. A customer shopping recently in The Home Depot store in Colma, CA wasn't aware of forest certification standards. "I don't know anything about standards," said the San Francisco postal carrier. "All I know is my fence blew down and I have to find more lumber" (Kim and Carlton 2001). Despite the current lack of consumer knowledge, Hansen believes that companies who are not involved with certification will be at a competitive disadvantage in the future.

Eco-Labeling in the Marketplace

Some forms of certification can involve the use of an eco-label on certified products. An eco-label is simply a logo that communicates to the consumer that the product is environmentally responsible and is a type of a brand for green products. This eco-label is similar to those on relating recycled paper content in many paper products, organic certification, and dolphin-safe tuna labeling. A certification eco-label can act as an important promotional tool.

Market-based research that examined various types of labeling programs has demonstrated that labeling can significantly change consumer behavior. Levy and Stokes (1987) and Teisl and Levy (1997) illustrated that shoppers who were exposed to detailed nutrition information labeling changed their purchasing habits based on this labeling. Teisl et al. (2002) examined the effects of dolphin-safe tuna labeling on consumer purchasing. They found that demand for canned tuna changed significantly when dolphin-safe labeling was introduced in the early 1990's. These findings provide evidence that consumers do respond to labeling information presented regarding health and environmental issues.

Hansen (1997) describes this labeling tactic as environmental marketing. He describes it as “gaining profit from identifying and providing for the wants and needs of consumers while recognizing and minimizing impacts to the environment” (p. 16). While, Coddington (1993) suggests that environmental marketing are activities that consider environmental stewardship as an opportunity for business development. Peattie and Ratnayaka (1992) expand on these definitions, stating that social responsibility, the pursuit of sustainability, and a holistic approach that stresses how everything is interconnected are all part of environmental marketing. Their definition implies that the company is using environmental marketing as a way to communicate to consumers its' belief in the company's social responsibility. Other definitions imply that environmental marketing is being used more as a competitive advantage than simply a feeling of responsibility. There are companies that follow each of these reasons for producing certified material.

Promotional Strategies

There are many ways to position green products. Iyer and Banerjee (1993) studied over 150 advertisements for green products and developed a differentiation strategy based on appeal. There are “green appeals,” such as emotional, euphoria, and management that emphasize the environmental attributes or implications of a product. “Non-green appeals” contain environmental information, but emphasize other aspects of the product, for example, financial or quality appeal.

Based on this work, a study by Schuhwerk and Letkoff-Hagius (1995) examined how consumers responded to different print advertisements for a green laundry detergent. They varied the relative prominence of the product's environmental attributes compared to the financial attributes. Except for the headline, the order of the text was kept constant across the ads. Results indicated that consumers who are highly involved with the environment may be predisposed to purchase green products regardless of the type of appeal used. For those less involved with the environment, appeal played an important role. The green appeal was a more effective approach with both groups. This suggests that by directing attention to environmental attributes through prominence, a green appeal may generate positive responses from consumers regardless of their level of involvement with the environment.

Banerjee et al. (1995) explained that environmental choices must involve two fundamental things: an assessment of the environmental impact of a product or service choice and a behavioral change in purchasing, consuming, and disposing of the product. 'Green advertising' must meet one or more of the following criteria:

1. Explicitly or implicitly addresses the relationship between a product or service and the biophysical environment;
2. Promotes a green lifestyle with or without highlighting a product or service; and
3. Presents a corporate image of environmental responsibility.

Typical appeals in current environmental advertising were emotional appeals, as well as fear and guilt. Very few ads in their studies voiced the environmental benefits of a product or discussed the specific environmental actions of a company. Since this research was published, more forest products companies have tried to adopt a corporate image of environmental responsibility. Companies such as Georgia-Pacific, International Paper, and Weyerhaeuser now air television advertisements that discuss their environmental activities, such as replanting efforts and land exchanges with The Nature Conservancy.

Research by Mazumdar (1993) addressed consumer purchase decisions for new products, explaining the factors that effect a consumer's willingness to adopt a new product. The three factors that have direct effects are product class knowledge, attitude risk, and relative concerns for low price compared with high quality. This framework

emphasizes that price and quality are directly related, with a general decrease in quality with a decrease in price. He explains that today's consumers are not automatically impressed by the highest quality product or the lowest priced product. Instead, consumers' decisions are based on careful assessment of what benefits they obtain in exchange for the costs they incur to acquire them. Another important factor to consider in any new product introduction, including green products, is that consumers are going to evaluate the new product by comparing it to a reference product.

Schkade and Kleinmuntz (1994) came to the conclusion that the most important factor in presentation of information is the ease of understanding the information. Applying this to promotional materials for certification would translate into a brochure that is attractive and minimizes the amount of scientific vocabulary used throughout. These attributes will result in a lower level of effort to learn about certified wood.

A study by Gronroos and Bowyer (1999) indicated, "it is a possibility that those seeking to sell wood products could place an increasing emphasis on educating consumers, explaining how forest products certification could result in less impact on the environment." However, they caution that an over-eagerness to sell the advantages of certification shouldn't rely on highlighting the shortcomings of current forest management practices. This could result in consumer disinterest of all wood products.

All of these studies emphasize that promoting green products is a tender balance of giving the consumer too much information and overwhelming them and not giving consumers enough information, making them skeptical of environmental claims. Further, other product attributes must be coordinated with the environmental attributes in order for promotion to be successful.

Pricing Strategies

A general theme through much of the previous research done on both forest certification and environmentally green products emphasizes the questions surrounding price. Many studies have examined whether companies are already receiving more for these products. While a series of studies have been done on consumers' willingness to

pay a premium, the question remains, can potential price premiums become standard practice for green products?

A study done by Humphries et al. (2001) compared the status of certified wood products merchants between 1995 and 1998. Much of the study surrounded corporate benefits of certification. The direct benefits identified were receiving green premiums and maintaining or increasing sales share. Surveys of merchants showed that market premiums are currently rare and that the indirect benefits of certification are often the most important reason for entering the certified products market (Humphries et al. 2001). Sixty-three percent of merchants did not apply a green premium for certified products, while 20% received a premium between one and five percent. Merchants indicated that the lack of a premium was due to the immaturity of the market. In addition, merchants often felt that certification was obtained based on the desire to expand sales share by distributing certified wood products. To reinforce the findings of Humphries et al. (2001), other studies showed similar results with little evidence that distributors were adding a green premium to the final cost (Stevens et al. 1998).

Ottman (1999) explains that many companies do not charge a premium for green products because of past experiences after new products flopped when consumers did not pay a premium. She explains that many new green products are poorly marketed. The important question to ask is what other benefits does this green product offer? She argues that today's generation of green products must offer similar or better quality attributes compared to competing products. During the past four years there have been a number of new product introductions that have gained commercial success, with premiums ranging from 25 to 50%. Terra Verde offers a line of soft certified organic cotton sheets and towels, as well as aromatic candles and natural body oils. An emporium in New York City's Soho district now merchandises these. Maytag's new Neptune Washer was designed to clean clothes better, clean more clothes per wash, and saves an estimated \$100 per year on water and energy bills. This product is sold at a 50% premium and retailers have trouble keeping it in stock (Ottman 1999).

Ottman emphasizes that the key to successfully getting a premium for green products is to go beyond the green aspect and focus on the primary benefits that consumers were seeking in the first place. In addition, she suggests that all of these

benefits be communicated to the consumer, while keeping in mind that consumers do not understand a lot about environmental issues. Consumers may also think that green products are inferior quality as a result of the poor performance of early green products. Michelle Barry, a market-research analyst with the Hartman Group explains, “a lot of companies don’t want to sell an organic product with a tree-hugger image anymore” (Fonda 2002 p. Y1).

Some general strategies for pricing consumer products are to add a predetermined mark-up to what the product costs or to compare the price of competitors and price to be comparable. However, the part of pricing that marketers and salespeople most commonly forget is the emotional side of price. This includes broad assumptions on the consumers’ part in correlating a higher price with better quality. O’Neill and Lambert (2001) validated the results of previous study that illustrated the relationship between price and quality. They found that as a consumers’ price-quality inference increases, how much they are willing to pay increases as well. The relationship between price and quality has also been examined in other ways.

Another study concurs with the conclusions that lacking other obvious cues consumers will judge quality based on price (Noel and Hanna 1996). This study varied price on a group of 14 competitive products and evaluated the respondents’ reactions in ranking them for quality. They found that product quality has a positive correlation to price assessment. The results indicated that consumer judgements about product quality influenced the price that they were willing to pay. Erickson and Johansson found that judgements of price influence and are influenced by beliefs about a brands quality. In addition that higher priced products are often perceived to possess higher quality than they necessarily deserve (Noel and Hanna 1996).

Brucks et al. (2000) studied the effects of both price and brand name as indicators of perceived quality by consumers. The research showed that consumers evaluate quality in many different ways and using varying quality dimensions. Unlike the research by O’Neill and Lambert (2001), their findings closely examined when price and brand influences a consumer’s perception of quality. The findings in this study indicate that price and product quality are not correlated under all circumstances. Potential explanations for this difference are explained. The price-perceived product quality

relationship could depend on specific quality dimensions that were relevant only to those products examined in previous studies. Consumers may only use price to infer for certain product types. For example, price would be more directly correlated with quality when the product was seen as an item of prestige. Whereas, a consumer may rely less on linking price and quality when they are concerned with the ease of use or serviceability as indicators of quality (Brucks et al. 2000).

Much of the research discussed in this section suggests that price can be used as a cue for multiple purposes. These can include portraying an image of high product quality, a hip or popular product, green product, or simply because of the brand name. However, many times multiple strategies are used. Numerous research has shown that this is also the case with green products. Products that are marketed simply as an environmentally elite product have often failed. Researchers suggest that this was not only because of the higher price, but the overall image of the product.

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Chapter Two: Methods

Introduction

This study is one of the first of its kind to study actual consumer purchasing decisions for certified forest products. Therefore, established methods were not available for this type of research. The methods used in this study were based on consumer studies done in similar fields as well as studies done within the certified forest products arena.

For the purpose of this research, certification is defined as *a verification scheme that can be used to ensure that wood products come from a sustainably managed forest, using a predetermined set of environmentally-sound criteria*. The certification scheme used for this research was created by the Forest Stewardship Council (FSC).

Objectives

The objectives of this study were:

1. To determine the influence of a promotional brochure for FSC certified forest products on consumer purchasing decisions.
2. To examine the impact on consumers' purchasing decisions when a 20% price premium is added to FSC certified forest products while a cheaper non-certified alternative is present.
3. To compare the consumer demographic findings of this study to those of previous studies to identify demographic indicators of the green consumer.

Population

The population of interest in this study was consumers of high-end hardwood boards. High-end is defined as clear and surfaced-four-sides (S4S) red oak and yellow poplar boards. This study included two types of consumers: "do-it-yourself" consumers and "professional shoppers," also called "contractors." "Do-it-yourself" consumers consist of the average individual who is working on a woodworking project at home, whether it is a home improvement project or a craft project. "Professional shoppers" are those consumers who have been hired by someone else to complete a home improvement or woodworking job.

Sample Frame

The study was conducted in 12 home center stores throughout the Southeastern United States. The store locations were chosen based on their proximity to large urban areas. These were then separated into two groups, labeled as “urban” and “suburban” stores and acted as the blocking effect for the project. This was done to allow further examination of the demographic characteristics of potential consumers of certified wood products. It was hypothesized that urban and suburban consumers would differ in their purchasing behaviors. Twelve stores were chosen by the participating home center. Three states were included in the sample frame: Florida, Alabama, and Georgia. Treatments were then randomly assigned to each of these stores within each state, which are described in detail in the next section.

A proportion formula was used to estimate the desired sample size. This formula is commonly used for marketing research and is preferred because it does not require an estimate of the standard deviation. By setting the true population proportion estimate, p^* equal to .50, variation is maximized for a dichotomous question (Malhotra 1996). This value was used because most of the questions of particular interest in the questionnaire were dichotomous. For example, “Did you purchase lumber today?” The response choices were yes or no. The resulting value for sample size can be seen as a conservative estimate. Sample size was calculated as follows:

Confidence level (α) = 90%
Corresponding z-value = 1.645
Level of precision (e) = .05
Assumed value of p^* = 0.50

Formula for estimation of N:
$$N = z^2 (p^* (1 - p^*)) / e^2$$
$$N = (1.645^2) (.50 (1 - .50)) / .05^2$$
$$N = 270.6 \approx 271$$

Based on this sample size calculation, a determination was made that the initial goal for this research should be to collect a minimum of 271 questionnaires. However another factor that was taken into consideration was the small number of stores per treatment type. This made the number of completed questionnaires per store important as

well. The initial goal was to collect 50 completed questionnaires from each of the 12 stores. This would allow statistical analysis to occur on a per store basis. With a target response rate of 100%, the initial goal was to collect 600 questionnaires. However, due to differences in the occurrence of sales between stores, only a portion of the stores reached that goal. This caused a larger error term and wider confidence interval. Both were considered when interpreting the results.

Data Collection – Sales Volume

There were two parts to this study, each requiring different data collection methods. The first section was designed to determine the change in sales as a result of changing factors within each block. The second portion of the study examines the results of the consumer survey.

This study was designed to determine the influence of the promotional brochure and pricing on consumer purchasing decisions. The data collection technique tracked the total sales volume of each product using designated universal price codes (UPCs). Sales volume was recorded on a monthly basis. Sales of the similar non-certified hardwood lumber product were tracked. Also, sales volume was tracked by individual store and analyzed by block and treatment type.

This design can be treated as a 2 x 2 x 3 factorial experiment (Figure 2.1). Using this design, the promotional brochure, price premium, and store location are treated as the

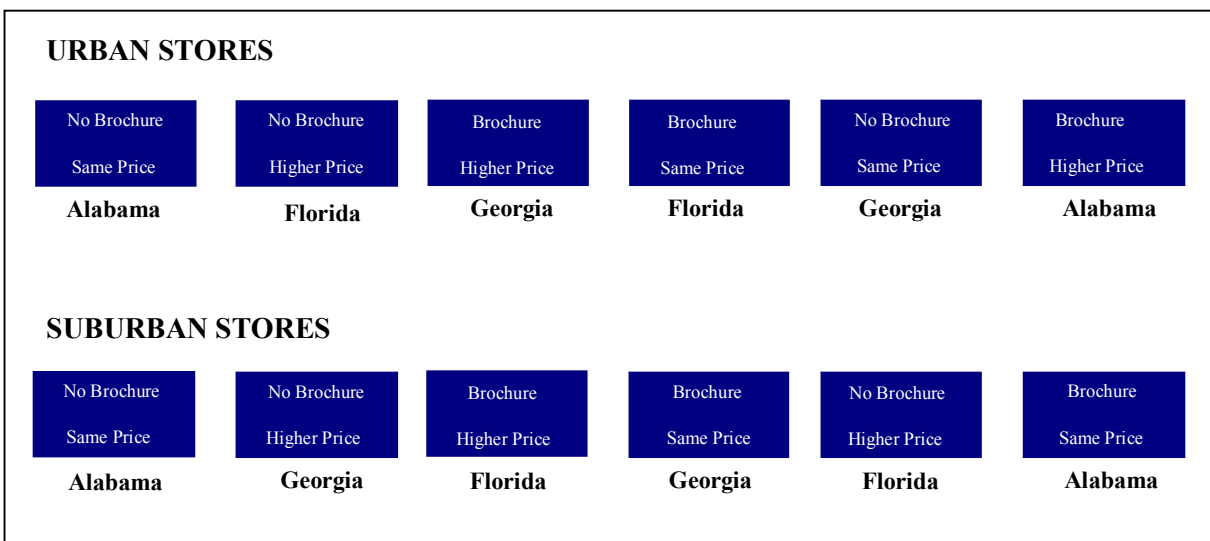


Figure 2.1: The experimental design used in this study was a 2 x 2 x 3 factorial.

factors. This design allows testing both the main effects and the interactions between the treatments (Schabenberger 2000). However, due to the lack of a full replication within each block, the standard error within each block cannot be calculated.

The independent variables were the treatments: promotion and price premium. A price differential was set for some of the test stores. The premium price for these FSC certified wood products was 20% more than that of the comparable non-certified product. This premium was chosen by examining other comparable environmentally sensitive products, such as organic produce and recycled paper products, as well as other specialty products, such as micro-brew beers and all-natural foods. These premiums ranged from 10% to 100% more than alternative products (Ottman 1992). In addition, the pricing for this study was influenced by the previous premiums tested in studies of consumers' willingness to pay for certified wood products. These premiums were all fairly low, ranging between one and ten percent (Gronroos and Bowyer 1999). The price premium helped to accurately determine consumers' demand for purchasing certified products by making the price difference enough that it would be noticed. This also allowed the examination of whether promotional material could convince consumers to purchase certified products despite a higher cost.

The promotional brochure (Appendix 3) was designed and placed in home centers by Virginia Tech in cooperation with the home center, the supplier, and the supplier's advertising agency. All stores received the same display to hold the products, as well as a sign stating that the products were "FSC Certified." One-half of the stores had a tear-away information sheet explaining FSC certification. The message focused on the environmentally friendly and sustainable aspect of the product, as well as its high quality. It was assumed that consumers in home centers are less likely to recall specific company information on products such as hardwood boards. Based on this assumption, a brand was created for these FSC certified products – GreenMark. The intent was to assist consumers in recalling the brand they had purchased.

A large portion of the study was designed to determine the influence of promotion on consumer purchasing decisions. Sales of each product were tracked, using specifically designated UPC codes, and recorded on a monthly basis. Sales of the similar non-certified hardwood lumber product were tracked as well. For this section of analysis, the

dependent variable was GreenMark's sales share per store. The final value that was determined to be a valid dependent variable was the arc sine of GreenMark's relative sales share per store. This value was chosen to eliminate store-to-store variance in the total sales volume of hardwood boards sold. This could have been addressed in other ways, such as using Analysis of Covariance (ANCOVA), however the arc sine transformation corrected any variance problems, while maintaining the maximum number of degrees of freedom (Myers 1972, Ott 1993).

The relative sales share per store was calculated by taking the number of boardfeet purchased in that store and dividing it by the total sales volume in boardfeet in that store for both the FSC certified and non-certified brands. Once the relative sales share was calculated, the arc sine was taken. The arc sine transformation is common practice by statisticians in order to stabilize the variances. This transformation allowed further analysis to be done based on the relative sales share without concerns regarding the wide range of variances typically seen when examining proportions (Myers 1972, Ott 1993).

Initially, other potential forms of data were examined. These were sales dollars, number of pieces sold, and the boardfeet sold. Sales dollars was determined to be confounded by the influence of the price premium within each store based on the pricing treatment. For example, if a store had a price premium and sold the exact same amount of GreenMark as a store with no price premium, there would appear to be a difference in the sales between those stores. The number of pieces sold was confounded by the variation in size of those pieces. One store could have sold a large number of small pieces of GreenMark, while another store could have sold the same number of large pieces. Using the number of pieces sold measure, these stores would appear to have sold the same amount of GreenMark, however the implications are very different for these two scenarios. The number of pieces sold was converted to the total boardfeet sold per store based on unit size, allowing for a better account of the actual volume sold. However, this value could not be used either. This is due to the large variation between individual stores in the total boardfoot sales of hardwood boards. Using this value would have detected differences in treatments that were actually differences in the store size and overall amount sold.

Sales data was provided by the home center. The data was then inputted into a SPSS® Statistical Data Analysis package computer spreadsheet. It was coded to reflect the treatment for each specific store as shown in Figure 2.1 and reviewed for errors or omissions. Analysis of variance (ANOVA) was used to investigate the effects that each treatment had on the arc sine transformation of store sales share. The difference between the overall mean and the mean for each treatment is known as the variance. The variance can be broken into two pieces: that which is attributable to the influence of the treatments and that which cannot be explained. ANOVA also allows for the calculation of significance levels for the main effects, as well as the interactions between effects and between blocks (Winer et al. 1991). Interactions are the effects due to putting two or more features in combination that cannot be predicted by knowing the effects of the two features separately (Lehmann et al. 1998).

In analyzing the ANOVA results, a significance level of .10 was used to determine whether the effect of a treatment was significant. Those main effects and interactions with $p < .10$ are considered to have significant evidence that they are different than the overall mean (Ott 1993). P-values of .01, .05, and .10 are typically used to test whether treatments are statistically significant or whether they are simply due to chance. The statistically significant effects helped to identify which actions will increase the sale of GreenMark as well as those actions that will decrease sales (Sahai and Ageel 2000).

Data Collection and Analysis – Consumer Survey

In addition to the analysis of the two experimental designs, a consumer survey was conducted to examine consumer attitudes regarding certified wood products, pricing, and promotion. Respondents were all purchasers of S4S hardwood boards, both the FSC certified (GreenMark) and the non-certified alternative.

The survey was conducted using intercept interviewing. This involved conducting interviews in home center stores where the research project was located by intercepting shoppers and interviewing them face-to-face (McDaniel and Gates 2000). The shoppers were intercepted as they were leaving the aisle and had already committed to the purchase of S4S hardwood board products. It was important to survey the shoppers after

they had committed to their purchases, as to minimize the influence on their purchase decision. The shoppers were offered a \$5 store coupon for participating in the study. An incentive is a useful tool when asking consumers to complete lengthy questionnaires. The one in this study took approximately ten minutes to complete. Past research has shown that incentives help to improve the response rate of a questionnaire. Response rates using incentives are expected to reach between 50 and 55% (Chakrapani 2000; Sudman 1998). This was critical to the success of this study because there was a rather low occurrence of individual sales for these products, with some stores recording sales occurrence as low as 5 purchases in a given day.

Sudman (1998) suggested that sampling in stores should be done so that shoppers are chosen randomly. This includes sampling at different times of the day and various days of the week. Although the bulk of the research was collected during busier times, such as Saturdays, information was collected on Thursdays, Fridays, and Sundays as well. This was done to minimize sampling frame bias, resulting in a more even representation of consumers by representing those who shop on weekends as well as weekday shoppers.

Intercept surveys are often used because they are the cheapest form of a personal interview and results have been proven to be comparable in quality to answers obtained by other survey methods (Sudman 1998). The questionnaires were administered by an outside market research company, who then contracted with local surveyors in each one of the markets. A total of 301 completed questionnaires were collected. This is more than the minimum requirement that was calculated using the proportion formula but only half the number originally targeted for this research. However, due to financial restrictions in obtaining data, this is the largest number of completed questionnaires that could be obtained.

The questionnaire included questions to determine promotional effectiveness, factors considered in the consumers' purchase decisions, price sensitivity, trustworthiness of various certifying groups, as well as demographics. A copy of the questionnaire is included as Appendix One.

Promotional effectiveness was examined through questions regarding the recollection of the brand, how they define certified lumber, and by asking the respondents

to describe one thing that they learned from the promotion. In addition, specific questions asked about the respondents' action after seeing the display and tear-away sheet. Price sensitivity was also examined. This was examined by asking respondents to indicate whether they thought certified lumber cost the same or more than the non-certified equivalent. They were then specifically asked to recall the price differential between the FSC certified boards and non-certified boards. In addition, the major factors for purchase or not purchasing were examined. This addressed whether it was a lack of understanding what certification is, whether it wasn't important to them, and whether it was influenced by price.

A final pricing question asked a hypothetical question designed to examine the consumers' willingness to pay a premium. The question first explained that a company was thinking of introducing a new product line similar to GreenMark. The question then explained that the products would be environmentally certified and asked consumers what the maximum premium was that they would be willing to pay for this product. This question was set-up using suggestions from Wright et al. (1999) to help gain more precise measures of willingness to pay. This research examined why survey-based experiments have yielded inaccurate estimates of price effects in the past. Previous estimates have typically overestimated consumers' actual willingness to pay more for environmentally green products. Previous researchers have found that much of the overestimation could be eliminated by not including non-buyers of the product in the sample. In addition, respondents were less likely to overestimate price effects if pictures of relevant brands were shown. By asking this question as they are leaving the aisle, both of these issues have been minimized, resulting in better estimates of consumers' willingness to pay (Wright et al. 1999).

Due to the continuing debate about the various certification programs, there was a question that addressed the trustworthiness of each type of certifying: company claims, industry-sponsored groups, and independent certifying organizations. An interval scale was used to rank customer confidence levels in statements made regarding environmental claims.

Specific demographic information was collected, including age, gender, education level, income level, and political party affiliation. This data was then linked to purchase

decisions to determine a profile of the typical consumer of certified hardwood lumber. After consumer characteristics were identified, they were compared to previous studies with the goal of determining whether certain consumer characteristics are consistent throughout various studies.

The other type of demographic information collected included a series of statements rated by respondents using a Likert scale. This scale asks respondents to rate statements selecting from strongly disagree to strongly agree. These questions were based on an established ecoscale created by Stone et al. (1995). The ecoscale questions selected for use were questions from the larger scale that were said to be indicators of respondents' opinions and beliefs and their environmental awareness (Figure 2.2). The sub-factors not used in this questionnaire were willingness to act, environmental attitude, action taken, ability to act, and environmental knowledge.

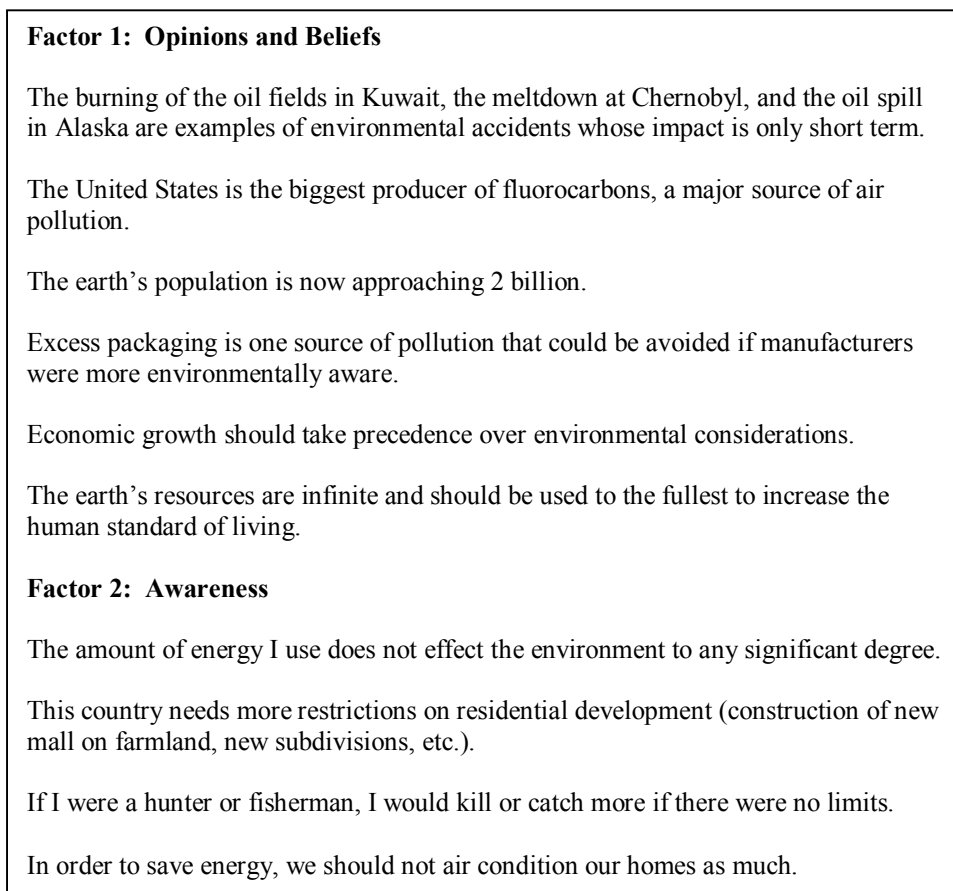


Figure 2.2: Statements used in questionnaire to create respondent ecoscale score.

An incomplete version of the ecoscale by Stone et al. (1995) was used for a number of reasons. The full ecoscale was too large to include in the questionnaire. In addition, Stone et al. (1995) stated that these two subscales, opinions and beliefs and environmental awareness, were the least predictive factors to forecasting actual environmental actions. However, these two subscales explain the largest portion of the overall variance within the ecoscale model. This study chose to investigate the predictive ability of these two subscales for predicting actual environmental action.

Upon receiving completed questionnaires from the market research company, they were examined for completeness and usability. Useable surveys were coded and entered into a SPSS[®] Statistical Data Analysis package computer spreadsheet. SPSS is designed for survey analysis and provides summary and comparison statistics for each individual question.

The authors of the original ecoscale give no instruction for how to categorize the results of the scale in order to identify the environmentally responsible consumer. Using a sum of the responses was chosen as the best method for creating an ecoscale score for each respondent. In order to sum the responses correctly, the ecoscale responses for the negative environmental statements were reversed. The responses were then summed to determine a total score, which was the value used to run various statistics.

There were three different types of responses contained in the questionnaire. The yes/no questions are binary and were analyzed by comparing the proportion of yes to no responses. Some of the questions required nominal responses, where respondents chose an arbitrarily appointed number that corresponded to a specific response. These were analyzed by examining the frequency of each response. In addition, the nominal responses could then be split by how the respondent answered the first binary questions on whether they purchased GreenMark and whether they were more willing to pay for it. These subsets of respondents included comparisons of purchasers of GreenMark FSC certified lumber, to purchasers of the non-certified alternative. Those subsets were labeled Purchasers and Non-Purchasers. In addition, comparisons were done of those individuals who stated they would pay extra for the FSC certified product versus those who stated they wouldn't. Those groups were defined as Willing to Pay and Not Willing to Pay.

Parametric statistics were processed for each of the survey questions, as appropriate. T-tests were conducted to determine the questions with statistically significant differences at the .10 level. Other statistical analysis was then based on these initial results. To understand the effect of the various treatments, they were tested for statistical significance using the appropriate test (ANOVA or t-test). Results were examined for all of the combinations of promotion, price, and store location. Comparisons were also made based on common characteristics among purchaser and non-purchaser subsets to examine significant differences in the demographic make-up of each group. Finally, the ecoscale statements are based on an interval scale and were analyzed using parametric statistics. The predictive ability of this ecoscale was analyzed by comparing average consumer ecoscale scores for various subsets of consumers by performing t-tests. In addition, the reliability indices from this study were compared to the indices from those same subscales in the original study.

Time Frame

The study was started in the spring of 2001 and completed in the summer of 2002. This research study required a great deal of preparation before the actual research was conducted. During spring and summer of 2001, the promotional brochure was researched and designed. During that time period the prototype display unit was also designed and built. In the fall of 2001, the promotional brochure, display unit, and all store signage underwent review and approval by the home center. The end of 2001 was spent working through the logistics necessary to introduce a new product to twelve home center stores. This included assigning product UPC codes, pricing codes, store set-up schedules, product shipping schedules, and a variety of other logistical necessities.

During the beginning of 2002, the display units were built. In addition, the promotional brochure tear-aways and signage was printed. During this same time period the company providing the FSC certified boards was manufacturing the products needed for this study. The store set-ups took place in March and April of 2002.

Data collection started in May and continued through July of 2002. The collection period was dictated by the home center participating in this study. The sales of both the FSC certified products as well as the non-certified alternative were tracked throughout

that period. In addition, the intercept surveys were conducted during mid-May, as well as selected days in June 2002. All in-store research for this project was completed by August 1, 2002.

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Chapter Three: Consumers of FSC Certified Forest Products: A Comparison Study of Consumer Demographics for FSC Certified Lumber Versus Other Environmentally Green Products

Introduction

In recent years, environmental issues have received a great deal of attention, reflecting increased public awareness and concern. During this period, companies have reevaluated their environmental image with consumers. Companies have increased selling environmentally sensitive products and have used this as a competitive advantage in the marketplace. This is seen as a legitimate avenue for market growth by companies interested in this area. Green markets have not gone mainstream, but continue to grow and flourish in many industries. This is reinforced by the fact that green offerings represented 20-40% of all new products introduced in 1991 in health-beauty aids, pet care, and household and laundry product categories (Ottman 1992).

In recent years, forestry practices in the United States came under additional scrutiny as well. One response to environmental issues has been the formation of various forestland and forest product certification programs and corporate purchasing policies addressing forest products (Bull et al. 2001). With increasing consumer interest in green products, certified forest products may play an important role in today's marketplace, as well as help direct the future of the forest products industry.

Certification in the Forest Products Industry

Certification involves creating a verification scheme that can be used to ensure that wood products come from a sustainably managed forest, using a set of environmentally-sound criteria. There has been a trend by some forest products companies to "certify" part or all of their forestlands, manufacturing, and/or distribution facilities. Some of the largest forest products companies in the United States have completed some type of certification process, including Anderson-Tully Lumber Company, Weyerhaeuser Company, and Columbia Forest Products. The two largest home improvement retailers in the United States, The Home Depot and Lowe's Home

Improvement Warehouse, have decided to support certification by selecting these products for their stores. Both home improvement companies have released updated buying policies that specifically give preference to certified products over non-certified ones where it was possible (The Home Depot 1999, Lowe's Home Improvement Warehouse 2000).

Certified forest products are now being studied as a new addition in the realm of green products. Very little is known about the consumer who is interested in certified forest products. As forest products companies decide on whether or not to adopt a strategy that includes pursuing certification and what to do once they have achieved certification, additional information is needed about who is interested in purchasing these products. This research was conducted to examine the consumers of certified hardwood boards in home improvement stores. A comparison of other consumer demographic studies was done for comparison.

Green Consumer Demographics

Over the last two decades, researchers have tried to identify key characteristics of the green consumer. Companies have recognized that this is an important consumer segment and would like to develop a clear picture of this consumer. Developing an understanding of who purchases green products would allow estimations of market segmentation and market potential. "Market segmentation is based on the idea that consumers will have differing demand elasticities to the marketing variables of a firm" (Ozanne and Smith 1998). Consumers may react differently to new product offerings, changes in price, advertising themes, or promotional offers. This reinforces the need to target these consumers.

Researchers have chosen to differentiate green consumers in many different ways. Some have examined consumers' concern for and knowledge of the environment. Green consumers have been classified by their degree of commitment to the environment according to their attitudes and behaviors (Roper Starch Worldwide 1999). Other research has suggested identifying green consumers through correlation with environmental concern and personality traits (Ozanne and Smith 1998). Studies have examined the relationship between environmental attitudes and product purchase or usage

intentions (Balderjahn 1988). Finally, a variety of studies have tied demographic variables to the green consumer (Cornwell and Schwegker 1985, Ozanne and Smith 1996, Jones and Dunlap 1992).

From all of these studies, there are a number of consumer traits that were similar across multiple studies (Table 3.1). Most of the studies cited a higher level of education as an important factor in purchasing decisions, as well as higher income levels (Goldman and Clancy 1991, Ozanne and Smith 1998, Cornwell and Schwegker 1985, Ozanne and Smith 1996, Jones and Dunlap 1992). Political affiliation with the Democratic Party or a liberal party also increased the probability of purchasing environmentally certified wood products (Jones and Dunlap 1992, Ozanne and Smith 1996). Consumers who were members of an environmental organization and concerned about environmental conservation were also more likely to be green consumers (Ozanne and Smith 1996, 1998). Finally, some studies found that the likelihood of environmental-based purchasing habits seemed higher for white, urban individuals (Jones and Dunlap 1992, Cornwell and Schwegker 1985).

Table 3.1 Comparison of previous research examining the demographic characteristics of green consumers.

	Age	Household Income	Education Level	Gender	Political Affiliation
<i>Thompson & Kidwell 1998</i>	Older consumers	Higher income levels	Graduate education	Females	Liberal (member of environmental organization)
<i>Goldman & Clancy 1991</i>			Advanced education		
<i>Ozanne & Smith 1998</i>			Higher education levels		
<i>Cornwell & Scwepker 1985 / 1995</i>	Young	Higher income	Better educated	Male	Democratic party
<i>Ozanne & Smith 1996</i>			College graduate or higher		
<i>Shrum et al. 1995</i>			Well educated		
<i>Jones & Dunlap 1992</i>					Liberal or Democrat

There were two distinctions that researchers could not agree on. Age and gender descriptions varied from study to study. Research by Ozanne and Smith (1998) and Humphries et al. (2001) showed that green consumers were more likely females and tended to be older. Shrum et al. (1995) found that males were more likely to purchase and women tended to be more skeptical of product claims. Jones and Dunlap (1992) found that younger consumers were more likely to purchase green products.

Consumer Demographics of the Home Improvement Shopper

In contrast to identifying and understanding the green consumer, the typical home center consumer must also be addressed. There has been very little research done to profile the home center consumer. One of the only studies done examined the home workshop / home improvement enthusiast. It should be noted that this is only a portion of the overall home center consumer demographic. However for this study, this is the most appropriate segment to examine because the product being studied is one commonly used by this segment.

The stereotypical image of this demographic is male, mature, and married. He also tends to be middle-class, educated, and family-oriented (Mason 2002). This is reflected by examining the mailing lists of many tool catalogs. *Klingspor's Woodworking Shop Sanding Catalogue* claims an almost exclusively male subscriber base, with 92% of subscribers being men (Mason 2002).

However, in recent years observations show an increasing number of women in the do-it-yourself market (Hughes and Cuneo 2001). A recent market profile by Equifax Direct Marketing Solutions, reports an increase in women's do it-yourself purchases. They reported an increase from 32% in 1997 to 37.6% in 1999 (Mason 2002). Lowe's Home Improvement Warehouse launched a \$100 million marketing campaign in 2001, which targeted women. Since then the company has continued to target this growing sector of consumers, which make an estimated 55% of all home improvement decisions (Hughes and Cuneo 2001, Bureau of Census 2000).

Examining subscriptions for popular home improvement magazines reinforces this changing face of home improvement. Subscribers of *This Old House* magazine are evenly split among women and men, with a median age of 40. They have an above-

average household income of \$55,000. Subscribers to *Wo Magazine* are split into 64% men and 20% women, with an average age of 44 and median income of \$47,800 (Mason 2002).

Segmenting Consumers through an Ecoscale

Another approach to differentiating green consumers is by using an ecoscale. In general, marketing scales are a classical approach based on the principle of correlation. Churchill's (1979) theory on scales assumes that when developing a scale, only items that show high loadings in factor analysis are retained. Specifically, an ecoscale examines consumers' attitudes and understanding about the environment in order to attempt to predict their actions.

Stone et al. (1995) developed the first ecoscale by using a series of statements about the environment to assess respondents and then segment a subset of environmentally responsible consumers. The scale was developed using a convenience sample of survey respondents to test 50 statements based on their predicting ability. These belief and attitude statements were measured on a five-point Likert type scale; with responses ranging from strongly agree to strongly disagree. The ecoscale was developed by using reliability analysis and exploratory factor analysis to eliminate statements that showed low item-to-total correlation or explained less than five percent of the variance. Factor analysis is a statistical technique useful for determining how many latent, unrelated variables underlie a set of factors (Norusis 1985).

The end result of the research by Stone et. Al (1995) was an ecoscale with a total of 31 statements about the environment that are segmented into seven sub-factors. These sub-factors are: (1) opinions and beliefs (2) awareness, (3) willingness to act, (4) attitude, (5) action taken, (6) ability to act, and (7) knowledge (Stone et al. 1995). The two factors that accounted for the most variance were opinions and beliefs (31.9%) and awareness (14.9%).

This ecoscale was calculated to have a coefficient of alpha equal to 0.9288 and accounts for 86.3% of the variance. The authors state that the high coefficient of alpha indicates that the scale possesses high internal scorer reliability. They also argue that the

high percent of variance the scale accounts for indicates that this scale should be a good estimator of identifying environmentally responsible consumers.

The scale was later tested for correlation with environmental behaviors and was found to be correlated with six behaviors consistent with environmentally conscious consumers. Three of these: boycotting, life-style changes, and changes in strategy, imply changes in purchasing behavior. This ecoscale's power to correctly identify an environmentally conscious consumer is of interest. However, after an extensive search of references to the ecoscale by Stone et al. (1995), it was found that before this research, no one else has tested this ecoscale besides the authors.

Objectives

This research study examined the introduction of a new environmentally friendly wood product, certified hardwood boards. The primary objectives of this study were to:

1. examine the characteristics of purchasers of FSC certified hardwood boards;
2. examine the characteristics of consumers willing to pay more for FSC certified hardwood boards;
3. based on the profile of the environmentally conscious purchaser identified, compare these results to the typical green consumer from previous studies; and
4. use two subscales of a developed ecoscale to identify and predict green purchasing behavior.

Methods

The population of interest was do-it-yourself consumers of high-end hardwood boards. High-end is defined as clear and surfaced-four-sides (S4S) red oak and yellow poplar boards. The FSC certified product was provided by Anderson-Tully Lumber Company and was branded as GreenMark. GreenMark S4S boards were placed in 12 selected home center stores throughout the Southeastern United States. The FSC certified lumber was placed on the shelf directly next to the non-certified product. GreenMark was labeled "FSC Certified Lumber" to identify it as the certified brand. The two products looked very similar, other than natural variability in wood.

Three different states made up the sample frame, including Florida, Alabama, and Georgia. The 12 stores were split into two blocks with six stores per block. The blocks were designated as “urban” and “suburban” stores. Stores were designated by the home center corporate headquarters by using their geographical proximity to a large urban area. It should be noted that suburban stores are still located near populations large enough to sustain a large home center. This assumes that shoppers from more rural areas travel to these stores since they do not have an alternative store closer to them. Blocks were designated to allow the examination of differences in the purchase of certified S4S boards between consumers who shop in urban stores and those who shop in suburban stores. Past research has suggested that there are differences between green consumers in urban and rural areas (Jones and Dunlap 1992, Cornwell and Schwegler 1985).

The questionnaire was developed by a panel of experts in forest products marketing and survey design. Upon its completion, both research sponsors then critiqued it. The questionnaire was administered by an outside market research company, who then contracted with local surveyors in each one of the markets.

The survey was conducted using intercept interviewing. This involved conducting interviews in the 12 home center stores where the new product was being sold. The shoppers were intercepted as they were leaving the aisle after they had placed S4S hardwood board(s) in their shopping cart. It was important to survey the shoppers after they committed to their purchases to minimize the influence on their purchase decision. The shoppers were offered a \$5 store coupon for participating in the study. This is especially important for lengthy questionnaires such as the one used in this study, which took approximately ten minutes to complete. Although an overall response rate was difficult to calculate, antidotal evidence suggests it was close to 100%. This was critical to the success of this research because the individual sales occurrence for these products was low. Although the bulk of the research was collected during busier times, such as Saturdays, information was also collected on Thursdays, Fridays, and Sundays. This was done to minimize sampling frame bias, resulting in a more even representation of consumers by representing those who shop on weekends as well as weekday shoppers.

There were two different types of information collected to capture consumer characteristics. Specific demographic information was collected, including age, gender,

education level, income level, and political party affiliation. The demographic information in this questionnaire was collected by asking respondents to select an answer from a set of predetermined responses. For example, respondents weren't asked to give their exact income, but rather to select the range that included their income. This was done because respondents tend to give more honest answers when they don't have to give exact information.

In addition, a scale designed to measure consumers' ecological awareness was used in the questionnaire. This scale was based on an ecoscale created by Stone et al. (1995). The questions selected for use in this questionnaire were those from the larger scale that were said to be indicators of respondents' opinions and beliefs and their environmental awareness (Figure 3.1). The sub-factors not used in this questionnaire were willingness to act, environmental attitude, action taken, ability to act, and environmental knowledge.

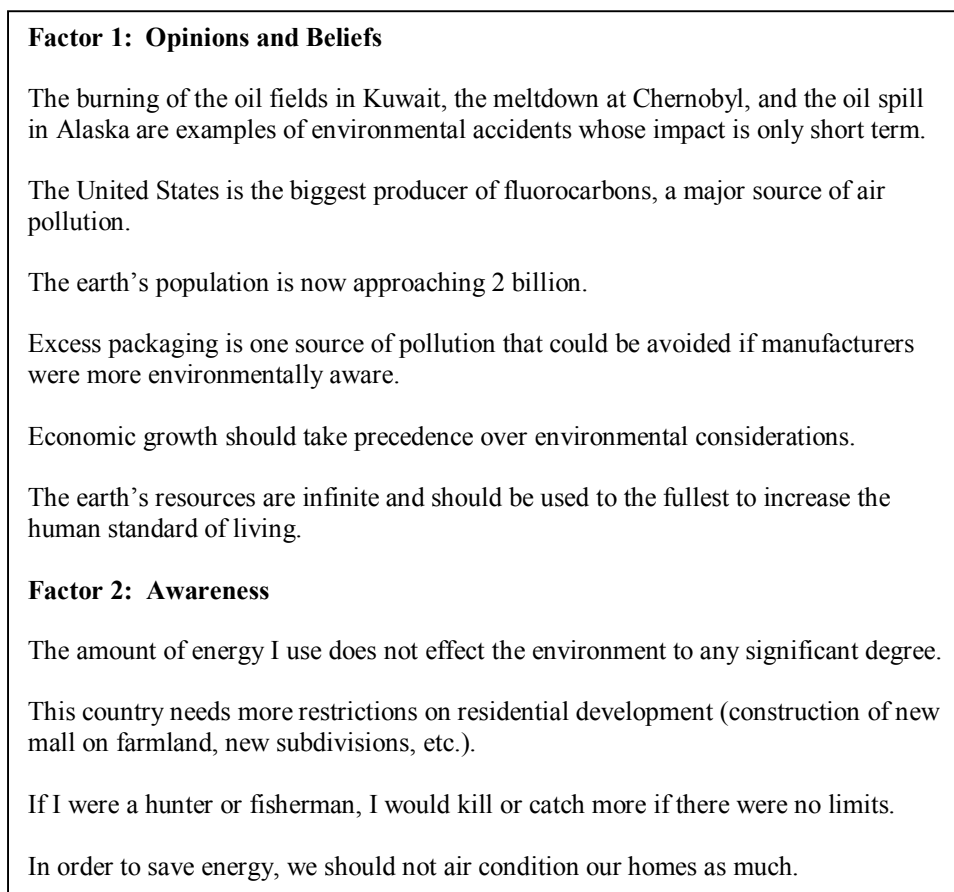


Figure 3.1: Statements used in questionnaire to create respondent ecoscale score.

An incomplete version of an ecoscale by Stone et al. (1995) was used for a number of reasons. The full ecoscale was too large to include in the questionnaire. In addition, Stone et al. (1995) stated that these two subscales, opinions and beliefs and environmental awareness, were the least predictive factors to forecasting actual environmental actions. However, these two subscales explain the largest portion of the overall variance within the ecoscale model. This study chose to investigate whether these two subscales had the predictive ability to predict actual environmental action.

Upon receiving completed questionnaires from the market research company, they were examined for completeness and usability. Useable surveys were coded and entered into a SPSS[®] Statistical Data Analysis package computer spreadsheet. SPSS is designed for survey analysis and provides summary and comparison statistics for each individual question.

The authors of the original ecoscale give no instruction for how to categorize the results of the scale in order to identify the environmentally responsible consumer. Using a sum of the responses was chosen as the best method for creating an ecoscale score for each respondent. In order to sum the responses correctly, the ecoscale responses for the negative environmental statements were reversed. The responses were then summed to determine a total score, which was the value used to run various statistics.

The predictive ability of this ecoscale was analyzed by comparing average consumer ecoscale scores for various subsets of consumers by performing t-tests. These subsets of respondents included comparisons of purchasers of GreenMark certified lumber, to purchasers of the non-certified alternative. Those subsets were labeled Purchasers and Non-Purchasers. In addition, comparisons were done of those individuals who stated they would pay extra for the FSC certified product versus those who stated they would not. Those groups were defined as Willing to Pay and Not Willing to Pay. T-tests were also performed based on each of these subsets to examine significant differences in the demographic make-up of each group.

Results

A total of 301 completed questionnaires were collected with a goal of obtaining approximately equal numbers of completed questionnaires from each store. This goal was not obtained, with the total questionnaires collected varying from store to store. However, approximately equal numbers of completed questionnaires were collected for each treatment type. Respondents for each store were representative of all demographic levels for age, gender, household income, education level, and political affiliation.

Purchasers vs. Non-Purchasers

Respondents' were categorized based on their answer to a question asking which hardwood lumber product they were purchasing that day. Forty-five responses could not be used because they did not answer the question in a way that it could be interpreted (e.g. "red oak," "Lowe's brand"). Eighty-two respondents (34%) purchased GreenMark, 151 respondents (64%) purchased the non-certified equivalent, and 5 respondents (2%) purchased both brands.

As Table 3.2 illustrates, almost all of the demographic variables tested were shown to not have statistically significant differences. However, political affiliation was found to be statistically significant ($p = 0.01$).

Table 3.2: Results of Pearson’s chi-square test examining demographic variables of purchasers and non-purchasers.

	Overall Proportion	Proportion of Purchasers	Proportion of Non-Purchasers	Pearson’s Chi-square Test
Age	n = 233	n = 82	n = 151	<i>p</i> = 0.38
65 and Over	20.2 %	22.0 %	19.2 %	<i>df</i> = 6
	n = 47	n = 18	n = 29	
55 – 64	16.3 %	9.8 %	19.9 %	
	n = 38	n = 8	n = 30	
45 – 55	18.9 %	18.3 %	19.2 %	
	n = 44	n = 15	n = 29	
35 – 44	21.9 %	23.2 %	21.2 %	
	n = 51	n = 19	n = 32	
25 – 34	18.5 %	20.7 %	17.2 %	
	n = 43	n = 17	n = 26	
Under 24	4.3 %	6.1 %	3.3 %	
	n = 10	n = 5	n = 5	
Household Income	n = 223	n = 81	n = 142	<i>p</i> = 0.52
Over \$75,000	21.5 %	22.2 %	21.1 %	<i>df</i> = 4
	n = 48	n = 18	n = 30	
\$50 - \$74,999	21.5 %	17.3 %	23.9 %	
	n = 48	n = 14	n = 34	
\$35 - \$49,999	24.2 %	29.6 %	21.1 %	
	n = 54	n = 24	n = 30	
\$25 - \$34,999	25.1 %	22.2 %	26.8 %	
	n = 56	n = 18	n = 38	
Under \$25,000	7.6 %	8.6 %	7.0 %	
	n = 17	n = 7	n = 10	

Table 3.2 Continued: Results of Pearson’s chi-square test examining demographic variables of purchasers and non-purchasers.

	Overall Proportion	Proportion of Purchasers	Proportion of Non-Purchasers	Pearson’s Chi-square Test
Education Level	n = 233	n = 82	n = 151	<i>p</i> = 0.52
Advanced Degree	7.7 %	3.7 %	9.9 %	<i>df</i> = 6
	n = 18	n = 3	n = 15	
College Degree	18.0 %	18.3 %	17.9 %	
	n = 42	n = 15	n = 27	
Some College	22.7 %	19.5 %	24.5 %	
	n = 53	n = 16	n = 37	
Vocational School	10.7 %	13.4 %	9.3 %	
	n = 25	n = 11	n = 14	
High School	30.9 %	34.1 %	29.1 %	
	n = 72	n = 28	n = 44	
Some High School	7.3 %	7.3 %	7.3 %	
	n = 17	n = 6	n = 11	
Gender	n = 232	n = 82	n = 150	<i>p</i> = 0.77
Female	18.5 %	19.5 %	18.0 %	<i>df</i> = 1
	n = 43	n = 16	n = 27	
Male	81.5 %	80.5 %	82.0 %	
	n = 189	n = 66	n = 123	
Political Affiliation	n = 230	n = 82	n = 148	<i>p</i> = 0.01
None	15.2 %	9.8 %	18.2 %	<i>df</i> = 3
	n = 35	n = 8	n = 27	
Reform & Independent	15.2 %	11.0 %	17.6 %	
	n = 35	n = 9	n = 26	
Republican	36.1 %	32.9 %	37.8 %	
	n = 83	n = 27	n = 56	
Democrat	33.5 %	46.3 %	26.4 %	
	n = 77	n = 38	n = 39	

Purchasers of GreenMark were more likely to be affiliated with the Democratic Party (Figure 3.2). This finding is consistent with a great deal of previous research and is

one of the few demographic variables that all researchers have agreed upon (Cornwell and Schwegker 1985, Ozanne and Smith 1996, Jones and Dunlap 1992). Each of these past researchers has also found that environmentally conscious individuals were more likely to be members of the Democratic party.

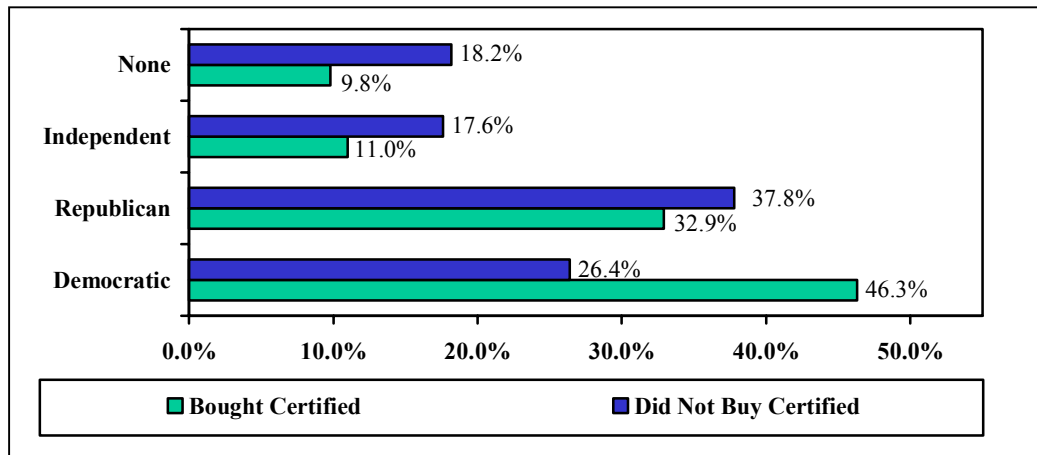


Figure 3.2: Political affiliation of purchasers and non-purchasers of GreenMark certified wood.

All of the other demographic variables were not found to have statistically significant differences. Age was not found to be statistically significant as an indicator of purchase decision ($p = 0.42$). Previous research is divided on this characteristic. Ozanne and Smith (1998) found that ‘green consumers’ were more likely to be older. In contrast, Jones and Dunlap (1992) found that young people were more likely to be green consumers. The disagreement in previous research could be the result of no particular age group being more likely to purchase green products. This conclusion is not contradicted by the lack of statistical significant findings in this study.

Household income was also found to have no statistical difference when compared between purchasers and non-purchasers of GreenMark ($p = 0.68$). This would suggest there is not a specific income group that is more likely to purchase environmental products such as GreenMark. However most previous research disagrees with this finding. Multiple studies have shown that consumers with higher incomes are more likely to purchase products like S4S hardwood boards (Ozanne and Smith 1996, Cornwell and Schwegker 1985). This is reinforced by consumer behavior literature, which suggests that lower income consumers are most concerned with obtaining necessities. In contrast,

higher income consumers are able to obtain necessities, while also comparing secondary characteristics. For example, higher income consumers will examine the quality, durability, and other products aspects such as environmental sensitivity.

In this research the education level of purchasers of GreenMark remains fairly consistent across all levels GreenMark ($p = 0.52$). This result was not expected to be conclusive due to the mixed results of previous studies. Other studies had shown inconsistencies in what group was most likely to purchase environmentally green products. Some studies suggested that higher educated consumers are more likely to be knowledgeable about the products that they considered purchasing. This in turn would suggest that higher educated consumers are more likely to understand the significance of environmentally green products (Ozanne and Smith 1998, Goldman and Clancy 1991, Cornwell and Schwegler 1995). These same studies suggest that this understanding would make it more likely that these consumers would purchase products like GreenMark. In contrast, other studies have argued that consumers with higher education levels, especially those with advanced degrees, are less likely to purchase green products because they will view these products with skepticism (Thompson and Kidwell 1998).

Finally, there was not found to be a statistically significant difference between purchasers and non-purchasers based on gender ($p = 0.77$). In this study, female consumers were just as likely to purchase GreenMark as male consumers. These results are not surprising, considering the debate surrounding female consumers and environmentally friendly products. Some studies have shown that female consumers are more likely to purchase any product that is considered environmentally friendly (Ozanne and Smith 1998). Other studies disagree with that finding. One study argues that female consumers are more skeptical of all product claims, regardless of whether it is an environmentally friendly claim or a high quality claim (Shrum et al. 1995). In summary, the findings of this study in regard to demographic characteristics were fairly consistent with the findings of previous research. The exception to this is household income.

Willingness to Pay

Identifying the Willing to Pay respondents from the Not Willing to Pay respondents was done using their response to the question which explained the S4S

product being sold and asked them how much more they would pay for the product. The question was, *“This is a new product that is being tested for market potential. Because it is “Forest Certified”, GreenMark FSC certified lumber allows you to support responsible forestry practices such as ensuring long term forest management, minimizing damage done to the remaining forest, protecting habitats, preventing over-cutting, and planting trees on already cleared land, while at the same time delivering a quality product. If this product were to be offered in the future, how much more would you pay for it than a non-certified product similar to it”?*

Anyone who expressed any willingness to pay, ranging from as little as between one and five percent and those exceeding 20%, were grouped into a category called “Willing to Pay.” The respondents who said that they would not pay anymore for the product were grouped into a separate category, “Not Willing to Pay.” Eighteen percent of respondents were identified as Not Willing to Pay, while the other 82% were Willing to Pay some type of premium (Figure 3.3).

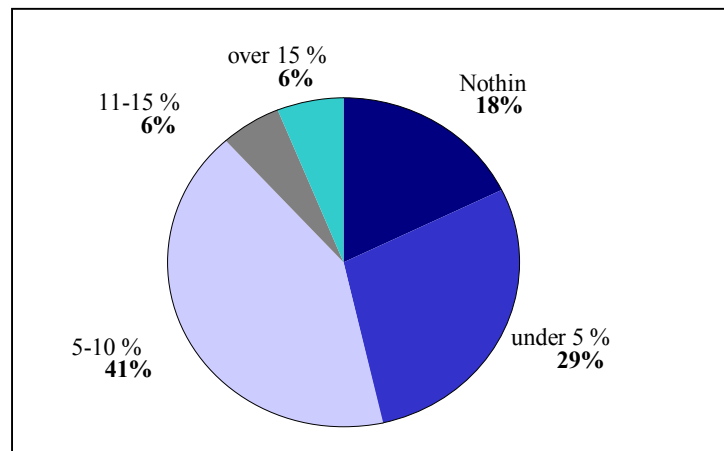


Figure 3.3: Percent of respondents willing to pay more for “forest certified products.”

Based on willingness to pay responses, no statistical differences were found among the demographic variables (Table 3.3). This is a similar finding to those based on purchase of GreenMark. Similar results suggest consistency between these two indicators. Age was not found to be statistically significant as an indicator of purchase decision ($p = 0.69$). No age category was more likely to pay more for GreenMark. As discussed in an earlier section, previous research is divided on this characteristic. This supports the lack of statistical significant findings in this study.

Table 3.3: Pearson’s chi-square tests for willingness to pay for GreenMark by demographic characteristics.

	Overall Proportion	Proportion of Willing to Pay	Proportion of Not Willing to Pay	Pearson’s Chi-square Test
Age	n = 299	N = 246	n = 53	<i>p = 0.69</i> <i>df = 6</i>
65 and Over	19.1 % n = 57	19.9 % n = 49	15.1 % n = 8	
55 – 64	15.1 % n = 45	14.6 % n = 36	17.0 % n = 9	
45 – 54	20.7 % n = 62	20.7 % n = 51	20.8 % n = 11	
35 – 44	20.7 % n = 62	21.5 % n = 53	17.0 % n = 9	
25 – 34	19.4 % n = 58	18.7 % n = 46	22.6 % n = 12	
Under 24	5.0 % n = 15	4.5 % n = 11	7.5 % n = 4	
Household Income	n = 285	N = 234	n = 51	<i>p = 0.35</i> <i>df = 4</i>
Over \$75,000	19.3 % n = 55	19.2 % n = 45	19.6 % n = 10	
\$50 - \$74,999	24.6 % n = 70	25.2 % n = 59	21.6 % n = 11	
\$35 - \$49,999	26.3 % n = 75	23.9 % n = 56	37.3 % n = 19	
\$25 - \$34,999	22.1 % n = 63	23.5 % n = 55	15.7 % n = 8	
Under \$25,000	7.7 % n = 22	8.1 % n = 19	5.9 % n = 3	

Table 3.3 Continued: Pearson's chi-square tests for willingness to pay for GreenMark by demographic characteristics.

	Overall Proportion	Proportion of Willing to Pay	Proportion of Not Willing to Pay	Pearson's Chi-square Test
Gender	n = 298	n = 245	n = 53	<i>p = 0.41</i> <i>df = 1</i>
Female	17.1 % n = 51	18.0 % n = 44	13.2 % n = 7	
Male	82.9 % n = 247	82.0 % n = 201	86.8 % n = 46	
Political Affiliation	n = 295	n = 243	n = 52	<i>p = 0.81</i> <i>df = 3</i>
None	15.6 % n = 46	14.8 % n = 36	19.2 % n = 10	
Reform & Independent	17.3 % n = 51	16.9 % n = 41	19.2 % n = 10	
Republican	35.6 % n = 105	36.2 % n = 88	32.7 % n = 17	
Democrat	31.5 % n = 93	32.1 % n = 78	28.8 % n = 15	
Education Level	n = 299	n = 246	n = 53	<i>p = 0.13</i> <i>df = 6</i>
Advanced Degree	9.0 % n = 27	8.5 % n = 21	11.3 % n = 6	
College Degree	18.4 % n = 55	20.3 % n = 50	9.4 % n = 5	
Some College	24.7 % 74	26.0 % n = 64	18.9 % n = 10	
Vocational School	11.0 % n = 33	10.2 % n = 25	15.1 % n = 8	
High School	29.8 % n = 89	27.6 % n = 68	39.6 % n = 21	
Some High School	7.0 % n = 21	7.3 % n = 18	5.7 % n = 3	

Household income was also found to have no statistical difference between individuals willing to pay more for GreenMark and those who were not ($p = 0.35$). However intuition as well as previous research suggests that consumers with higher incomes should be more likely to pay more for green products (Ozanne and Smith 1996, Cornwell and Schwegker 1985).

Gender was not found to be statistically significant when examining consumers' willingness to pay ($p = 0.41$). Female consumers were no more likely to pay more for GreenMark than male consumers. Again, these results are not surprising considering the lack of consensus among past research (Ozanne and Smith 1998, Shrum et al.1995).

Democrats were not found to be significantly more likely to say that they were willing to pay more for FSC certified S4S boards ($p = 0.81$). This is the opposite result of what was expected. These results were expected to be similar to those based on the statistical significance of purchasers of GreenMark. In addition, past research has shown consistently that democrats are more likely to be interested in green products and are more willing to pay more for them.

Overall, education is not statistically significant, however, when results were compared between respondents who did not attend college and those who did, a statistically significant difference was found, with a significance value of $p = .031$ (Figure 3.4). This result is consistent with results from three previous studies attempting to profile consumers. The authors argue that more consumers with a higher level of education are more likely to understand and value green products (Ozanne and Smith 1998, Goldman and Clancy 1991, Cornwell and Schwegker 1985).

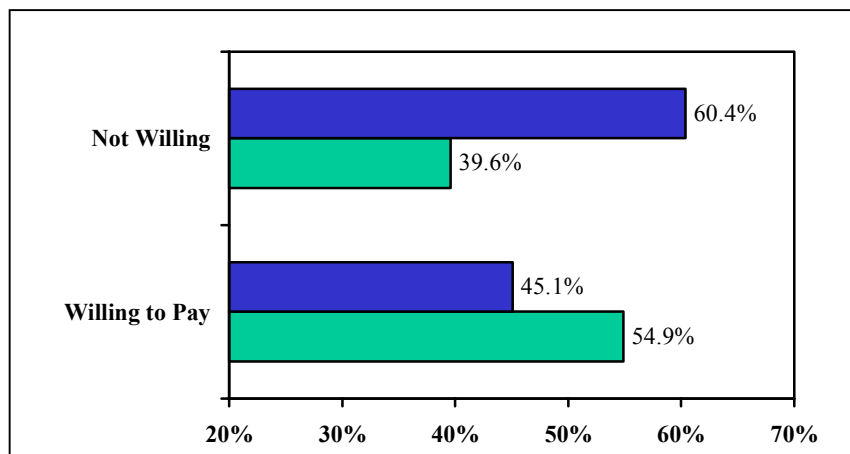


Figure 3.4: Respondents' willingness to pay for certification compared by college education.

Ecoscale

The last part of this research examined using a modified ecoscale to predict consumer buying preferences for certified S4S hardwood boards. The original scale was an established scale included in the *Handbook of Marketing Scales* (Stone et al. 1995). This study chose to investigate whether the two subscales that explained the most variance were predictors of actual environmental action.

An overall respondent score, as well as individual scores for each subscale (opinions / beliefs and awareness) were compared between individuals who purchased GreenMark and those who did not purchase this product. In addition, scores were compared for those who said they were willing to pay more for forest certified boards versus those who said they would not be willing to pay more.

Statistical analysis was done by using t-tests to compare each population against the others (Table 3.4). No statistically significant differences were found between the overall scores for purchasers and non-purchasers ($p = 0.15$). When examining each separate subscale for purchasers and non-purchasers, consumer awareness was found to be statistically significant ($p = 0.08$). This is consistent with previous market research that has argued that consumers who are aware of issues involved with the environment are more likely to purchase environmentally sensitive products (Ozanne and Smith 1998). However, it is inconsistent with the conclusions made by Stone et al. (1995).

Table 3.4 Comparison of ecoscale scores and t-test results for purchasers and non-purchasers of GreenMark.

	Purchasers of GreenMark	Non-Purchasers of GreenMark	T-test Result
Overall Ecoscale Mean Score	33.17	37.34	$p = 0.15$
Opinions & Beliefs Score	20.49	22.87	$p = 0.36$
Awareness Score	12.68	14.47	$p = 0.08$

No statistical difference was found between the mean overall ecoscale scores of consumers willing to pay a premium and those who were not willing ($p = 0.87$). In addition no differences were found in either consumers' opinions / beliefs or consumers' awareness (Table 3.5).

Table 3.5 Comparison of ecoscale scores and t-test results for respondents willing to pay more for GreenMark versus those who weren't.

	Willing to Pay More for GreenMark	Not Willing to Pay More for GreenMark	T-test Result
Overall Ecoscale Mean Score	35.92	36.30	p = 0.873
Opinions & Beliefs Score	22.08	22.74	p = 0.915
Awareness Score	13.84	13.56	p = 0.281

In addition to running t-tests to assess the predictive ability of the subscales, a reliability analysis was also done. Reliability analysis is a procedure for evaluating multiple-item additive scales. The procedure allows the researcher to examine the properties of measurement scales and the items that make them up. This is done by calculating a number of commonly used measures of scale reliability (Norusis 2002). One of the most common reliability measures is Cronbach's alpha. The overall ecoscale alpha value calculated was 0.5630. This alpha level is seen as acceptable, however typically not a very strong predictor. Values of over 0.70 are preferred (Comfrey and Lee 1992). Each of the subscales was also examined individually. Cronbach's alpha value for the opinions and beliefs subscale was 0.4146, while the awareness subscale's alpha value was 0.2174. These findings reinforce the findings from the t-tests and are consistent with the authors' findings from the original ecoscale.

Discussion

This research profiled the typical consumer of FSC certified hardwood lumber in the home center industry. The results varied from previous profiles of green consumers, based on both actual purchase decisions as well as willingness to pay measurements. The abbreviated ecoscale used in this questionnaire did not prove to be a strong indicator of occurrence or intention to purchase environmentally friendly products. Finally, all results may have been confounded by respondent confusion and ambiguity over the term "certified."

Consumer Demographics

Purchasers of GreenMark were more likely to be affiliated with the Democratic Party. This is consistent with previous research (Cornwell and Schwegker 1985, Ozanne and Smith 1996, Jones and Dunlap 1992). However, this was not significant in their willingness to pay more for GreenMark. Historically, Democrats and Liberals are more likely to support environmental causes. These political party implications indicate that there are differences in what consumers value between parties. More importantly, a targeted approach may be available for offering certified forest products. These products could be offered in areas where there is a larger population of members of the Democratic Party.

Education level remained fairly consistent across all levels in examining those who purchased GreenMark. However, in analyzing respondents who stated they were willing to pay extra for GreenMark, respondents with a college education were more likely to say that they would pay more for an environmentally friendly product. Most previous research recorded a higher likelihood of purchasing certified forest products among individuals with a college education (Ozanne and Smith 1998, 1996). Other research examining different product segments have also showed this trend (Jones and Dunlap 1992, Cornwell and Schwegker 1985). These findings show that level of education may influence consumers' willingness to purchase these products and this research did not shed any additional light on previous findings.

No other factors were statistically significant when comparing purchasers and non-purchasers of GreenMark. Having few statistical differences in major demographic groups is an advantage in implementing any new advertising or marketing campaign for this new product. This will allow the manufacturers of GreenMark to create a single campaign with a single message. Little target marketing would be necessary since each age group and gender, income level, and educational level has a similar probability of responding.

Overall, results from this study were more reflective of the do-it-yourself market than that of a green consumer. The most recent examination of do-it yourself shoppers shows that the stereotypical images of a working class male may no longer reflect the

typical profile of home centers. This research reinforces the overall demographic findings of other these studies (Mason 2002, Hughes and Cuneo 2001).

Overall, 41.5% respondents of this study fell between the ages of 35 and 54. This age distribution closely mirrors that of home improvement consumers as a whole, with reported averages of 40 and 44 years of age (Mason 2002). This research also reinforces previous findings of the increasing number of women in the do-it-yourself market (Hughes and Cuneo 2001, Mason 2002). Overall, 17% of the respondents to this survey were women.

Income estimates cannot be compared as readily to previous studies because this study did not ask respondents for their exact income. However, the trends are similar to previous findings. Twenty-six percent of respondents reported income between \$35,000 and \$74,999, with another 25% of respondents indicating income between \$50,000 and \$74,999. Previous estimates for the home improvement shopper estimate mean income of between \$47,500 and \$55,000 (Mason 2002).

Education and political party affiliation were not examined in any of the previous research studies that profiled the do-it-yourself consumer. Overall, 52.2% of respondents had some college education. Distribution between political party affiliations was fairly evenly distributed, with 31.3% democrat, 36% republican, 17.2% reform and independent, and 15.5% with no affiliation.

Ecoscale

Statistical analysis found no significant differences between the overall scores of purchasers and non-purchasers ($p = 0.15$) or between the scores of consumers willing to pay a premium and those who were not willing ($p = 0.87$). The mean score for consumers' awareness was found to be statistically significant when comparing purchasers to non-purchasers of GreenMark.

Overall, these findings reinforce the authors' argument that these subscales may not be good predictors of environmentally conscious purchasing habits (Stone et al. 1995). However, a respondents' score for environmental awareness showed some promise as an indicator. With further fine-tuning, this subscale could be a valuable addition to the overall ecoscale.

Discussion of Study Limitations

This study is one of the first to specifically examine the green consumer within the do-it yourself home center market. Therefore no benchmarking studies could be found to directly compare the results of this research. In the absence of other similar studies, this research was compared against studies that examined the green consumer and the do-it yourselfer separately. By surveying only in home improvement stores, a direct comparison was not possible against the overall general population or the green population.

The original scale was tested and designed to be used only in its complete form. Due to the nature of factorial analysis, using only a portion of the factors could result in an incomplete indicator. However, since the subscales used did emerge from a larger set, they can be legitimately treated as scales in their own right. However, the results from the modified subscales should not be seen as comparable in the predicting ability to those of the original scale.

In addition, consumers shopping in a home center are not likely to match those who helped develop this ecoscale. Due to the much different demographic profile, this scale may not be as good of a predictor for typical consumers in the do-it-yourself market compared to overall consumers.

Recommendations for Future Research

With the home improvement segment totaling over \$200 billion in annual sales (Johnson and Wright 2003), additional research should be focused on all aspects of this booming market. Although there has been some research done, much more research is needed to better understand this market. Specifically, additional studies are needed focusing on the consumer demographics of home center consumers, especially do-it yourselfers (as compared to contractors).

Despite the announcement of environmental purchasing policies by most major home improvement companies, little research has been done to examine whether this has effected the consumer base that these stores attracts. Additional work related to this research would be helpful in better understanding how green consumers play into the

home improvement store consumer profile. Replications of this research covering a more wide spread geographic area would be helpful in examining consumer demographics.

Finally, additional investigations into the development and testing of an ecoscale such as the one developed by Stone et al. (1995) would be helpful in correctly identifying the environmentally conscious consumer. Any work based on the work of this and Stone et al. should further investigate how to improve the predicting power of the subscales, opinions / beliefs and awareness.

Conclusions

Overall, 82% of consumers said they would pay more for FSC certified lumber, with 53% willing to pay over 5% more for the lumber. Based on these findings as well as previous research, forest products companies and home centers should pursue these markets for certified forest products. It appears that consumers are willing to incur at least some of the costs associated with certification. This would allow companies to pursue certification with less of a financial risk.

In general, consumers of certified forest products do not differ a great deal from the general population. This is an advantage to companies who choose to market any type of environmental products. It allows companies to market to a broad population without a great deal of target marketing. However, there were two areas where some differences in the consumer may exist. Based on these results as well as previous research, members of the Democratic Party are more likely to purchase GreenMark and other environmentally conscious products. Political party affiliation could prove to be a helpful demographic because it can be determined based on where someone resides as well as voter registration information. The influence of a purchaser's level of education on the purchase decision of certified forest products is still debated. In this study the results were conflicting, with a respondent with some college education more likely to state they were willing to pay more for certified products. However since this is not based on actual action, additional information should be gathered before any action is taken based on this finding.

Finally, this research reinforced some of the findings of Stone et al. (1995), the authors of the partial ecoscale tested in this research. The subscales based on

respondents' opinions and beliefs and knowledge may indeed be poor predictors of actual environmental action. However, with additional development and testing, these subscales, as well as the entire ecoscale, could be further improved.

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Chapter Four: The Effects of a Promotional Brochure on the Purchase of FSC Certified Wood Products and Consumer Understanding of Forest Certification

Introduction

Throughout the past thirty years, environmental issues have received increased attention from the media and special interest groups, reflecting public awareness and concern about the environment. During this era, companies have reevaluated their environmental image with consumers. Companies have increased selling environmentally sensitive products and have used this as a competitive advantage in the marketplace. This is seen as an avenue for market growth for interested companies. Green markets have not gone mainstream, but continue to grow and flourish in many industries. This is reinforced by the fact that green offerings represented 20-40% of all new products introduced in 1991 in health-beauty aids, pet care, and household and laundry product categories (Ottman 1992).

Forestry practices have come under additional scrutiny in the United States as well. Environmental issues specific to the area of forestry have been of interest throughout the 1990's. These include the controversy between endangered species conservation and personal property rights (e.g. the spotted owl), the debate about multiple use forest policies, as well as the federal Salvage Rider legislation (Gronroos and Bowyer 1999). Most recently, forest fire prevention harvesting has become a hotly debated issue.

One response to environmental issues has been the formation of various forestland and forest product certification programs. With continued consumer interest in green products, certified forest products play an important role in today's marketplace, as well as the future of the forest products industry.

Certified Wood Products – Defined and History

The definition of certification is often debated, with definitions even difficult to find in existing literature. Those involved in certification are currently debating what the definition should encompass. Hansen (1997) described certification as a system of identifying forestland and those products that are well managed with a goal toward

sustainability. Stevens et al. (1998) defined forest certification as an instrument used to communicate credible environmental information to consumers about the forest resource. The working definition for this research is that *certification is a verification scheme that can be used to ensure that wood products come from a sustainably managed forest, using a predetermined set of environmentally-sound criteria.*

There has been a trend by some forest products companies to “certify” part or all of their forestlands, manufacturing, and/or distribution facilities. Some of the largest forest products companies in the United States have completed some type of certification process, including Anderson-Tully Lumber Company, Weyerhaeuser Company, and Columbia Forest Products. The two largest home improvement retailers in the United States, The Home Depot and Lowe’s Home Improvement Warehouse, have decided to support certification as well. They have both released buying policies related to products that would be affected by this process. Both companies announced that they would give preference to certified products over non-certified ones where it was possible (The Home Depot 1999, Lowe’s Home Improvement Warehouse 2000).

There are many different certification systems that have been developed through various agencies. It has been widely debated over who is responsible for certifying forestland and the resulting wood products from those lands. The various certification systems include first-, second-, and third-party certification. All of these systems are constantly evolving. This makes many people skeptical of each program’s long-term viability. First-party certification is “an internal assessment by an organization of its own systems and practices” (Hansen 1997). Second-party certification involves an assessment by an outside party, such as a trade association. Third-party certification typically includes an on-site assessment by a neutral party not affiliated with a company or trade association (Vlosky and Ozanne 1997).

Most research shows that first-party certification is not seen as a viable alternative at this time due to the past experiences of untrue company claims, consumers are unwilling to trust a company’s claim of environmentally-sound practices (Hansen 1997). Consumer research indicates that consumers are often suspicious of company claims or advertisements, environmental or otherwise (Bass 1996; Hansen 1997; Coddington 1993; Ozanne and Vlosky 1997).

The most prominent example of second-party certification is the Sustainable Forestry Initiative (SFI), which originated from the American Forest and Paper Association (AF&PA). The major goal of SFI is “to ensure that future generations of Americans will have the same abundant forests that we enjoy today” (Anonymous 2001). SFI is composed of a group of principles and guidelines that companies must follow. Companies must report annually on their activities, explaining in detail their compliance with SFI. A panel of experts composed of public officials, university deans of forestry, and conservation groups, review these company reports. However, no on-site inspections are done. After review by the panel, the company is given suggestions for improvements for the next year.

Due to company and public input on the SFI system, many changes have occurred in the system over the past year. Recognizing that many were uncomfortable without a third-party review, AF&PA also introduced a third-party audit option in early 1999. This is voluntary at this time. To date, more than 28 million acres of AF&PA member companies and SFI program licensee forestlands have undergone third-party certification audits, representing almost one-third of the total amount of SFI program lands. No labeling is currently available for SFI certified products. However, a labeling system is being developed and is in the process of being introduced. This on-product labeling system will be available for use only to those companies that have undergone third-party certification audits (Anonymous 2001).

The Forest Stewardship Council (FSC) is the largest third-party certifying organization. Founded in 1993, FSC “has positioned itself as the all-encompassing body for accrediting third-party certifiers” (Hansen 1997). The Forest Stewardship Council (FSC) defines certification as a voluntary way that forest managers and forest products companies can be recognized in the marketplace for “careful and long term forest management.” The resulting label provides consumers with assurance that their purchases of forest products come from a well-managed forest (FSC 2002).

FSC evaluates and accredits forest management certifiers throughout the world. All certifiers follow FSC’s 10 principles and criteria for forest management to assure performance-based evaluation based on regionality. FSC has accredited seven certifiers throughout the world. The two popular U.S. based FSC certifying organizations are

Scientific Certification Systems and SmartWood. The FSC system carries a label to communicate certification to consumers. The FSC logo can be used alone or in conjunction with the certifier's own brand label. Third-party certification is seen as the most viable option for companies hoping to achieve purchaser confidence (Kozma et al. 2000).

One response to the proliferation of standards is the work of the International Organization for Standardization (ISO). ISO is recognized throughout the world, but is especially prominent in the U.S. They have developed a series of environmental management systems called ISO 14000 Standards that are intended to become international standards for environmental certification. This system addresses standards in five areas: environmental management systems; environmental performance evaluations; environmental auditing; life cycle assessment; and environmental labeling (Kinsella 1994; Anonymous 1999). This series of management systems has been supported by the wood products industry, but has been met with criticism from environmental groups.

Many current suppliers of Lowe's Home Improvement Warehouse and The Home Depot have chosen to become third-party certified. Lowe's went a step further, specifying that they would give preference to any company or supplier who was FSC certified. The first companies to take these steps were J.D. Irving and Columbia Forest Products, who each gained recognition in the annual reports of The Home Depot for their certification efforts.

Previous Studies on the Market Potential of Certified Forest Products

Many forest products companies are still skeptical of certification. Specifically, there is concern because of the great deal of cost involved in becoming certified. Companies are interested in whether they can pass some or all of the added expense of certification on to the final consumer. Other companies are interested in whether they are missing untapped market potential that can be harnessed through certification. To address the concerns and questions of the industry, research has been done on a variety of different products and issues associated with the market potential of certified wood

products. These products have included new homes, wooden household furniture, veneer, and softwood studs.

The examination of market potential for certified wood products in new home construction was studied by Gronroos and Bowyer (1999) in two major metropolitan areas: Chicago and the Minneapolis/St. Paul area. Results of Gronroos and Bowyer's study showed that 36% of respondents in Chicago and 24% of respondents in Minneapolis/St. Paul would have been willing to pay more for inclusion of certified lumber and wood products in their homes.

In addition, results indicated that consumers were more interested in purchasing environmentally certified lumber and wood products for features that they can see in the home after it is built, such as flooring, doors, cabinets, and furniture. Forty percent of Chicago respondents and 25% of Minneapolis/St. Paul respondents indicated that they would be more likely to buy furniture that is made of certified wood than building materials or other less visible products.

These results have been verified by other studies (Gronroos and Bowyer 1999). John McNulty, Vice President of Seven Islands Land Company, a company producing certified lumber, stated, "consumers relate best to wood products they can see, such as flooring, moulding, doors, and stairways (Hammel and Ward 1996). Consumers will request these items while not even considering the 2x4s, studs, and framing which make up their homes." Stevens et al. (1998) found that companies selling certified wood products indicated that certified flooring materials, furniture, architectural panels and mouldings were the certified products in the highest demand. Results from another study stated that although environmentally preferred characteristics were important, price and quality were still seen as the most important characteristics. Environmental concern was highest when participants purchased paper and was considered less important for other products. This was related to the high frequency of purchase for paper in comparison to other wood products (Teisl et al. 2000).

Hammel and Ward (1996) used case studies to describe companies that became third party certified in the early 1990's and how they used certification as a marketing tool. They explain that Collins Pine Company initially sought certification to act as a pro-active leader on environmental issues. They hoped to gain a marketing advantage over

larger competitors as a result of certification. They attribute their increases in sales to certification. In 1995 Collins Pine saw a 25% increase in their sales to retailers, 22% sales increase to furniture manufacturers and a three to four percent increase to commodity dealers. The initial increase in cost was between two and three percent, but they expected that to fall over time.

Comparison to the Green Energy Industry

There are many examples of environmentally green products in the marketplace. These can be used to draw parallels and help us predict consumer reactions to certified forest products based on previous reactions. This would include products such as recycled content in paper and plastic packaging products, chemical free and phosphate free products, and air and water filtration systems. There has been large growth in natural and organic food and beauty products, as well as a boom in bottled water, all-natural soft drinks and energy drinks.

The evolution of the green energy and the energy services market is another pertinent example to use as a guide for the forest products industry. This industry has experienced similar manufacturer concerns about the future of these environmentally friendly products in their markets, as well as similar consumer purchasing characteristics. This industry's experience with green certification started at approximately the same time as the forest products industry's, with many of the same initial reactions. These similarities will be useful for comparison.

At the current time, a number of groups are developing certification standards, with no single agreed upon standard. These include first-, second-, and third-party certification systems. Some industry groups now offer certification to their members. These include the Air-Conditioning and Refrigeration Institute and the National Fenestration Ratings Council (Paulos 1998). This type of certification is usually based on clearly defined standards. Participation in some of these certification programs is as high as 90%.

There is also a third-party certifying organization, the Center for Resource Solutions "Green-e" program. This program is certified through two private eco-labels, Green Seal and Scientific Certification Systems (SCS) (Paulos 1998). These eco-labels

have only been successful in niche markets to this point in time and have had trouble attracting applicants. Major companies in the U.S. have shunned these labels and have actively opposed their existence (Paulos 1998). The industry has complained that the method for judging environmental effects is inadequate and tends to be too subjective. Within the industry, the credibility of these systems has been debated, as well as what role the government should play in certification. A 1990 study of consumers examined which source was more unbiased for environmental information. Environmental groups were seen as much more unbiased than the government by consumers (Paulos 1998).

Another issue that has arisen in certification in the energy field is how to define green-power and green-power products. There are disagreements in defining these terms between environmental groups, corporations, and industry associations. Without an agreed upon definition, it is difficult to communicate a consistent message to consumers. In other segments of environmentally green products, this has caused consumer confusion and skepticism (Mendleson and Polonsky 1995, Mohr et al. 1998).

This example illustrates that the changes the forest products industry face in addressing environmental certification are not new to the business world. The challenge is to learn from previous research in other industries, as well as the work that has already been done in forest products certification.

Eco-labeling in the Marketplace

One way of communicating to consumers is through an eco-label. An eco-label is a logo that communicates to the consumer that a product is environmentally responsible and is a type of a brand for green products. In the case of wood products, an eco-label offers an opportunity to explain the principles of sustainability of harvesting trees to make products for consumption. This eco-label is similar to those relating recycled paper content in many paper products, organic certification, and dolphin-safe tuna labeling. A certification eco-label can act as an important promotional tool in market development for these products. There are currently eco-labeling programs found in over 25 countries (Salzman, 1997).

Market-based research that examined various types of labeling programs has demonstrated that labeling can significantly change consumer behavior. Levy and Stokes

(1987) and Teisl and Levy (1997) illustrated that shoppers who were exposed to detailed nutrition information labeling changed their purchasing habits based on this labeling. Teisl and Levy (1997) examined the effects of dolphin-safe tuna labeling on consumer purchasing. They found that demand for canned tuna changed significantly when dolphin-safe labeling was introduced in the early 1990's. These findings provide evidence that consumers do respond to labeling information presented regarding health and environmental issues.

As a result of a variety of debate on eco-labeling, an extensive study was completed which specifically examined designing effective environmental labels for forest products (Teisl et al. 2000). This qualitative study used six focus groups throughout the country to discuss various environmental labeling.

One of the most valuable findings of the study was the identification of what consumers wanted to know relative to certification. In response to an unprompted question, the groups mentioned that they were most concerned about whether forests were adequately being replanted. They also mentioned they were concerned about whether wildlife and wildlife habitat were being protected. When participants were given a list of 32 forest management criteria, 5 criteria were identified as major concerns with participants. They were that: forest operations do not harm threatened or endangered species; clearcutting was not allowed; forest operations involve minimum waste; forest management ensures long-term sustainability of harvests, and bird and animal nesting habitat was protected (Teisl et al. 2000).

In general, most participants did not trust environmental marketing information, expressing distrust in environmental claims. When participants examined actual descriptions for a FSC certified wood product, consumers complained that the description did not state what criteria were used to obtain the certification. Despite the product's third party certification, participants felt that the environmental labels were just a marketing scam or an industry logo. Inconsistent with this finding is that participants stated that independent organizations are the most credible organizations as certifiers. Participants suggest that the credibility of an eco-label could be increased by including a website, or telephone number. This type of verification add credibility, increasing the consumers' piece of mind

Most participants felt that they would act differently when seeing the environmental information if they knew more about the certification program (Teisl et al. 2000). All of the focus groups emphasized that in order for a labeling program to succeed, an extensive campaign is needed to educate consumers.

Finally, a series of recommendations based on their findings were made by Teisl et al. (2000). Environmental labels should not be used by themselves but rather should be supported by text. This supplemental information should focus on the environmental topics that were listed as most important to consumers (e.g., forest replanting) and not focus on social issues. It is recommended that labels should present information in a standardized format to make cross-product comparisons possible. Finally, it is important that environmental labels strike a balance between detail and simplicity. Too much information will be overwhelming yet too little is not credible (Teisl et al 2000).

Promotional Strategies

There are many ways to position green products. In a study of over 150 advertisements for green products, appeals were identified to differentiate these ads (Iyer and Banerjee 1993). There are “green appeals,” such as emotional, euphoria, and management that emphasize the environmental attributes or implications of a product. “Non-green appeals” contain environmental information, but emphasize other aspects of the product, for example, financial or quality appeal.

Based on this work, a study examined consumers’ responses to two different print advertisements for a green laundry detergent (Schuhwerk and Letkoff-Hagius 1995). By varying the relative prominence of the product’s environmental attributes compared to the financial attributes of being an environmental product, consumer response could be examined. Results indicated that consumers who are highly involved with the environment may be predisposed to purchase green products regardless of the type of appeal used. For those less involved with the environment, appeal played an important role. The green appeal was a more effective approach with both groups. This suggests that by directing attention to environmental attributes through prominence, a green appeal may generate positive responses from consumers regardless of their level of involvement with the environment.

An examination of communication presentation concluded that the most important factor in presentation of consumer information is the ease of understanding the information (Schkade and Kleinmuntz 1994). This includes using non-scientific terms when possible without being vague, as well as making it attractive and eye catching. This was reinforced by later studies (Teisl et al. 2000, Hansen 1997).

A market study by Gronroos and Bowyer (1999) indicated, “it is a possibility that those seeking to sell wood products could place an increasing emphasis on educating consumers, explaining how forest product certification could result in less impact on the environment.” However, they caution that an over-eagerness to sell the advantages of certification shouldn’t rely on highlighting the shortcomings of current forest management practices. This could result in consumer disinterest of all wood products.

Consumer Understanding of Environmental Marketing Claims

Various sources indicate that concern for the environment has increased. However, this increased consumer concern and environmental awareness does not necessarily lead to a better understanding of the issues or science that are involved in making a more environmentally friendly product. Many of the terms and claims used in promoting environmentally green products are foreign to consumers. Consumers are not likely to hear words like ‘biodegradable’ in their everyday life. This may lead to undesirable consumer reactions. For example, ignoring new products that use words that they don’t understand even if it may be something that they would be interested in.

In comparison, general terms, such as ‘safe for the environment,’ are viewed with skepticism by consumers (Mohr et al. 1998, Kangun and Polonsky 1995). Other words that were considered vague by consumers include, market-incentive, environmentally friendly, eco-system diversity, and sustainability (Teisl et al. 2000). This is the backlash of companies that made broad environmental claims that were later found to be misleading.

In addition, guidelines addressing environmental marketing were established by the Federal Trade Commission (FTC), which state that environmental claims should be specific. The latest FTC guidelines explain that consumers should be skeptical of vague claims. The guidelines state that although a term such as “environmentally safe,”

“environmentally preferable,” “eco-safe,” or “Earth Smart” are helpful, they should not be used as the only claim on the product. These statements should be seen as the starting point from which to get additional information about the environmental impacts of that product (Federal Trade Commission 1999). Although environmental claims allow for consumer education, they may mislead or confuse the public. Market communications can be truthful but still be interpreted incorrectly by the consumer (Paulos 1998).

Compounding the problem is that many common environmental terms lack one standardized definition. Lack of one common theme or definition results in a varied definition, leaving consumers more confused and distrusting. It also leaves them to draw their own conclusions. This may lead to a perception among consumers that all environmental claims are equivalent to ‘good for the environment,’ and as a result oversimplify claims (Kangun and Polonsky 1995). The other challenge that green products face is that the advertising claims are not verifiable by the consumer. For example, typical advertising claims usually address claims such as, easier to clean, better tasting, and softer. These can be tested when the consumer purchases the product (Kangun and Polonsky 1995). The claim can then be verified before the consumer purchases the product again. Consumers would find it difficult or impossible to verify environmental certification on their own. These issues illustrate the limited ability that consumers have to effectively evaluate environmental claims. This is especially true in relation to certified forest products.

Before these products are accepted by consumers, they must understand what “certified” means and why they should care. Various studies have found this to be the largest barrier that these new products must overcome (Kangun et al. 1991; Ozanne and Smith 1998; Stevens et al. 1998; Michael and Smith 1994). In addition, consumers must be persuaded to act differently than they currently do. It is always easier for a consumer to act on habit. Research has addressed these consumer purchase decisions for new products (Mazumdar 1993).

The three factors that had direct effects are product class knowledge, attitude risk, and relative concerns for low price compared with high quality. This framework emphasizes that price and quality are directly related, a general decrease in quality is correlated to a decrease in price. The author emphasized that today’s consumers are not

automatically impressed by the highest quality product or the lowest priced product. Instead, consumers' decisions are based on careful assessment of what benefits they obtain in exchange for the costs they incur to acquire them.

Rationale

Currently, there is a limited consumer demand for certified forest products. The lack of demand is believed to be partially due to consumers' lack of understanding about forest management issues, as well as the significance of certification (Hansen 1997). Without education and promotion efforts, consumers are unlikely to recognize the value of a certification eco-label, or to understand its' significance (Hansen 1997). Lamson (1997) agrees with Hansen that there is a lack of consumer understanding of what "certified" products are or what a sustainable forestry logo means when placed on a product. He argues, "the public needs more detailed information. . . that empowers them to do the right thing." Although this is simply his opinion, it points out the need for making additional information available to consumers. In their recommendations for future research Banerjee et al. (1995, p 31) state, "there is virtually no research done on the effectiveness of green advertising" and that there is a need for research in this area.

Despite the agreement by leading researchers that promotion could increase the success of certified forest products in the marketplace, to date no research has been done in this area. This research addresses their assumption and examines how a promotional brochure explaining forest product certification influences consumer purchase decisions.

Objectives

This research examined the introduction of a new certified wood product to the marketplace, FSC certified hardwood boards. The primary objectives of this study were to:

1. determine if consumers who viewed a promotional brochure about FSC certification were more likely to purchase these products than consumers who did not see the a promotional brochure; and

- compare consumers' purchase decisions regarding these products when there is a price difference to determine if promotion influences consumers to pay extra for FSC certified products.

Methods

The population of interest was do-it-yourself consumers of high-end hardwood boards. High-end is defined as clear and surfaced-four-sides (S4S) red oak and yellow poplar boards. The FSC certified product was provided by Anderson-Tully Lumber Company and was branded as GreenMark. GreenMark was placed in 12 selected home center stores throughout the Southeastern United States. The certified lumber was placed on the shelf directly next to the non-certified product. GreenMark was labeled “FSC Certified Lumber” to identify it as the certified brand. The two products looked very similar, other than natural variability in wood. Three different states are included in the sample frame, including Florida, Alabama, and Georgia (Figure 4.1).

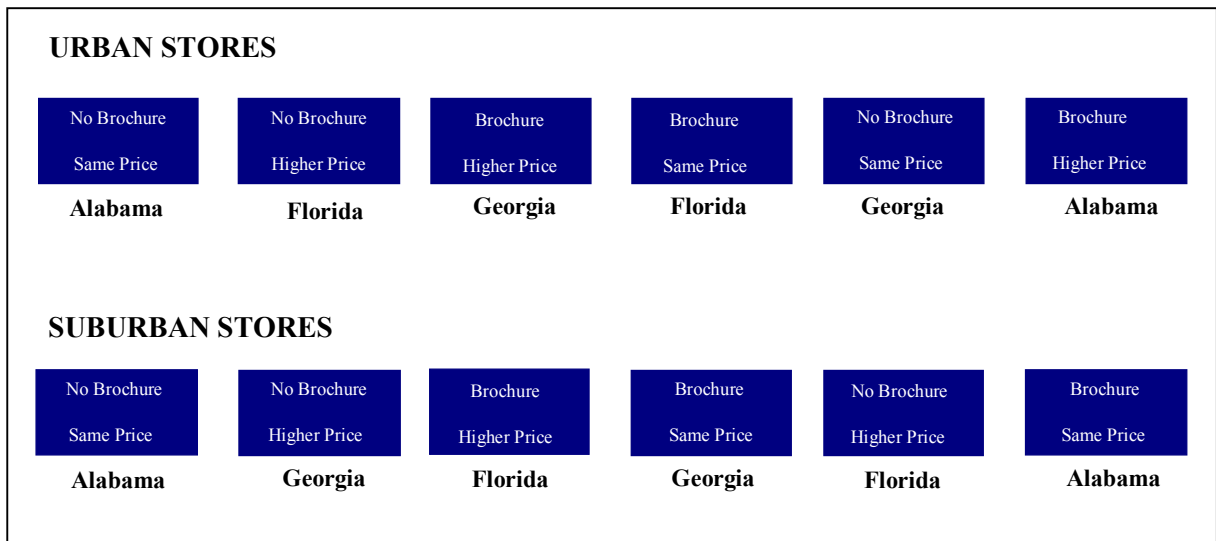


Figure 4.1: The experimental design used in this study was a 2 x 2 x 3 factorial.

The 12 stores were split into two blocks with six stores per block. The blocks were designated as “urban” and “suburban” stores. Stores were designated by the home center, using their average population size and average stores sales per year. It should be noted that suburban stores are still located near major populations that can sustain a large home center. This assumes that shoppers from more rural and suburban areas travel to

these stores since they do not have an alternative store closer to them. Blocks were designated to allow the examination of differences in the purchase of certified S4S boards between consumers who shop in urban stores and those who shop in suburban stores.

Promotional Design

In order to test promotional effectiveness for GreenMark, part of this study involved the design of the promotional brochure. The first step in that process was to determine what would be an effective message for consumers learning about certification for the first time in the store. A study of the effectiveness of various labels was used as a guide for designing promotional material (Teisl et al. 2000).

A promotional brochure was designed and placed in home centers by Virginia Tech in cooperation with Anderson-Tully's advertising agency. The promotional brochure highlighted what consumers have said they want to know relative to certification (Appendix 1). It highlighted that forests were growing back and that wildlife was being protected. The brochure also explained that forest operations did not harm fish or wildlife habitat. It emphasized that planning was done to ensure long-term care of the forest, including preventing overcutting, and planting trees when necessary (Teisl et al. 2000). The brochure explained forest certification in non-technical terms. A short description of FSC was also included in the brochure. Finally, a tagline for the brand was also developed, which read, "Environmental. Responsible. Beautiful." The term beautiful was used to imply quality because of the consumer perception that green products cannot be high quality (Mazumdar 1993). In addition to the brochure, a wooden display was designed, as well as signage. The sign also used the same tagline, as well as the term, "FSC Certified Lumber" (Appendix 2).

Because consumers in home centers are less likely to recall specific company information on products such as hardwood boards, Anderson-Tully created a brand for these FSC certified products – GreenMark. The intent was to assist consumers in recalling what they have purchased and increase the ease in recalling this product.

Data Collection and Analysis – Sales Volume

A large portion of the study was designed to determine the influence of promotion on consumer purchasing decisions. Sales of each product were tracked, using specifically designated UPC codes, and recorded on a monthly basis. Sales of the similar non-certified hardwood lumber product were tracked as well. For this section of analysis, the dependent variable was the arc sine transformation of GreenMark's sales share per store. This variable will be referred to as the relative sales share throughout this discussion. The final value that was determined to be a valid dependent variable was the arc sine of GreenMark's relative sales share per store. The arc sine transformation of sales share was chosen to eliminate store-to-store variance in the total sales volume of hardwood boards sold. This could have been addressed in other ways, such as using Analysis of Covariance (ANCOVA), however the arc sine transformation corrected any variance problems, while maintaining the maximum number of degrees of freedom (Myers 1972, Ott 1993).

The sales share per store was calculated by taking the number of boardfeet purchased in that store and dividing it by the total sales volume in boardfeet in that store for both the FSC certified and non-certified brands. Once the sales share was calculated, the arc sine was taken, resulting in the relative sales share figures. The arc sine transformation is common practice by statisticians in order to stabilize the variances. This transformation allowed further analysis to be done based on the relative sales share without concerns regarding the wide range of variances typically seen when examining proportions (Myers 1972, Ott 1993).

Initially, other potential forms of data were examined. These were sales dollars, number of pieces sold, and the boardfeet sold. Sales dollars was determined to be confounded by the influence of the price premium within each store based on the pricing treatment. For example, if a store had a price premium and sold the exact same amount of GreenMark as a store with no price premium, there would appear to be a difference in the sales between those stores. The number of pieces sold was confounded by the variation in size of those pieces. One store could have sold a large number of small pieces of GreenMark, while another store could have sold the same number of large pieces. Using the number of pieces sold measure, these stores would appear to have sold the same amount of GreenMark, however the implications are very different for these two

scenarios. The number of pieces sold was converted to the total boardfeet sold per store based on unit size, allowing for a better account of the actual volume sold. However, this value could not be used either. This is due to the large variation between individual stores in the total boardfoot sales of hardwood boards. Using this value would have detected differences in treatments that were actually differences in the store size and overall amount sold.

The independent variables were the treatments: the promotional brochure, price premium, and store location. A price differential was set for some of the test stores. The premium price for the FSC certified wood was 20% more than the comparable non-certified product. This premium was chosen by examining other comparable environmentally sensitive products. The price premium helped to accurately determine whether consumers are purchasing these products as a result of increased promotional materials available despite a higher cost. All of the stores received the same display to hold the products, as well as a sign stating that the products were “FSC Certified Lumber.” The promotional brochure was placed in half of the stores. The brochure was a tear-away informational sheet placed on the display that explained FSC certified products. The other half of the stores were provided with only the sign stating that the lumber was FSC certified but with no further explanation of certification. Finally, store location was varied, with half of the stores being located in urban settings and half in suburban areas.

Sales data was provided by the home center. The data was then inputted into a SPSS[®] Statistical Data Analysis package computer spreadsheet. It was coded to reflect the treatment for each specific store as shown in Figure 4.1 and reviewed for errors or omissions. Analysis of variance (ANOVA) was used to investigate the effects that each treatment had on the relative sales share of each treatment type. The difference between the overall mean and the mean for each treatment is known as the variance. The variance can be broken into two pieces: that which is attributable to the influence of the treatments and that which cannot be explained. ANOVA also allows for the calculation of significance levels for the main effects, as well as the interactions between effects and between blocks (Winer et al. 1991). Interactions are the effects due to putting two or

more features in combination that cannot be predicted by knowing the effects of the two features separately (Lehmann et al. 1998).

In analyzing the ANOVA results, a significance level of .10 was used to determine whether the effect of a treatment was significant. Those main effects and interactions with $p < .10$ are considered to have significant evidence that they are different than the overall mean (Ott 1993). P-values of .01, .05, and .10 are typically used to test whether treatments are statistically significant or whether they are simply due to chance. The statistically significant effects helped to identify which actions will increase the sale of GreenMark as well as those actions that will decrease sales (Sahai and Ageel 2000).

Data Collection and Analysis - Questionnaire

Before conducting the research, the questionnaire and interview questions were assessed for clarity, completeness, and content by a panel of experts in forest products marketing and survey design. Upon its completion, both research sponsors critiqued it as well. The questionnaire was administered by an outside market research company, who then contracted with local surveyors in each one of the markets.

The survey was conducted using intercept interviewing. This involved conducting interviews in the 12 home center stores where the new product was being sold. The shoppers were intercepted as they were leaving the aisle and had already committed to the purchase of some type of S4S hardwood board product. It was important to survey the shoppers after they had committed to their purchases to minimize the influence on their purchase decision.

The shoppers were offered a \$5 store coupon for participating in the study. This is especially important for lengthy questionnaires such as the one used in this study, which took approximately ten minutes to complete. This helped to bring the response rate close to 100%. This was critical to the success of this research because the individual sales occurrence for these products was low. Although the bulk of the research was collected during busier times, such as Saturdays, information was collected on Thursdays, Fridays, and Sundays as well. This was done to minimize sampling frame bias, resulting in a more

even representation of consumers by representing those who shop on weekends as well as weekday shoppers.

The study was conducted in home center stores throughout the Southeastern United States. The store locations were chosen based on their proximity to large urban areas. These were then separated into two groups, labeled as “urban” and “suburban” stores, which was intended for further examination of demographic characteristics of potential consumers of certified wood products.

A proportion formula was used to estimate the desired sample size. This formula is commonly used for marketing research and is preferred because it does not require an estimate of the standard deviation. By setting the true population proportion estimate, p^* equal to .50, variation is maximized for a dichotomous question (Malhotra 1996). This value was used because most of the questions of particular interest in the questionnaire were dichotomous questions. The resulting value for sample size can be seen as a conservative estimate. Sample size was calculated as follows:

Confidence level (α) = 90%
Corresponding z-value = 1.645
Level of precision (e) = .05
Assumed value of p^* = 0.50

Formula for estimation of N:
$$N = z^2 (p^* (1 - p^*)) / e^2$$
$$N = (1.645^2) (.50 (1 - .50)) / .05^2$$
$$N = 270.6 \cong 271$$

Based on this sample size calculation, the initial goal for this research was to collect at least 271 questionnaires. Another factor that was taken into consideration was the small number of stores per treatment type. This made the number of completed questionnaires per store important. The initial goal was to collect 50 completed questionnaires from each store. This would allow statistical analysis on a per store basis. With a target response rate of 100%, the initial goal was to collect 600 questionnaires. Due to differences in the occurrence of sales between stores, only a portion of the stores reached that goal. Upon receiving the questionnaires, they were examined for completeness and usability. Useable surveys were coded and entered into a SPSS[®] Statistical Data Analysis package. SPSS was designed for survey analysis and provides summary and comparison statistics for individual survey questions (Norusis 1985).

Results and Discussion

Sales Response to Treatments

The total amount of sales for both GreenMark and the alternative product were collected for the months of May, June, and July of 2002. The data was originally received as count data, but based on the standard conversion to boardfeet (bdft), total volumes sold were calculated. From the boardfoot calculations, the sales share was calculated per store. All statistical comparisons discussed in the results are based on sales share comparisons.

Table 4.1: Volume totals and percent sales share sold for 3-month measurement period.

Store Location	GreenMark (bdft)	Sales share GreenMark (%)	Other Wood (bdft)	Sales share Other Wood (%)
Suburban Georgia	1,651	22.4%	5,706	77.6%
Suburban Georgia	5,978	26.8%	16,289	73.2%
Urban Georgia	3,153	22.1%	11,130	77.9%
Urban Alabama	2,067	30.3%	4,765	69.7%
Urban Florida	2,621	20.1%	10,406	79.9%
Suburban Florida	4,251	22.2%	14,869	77.8%
Suburban Alabama	3,258	39.1%	5,076	60.9%
Urban Alabama	3,376	25.0%	10,120	75.0%
Suburban Alabama	2,923	32.1%	6,170	67.9%
Urban Florida	1,417	6.2%	21,558	93.8%
Suburban Florida	3,875	24.2%	12,154	75.8%
Urban Georgia	2,851	17.7%	13,245	82.3%
OVERALL	37,421	22.2%	131,488	77.8%

A breakdown by store is shown in Table 4.1. The total hardwood board volume sold in the 12 home center stores was 168,909 bdf. Of the total, 22.2% or 37,421 bdf sold were GreenMark and 77.8% or 131,488 bdf were the alternative non-certified product.

Statistical analysis was done to examine what treatments significantly changed the relative sales share of GreenMark. The treatment effects on GreenMark were considered to be the presence of a promotional brochure versus the absence of a promotional brochure, as well as urban versus suburban. The third effect, price premium, will not be addressed in detail in this chapter, except to examine whether the promotional brochure influenced consumers' likelihood to pay a premium for GreenMark.

Before the statistical analysis was interpreted, the assumptions of the analysis used, analysis of variance (ANOVA), were tested. ANOVA depends on the following assumptions: independence of the observations, proper scale of measurement, as well as normality and homogeneity of variance in the distribution of the data. In this case all of these assumptions were satisfied. However, it should be taken into consideration that all of the statistical analysis that follows is based on a small population. With a lower population size, ANOVA has less analytical power (Norusis 1985).

It should be noted that one of the urban stores in Florida appears to be an outlier. An average GreenMark sales share of 6.2% was observed for this store compared to an overall average of 22.2%. The next lowest sales share is 17.7%, a difference of eleven percentage points. Reasons for this data point were explored. It was verified that the store was indeed selling GreenMark in accordance with the experimental design. Possible reasons for this difference include consumer demographics that were not consistent with other urban stores or that interest in environmental products was significantly lower in this store. No specific reason could be determined. To examine how large of an effect this had on the overall analysis, 15% was substituted for 6.2% and the ANOVA was rerun. Although the exact significance levels changed, the results were not significantly altered. This outlier also affected the individual means of the data. However their overall trends remained unchanged as well. Since the value that appeared to be an outlier did not skew the overall analyses, the sales share value was left as 6.2% in all of the analysis that follow.

Before the main effects can be examined in an ANOVA table, the interactions must be examined (Figure 4.2). Strong interactions between the main effects would suggest that those main effects could not be examined individually because they are dependent on each other for their result (Norusis 2002). When these interactions were examined, two were found to be statistically significant. The interaction between a price premium and the promotional brochure was shown to have a statistically significant effect on the relative sales share of GreenMark ($p = 0.043$). This is an interesting result since both the promotional brochure and price premium were not found to be statistically significant when examined in this ANOVA. Further, the interaction between store location and price premium was also statistically significant ($p = 0.039$).

Table 4.2: Analysis of variance table for dependent variable, relative GreenMark sales share (the arc sine of sales share).

	Source Type III Sum of Squares	df	Mean Square	F	Significance
Corrected Model	636.784 ^a	7	90.97	4.08	.096 ^b
Intercept	5897.98	1	5897.98	264.21	.000
Store Location	292.37	1	292.37	13.10	.022^b
Price Premium	12.76	1	12.76	.572	.492
Promotional Brochure	75.02	1	75.02	3.36	.141
Store Location * Price	205.53	1	205.53	9.21	.039^b
Store Location * Brochure	6.58	1	6.58	.295	.616
Price * Brochure	190.22	1	190.22	8.52	.043^b
Store Location * Price * Brochure	19.62	1	19.62	.879	.402
Error	89.29	4	22.32		
Total	7618.89	12			
Corrected Total	726.08	11			

^a $R^2 = .877$ Adjusted $R^2 = .662$

^b statistically significant at the .10 level

To further examine these interactions, they were plotted on profile plots in SPSS. A profile plot is a line plot in which each point indicates the estimated marginal mean of

a dependent variable (adjusted for any covariates) at one level of a factor (Norusis 2002). The levels of a second factor can be used to make separate lines. Each level in a third factor can be used to create a separate plot. This was performed, with the resulting plots shown a Figure 4.2, Figure 4.3, and Figure 4.4.

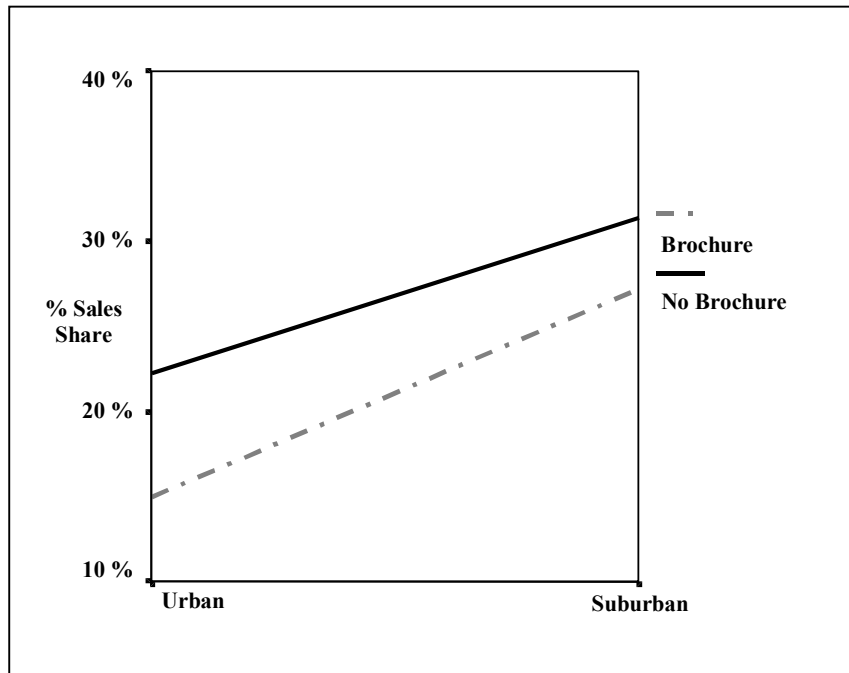


Figure 4.2 Profile plot showing no interaction between store location and the presence of a promotional brochure.

There was no interaction between store location and the presence of a promotional brochure (Figure 4.2). This is illustrated by the lack of a statistically significant effect in the ANOVA table as well as the profile plot. Therefore the statistically significant main effect that store location has is not being confounded by an interaction.

Analysis of the ANOVA based on the relative sales share resulted in a significant effect due to store location, with a p-value = .022 (Table 4.2). Other research has suggested that environmental products tend to sell better in large urban centers (Shrum et al. 1996). However, GreenMark sold better in suburban areas, with an average sales share of 26.7% compared to an average sales share of 17.9% in urban stores (Table 4.4). The assumption of this research was that suburban stores are typically located near other shopping centers on the edge of suburban communities and that because rural consumers

do not have a home center close to them, they would travel to the nearest one in these suburban communities.

Again, in Figure 4.3 the lines plotted cross when examining store location and the presence of a price premium. This illustrates another strong interaction when combined with the statistically significance in the ANOVA table ($p = 0.039$). This interaction could be the result of the main effect, store location, since it is statistically significant. Or the interaction could be causing the main effect to be significant. However, because of this interaction that should not be examined.

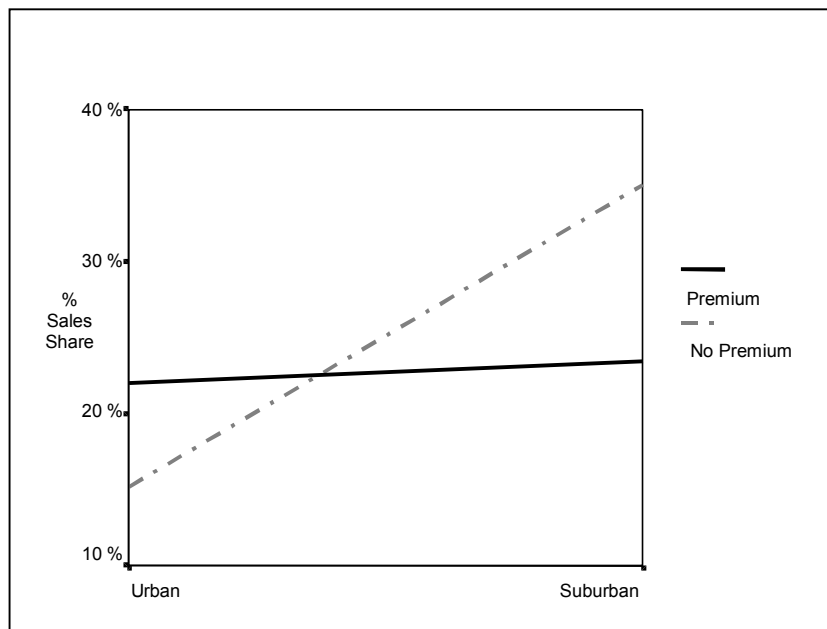


Figure 4.3 Profile plot showing the interaction between store location and the presence of a price premium.

In Figure 4.4, the most significant finding is that the lines plotting the presence of a promotional brochure and the presence of a price premium cross. This graph combined with a statistically significant interaction in the ANOVA table illustrated a very strong interaction ($p = 0.043$). This interaction is strong enough to state that the ANOVA statistics for each of these main effects should not be examined. The combination of these two factors influence the average sales share for GreenMark.

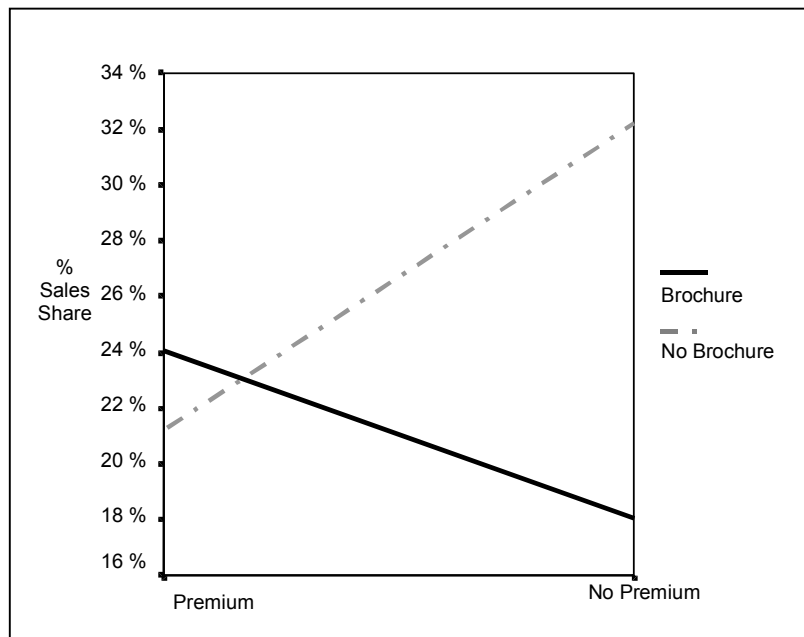


Figure 4.4 Profile plot showing the interaction between price premium and promotional brochure.

This indicates that when these two treatments are combined, they may result in a significant change in GreenMark’s sales share. The combination of conditions that results in the highest sales share is no price premium and no promotional brochure. This combination has a sales share of 29.5 % (Table 4.3). This optimal combination of treatments is counter to most previous research (Banerjee et al. 1995, Coddington 1993).

Table 4.3: Comparison of average sales share by treatment combinations.

Treatment combination	Average sales share
Price premium with brochure	24.1 %
Price premium without brochure	21.5 %
No price premium with brochure	22.0 %
No price premium without brochure	29.5 %

Table 4.4: Volume totals and percent sales share totals by treatment.

	GreenMark (bdft)	GreenMark (% sales share)	Other Wood (bdft)	Other Wood (% sales share)
Price Premium	18,926	22.7%	64,385	77.3%
No Price Premium	18,494	21.6%	67,102	78.4%
Urban	15,484	17.9%	71,223	82.1%
Suburban	21,936	26.7%	60,265	73.3%
Promotion	20,721	21.1%	77,421	78.9%
No Promotion	16,699	23.6%	54,067	76.4%

In analyzing the results of the ANOVA performed, all of the results should be examined with a degree of caution. Because of the complexity of this project and because it is the first of its kind, traditional statistical tools such as ANOVA did not carry a great deal of power, with only one degree of freedom. This research should be seen as the first step in a much larger analysis. These results should be investigated in additional research before any action is taken based on this portion of the findings.

Consumer Questionnaire

Based on the goal of obtaining approximately equal numbers of completed questionnaires from each treatment type, a total of 301 completed questionnaires were collected. The majority of the interviews were conducted during the period of May 16th through May 18th, 2002 (Thursday, Friday, and Saturday). The remainder of the questionnaires took place on the 8th, 15th, and 22nd of June, 2002 in select cities. These additional questionnaires were conducted in stores where that were underrepresented in the original data collection. These stores were identified as any store with under 50 completed questionnaires. Upon completion of the survey portion of this research not all of the stores had reached 50 completed questionnaires.

Purchasers vs. Non-Purchasers

The survey respondents were first asked whether they purchased GreenMark. This would classify them as either a purchaser or non-purchaser of GreenMark. Eighty-two respondents purchased GreenMark, while 151 respondents purchased the alternative product (Figure 4.5). Five respondents purchased both brands. There were also a total of 63 respondents who incorrectly identified what they purchased under the “other” category. These included answers such as “store brand” and identification by species and not brand. For example, responding that they purchased “red oak” or “yellow poplar.” It

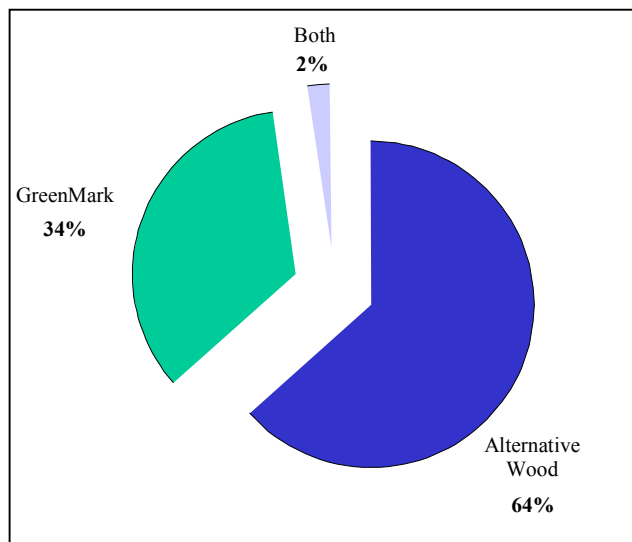


Figure 4.5: Consumer response to the question, “what brand of lumber did you purchase?”

should be mentioned that this questionnaire only captured the occurrence of a sale. The purchases could have been as little as one 2x2 board or a much larger quantity of material. Therefore, these numbers cannot be directly compared to those observed by calculating sales share using actual boardfeet purchased.

In addition to 82 respondents purchasing GreenMark, there were also another 48 respondents that considered purchasing it. This is important to note because each time a consumer is exposed to a new product and considers purchasing it, that consumer becomes more likely to purchase that product in the future (Schiffman and Kanuk 2000).

Respondents consisted of both do-it-yourselfers and contractors. Forty-nine respondents were hired to build or modify someone else’s home, classifying them as contractors. This compares to 109 respondents who were using the lumber to build or

modify their own home and an additional 95 respondents who were using it for a small hobby project (Figure 4.6). These individuals were classified as do-it-yourselfers. Finally, there were 46 respondents who said that they were using it for “other” purposes. These included responses such as “deck,” “fence,” and “cabinets.” Although most of these fell into one of the above categories, these were not examined any further because the responses could not be delineated into one of the categories.

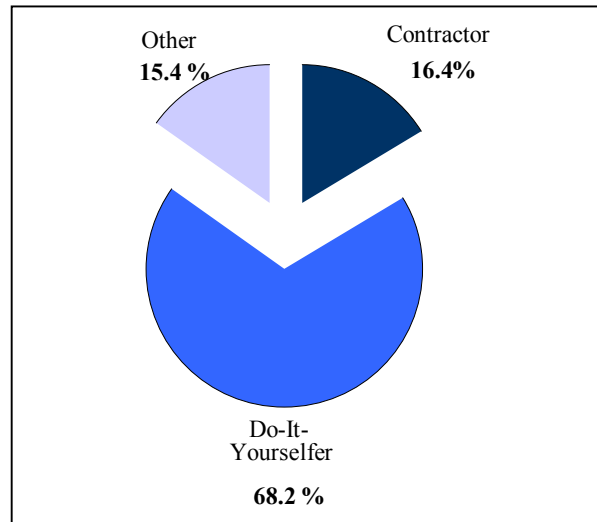


Figure 4.6: Proportion of respondents who were classified as do-it-yourselfers and contractors.

Using Pearson’s chi-square test, a significant difference was detected between the contractor and do-it-yourselfer groups ($p = 0.082$). Contractors were more likely to purchase GreenMark than do-it-yourselfers. Thirty-nine percent of contractors included in the survey indicated that they purchased GreenMark, while 30% of do-it-yourselfers who participated in the survey indicated they had purchased GreenMark.

Potential reasons were examined for why contractors were more likely to purchase GreenMark than do-it-yourselfers. One potential reason for this result may be that contractors simply pay closer attention to what they are purchasing when they shop in a home improvement store. This would mean that there was actually no difference in purchase behavior, but only appeared to be based on a better recall of what they purchased. However, since this possibility cannot be examined further, other potential reasons were considered.

Based on the perception of high quality associated with GreenMark, it is possible that contractors valued GreenMark as a higher quality product. Contractors would likely find this as a valuable attribute to a wood product they are purchasing for a work site. Contractors may assume that higher quality products would better suit their needs. However, when this was tested using Pearson's chi-square test, the result showed that contractors were not any more likely to see FSC certified products as higher quality ($p = 0.404$). Another potential reason examined was that contractors were more likely to purchase GreenMark because they were less price sensitive. It could be assumed that this could be the case since they could pass this cost on to their customer. When this was examined using Pearson's chi-square test, this was not the case. Contractors were no more likely to pay more for GreenMark than do-it-yourselfers ($p = 0.768$).

Although these additional tests were done to help identify an explanation for this result, none could be found. A larger study to examine potential differences in purchasing behaviors between contractors and do-it-yourselfers may shed additional light on these findings.

Consumers Lack Understanding of Forest Products Certification

A large portion of the questionnaire was designed to help determine the respondent's understanding of certification. Scattered throughout the questionnaire were five similar questions to help determine a respondent's understanding of certification. This was done to compare the consistency of their understanding, helping to determine how much consumers linked the concepts of FSC certification and GreenMark with the environment.

First, respondents were asked if the lumber they purchased on that day was "certified lumber." Overall, only 34% of respondents stated they purchased GreenMark (Figure 4.7). However, 47.6% of the respondents indicated that they had purchased certified lumber. Among the remaining respondents, 12.9% said they had not purchased certified lumber, while 39.5% stated that they did not know what type they bought.

The differences in the level of recall of certification were found to be statistically significant between purchasers and non-purchasers, using Pearson's chi-square test, $p < 0.001$. Purchasers of GreenMark were more likely to recall that that the lumber they

purchased was certified lumber. As shown in Figure 4.4, respondents who purchased GreenMark correctly identified that they purchased certified lumber 85.4% of the time. In contrast, respondents who did not purchase GreenMark were much more likely to respond that they did not know whether what they purchased was certified.

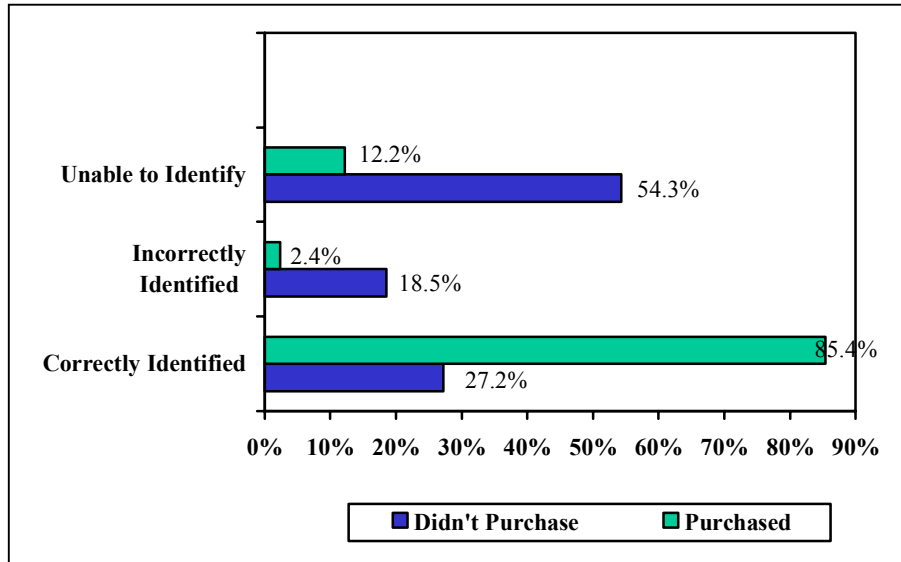


Figure 4.7: Percent of purchasers versus non-purchasers who were able to identify GreenMark as “certified lumber.”

Respondents were asked to define certification. This was asked in an open-ended manner to minimize the introduction of bias. The question was posed, “when you think of the term certified lumber, what comes to mind?” Overall, over 80% of respondents indicated quality or guaranteed, while only one percent indicated any type of environmental standard (Figure 4.8). When responses were compared based on whether

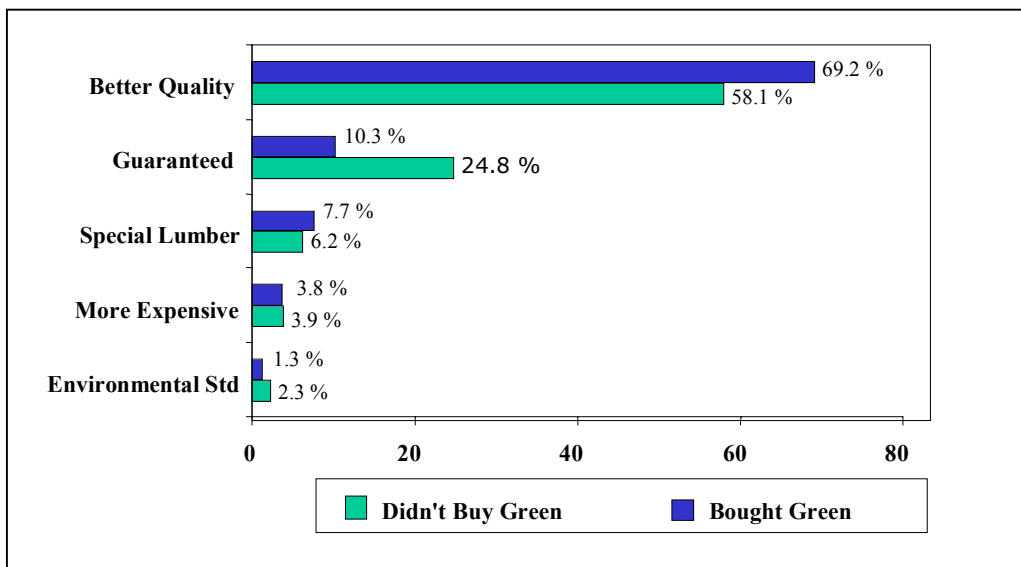


Figure 4.8: Open-ended responses regarding the definition of “forest certification.”

respondents had purchased GreenMark, no statistical significance was found, using Pearson's chi-square test, $p = 0.186$. This indicates that although consumers were more likely to identify GreenMark as a certified product if they purchased it, the overall perception of certification was that it represented quality assurances rather than any type of environmental assurances. However, respondents could think of environmental quality as a part of overall quality. A comparison was also made to determine whether respondents who saw the display or brochure had different perceptions regarding their definition of certified lumber. This was not the case, with $p = 0.391$ using Pearson's chi-square test.

For consumers who stated that they understood certification but did not purchase GreenMark, the questionnaire inquired about why they did not purchase it. There were 120 respondents who were prompted to skip this question because they indicated earlier in the questionnaire that they did not understand certification. Although the reason is not known, many additional respondents skipped this question. Therefore the subset of respondents answering this question was only 44 people. Out of that 44, an additional nine percent of respondents stated that they did not understand certification when they were asked this question, despite indicating earlier that they did understand it. Thirty-nine percent said that they did not purchase GreenMark because certification was not important to them; with an additional 4.5% answering that certification was just a gimmick. In some stores GreenMark's higher price was a problem, with 15.9% of respondents indicating that higher prices discouraged them from purchasing GreenMark. Only 2.3% of respondents stated that low product quality influenced their decision not to buy.

Respondents were also asked whether they had heard of certified lumber before. Twenty-six percent of respondents indicated that they had heard of it before, which is again close to the percent of respondents that purchased GreenMark (Figure 4.9). To determine whether this was indeed the case, a t-test was done comparing purchasers who had previously heard of certified wood to those who had not. No statistical differences were found ($p = 0.124$). Therefore, respondents who had previously heard about certified lumber were no more likely to purchase it.

Respondents were then asked how they first learned about certified lumber. Eighty-four respondents indicated they had heard about it before that day. Of those, 17 respondents indicated that they had learned on a previous visit to the store. Forty-three respondents stated that they learned about it from the brochure or display. Of those, 25 respondents purchased GreenMark. A similar number of respondents who did not purchase GreenMark stated that they learned through those avenues as well. Using Pearson's chi-square test, $p = .263$ (Table 4.5), showed no statistically significant difference between how purchasers and non-purchasers learned about certification.

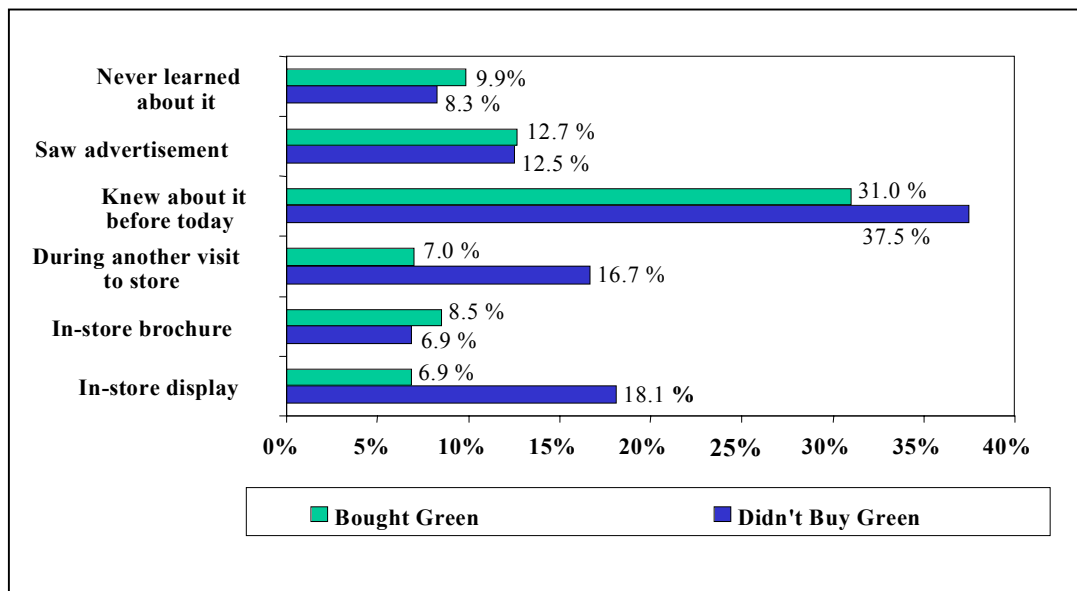


Figure 4.9: Consumers first learned about certification in a variety of ways.

Later in the questionnaire, respondents were asked if they knew that GreenMark was certified lumber. Twenty-nine percent of respondents indicated that they knew GreenMark was certified. Despite low understanding of the term "certification," these results indicate that consumers remember what they saw at the display. This has important ramifications for companies selling their products in home centers to the final consumer. Consumers were able to link a brand name to certification when they saw them together on a sign.

Table 4.5: Chi-square test results for the statistical significance of consumer knowledge questions separated based on whether respondents purchased GreenMark.

	Df	p-value
Did you purchase certified lumber?	2	< 0.001
When you think of certification, what comes to mind?	5	0.186
Have you heard of certified lumber before?	1	0.124
How did you first learn about certified lumber?	6	0.263
Did you know that GreenMark was certified lumber?	1	< 0.001

** statistically significant at the .10 level*

Promotional Recall Was Not High

After examining consumers' perceptions about certification, the questionnaire asked a series of questions that examined respondents' reactions to the two levels of promotion. Nearly 38% remembered seeing the GreenMark display and approximately 20% recalled seeing the brochure.

A total of 47 respondents recalled seeing the brochure. However 26 respondents that stated they saw the brochure where no brochure was present. Upon further investigation, it was discovered that there was another type of do-it-yourself brochure near the display. This may have confused some respondents. For example, upon examining these possibilities closer, many stores stated that they commonly put brochures explaining techniques for staining hardwood boards near the S4S hardwood board section. Respondents were likely indicating that they saw that type of brochure.

When the faulty responses are removed from the total number indicating they saw the brochure, 21 respondents correctly indicated that they saw a brochure. Of those respondents, 15 purchased GreenMark while 6 respondents did not (Figure 4.10). Although the total number of respondents was under 30, this was examined further by testing for statistical significance. Using Pearson's chi-square test, this was found to be statistically significant ($p < .001$). This indicates that individuals who saw the brochure may be more likely to purchase GreenMark. However based on the low number of

samples and the other brochure potentially biasing these responses, this result should be tested further.

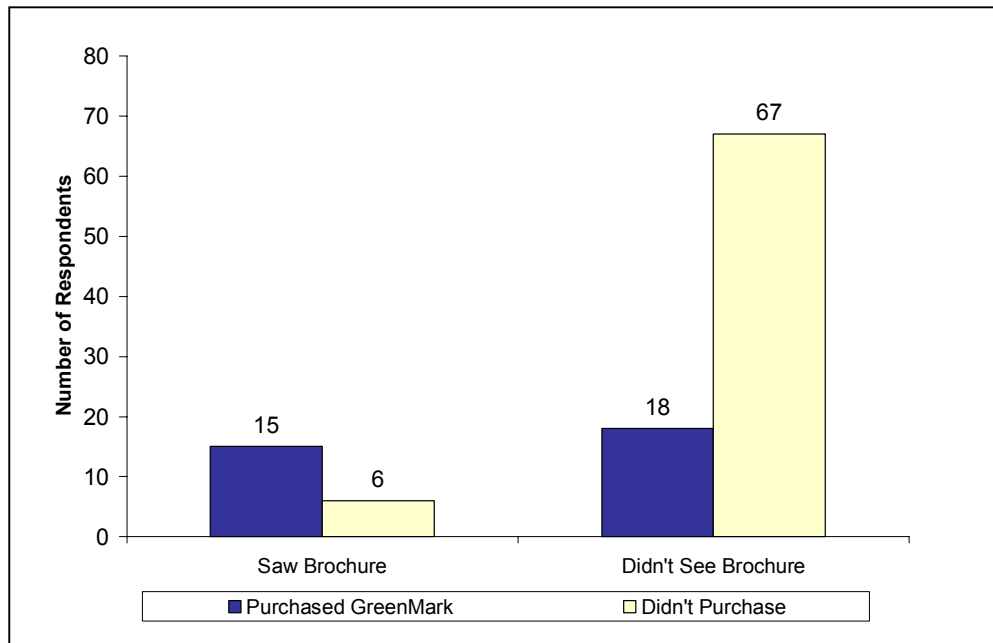


Figure 4.10: Number of respondents who stated they saw the promotional brochure, after eliminating those who were in stores where no brochure was present.

Previous studies have addressed questions of what type of brochure consumers would look at and what information the brochure should contain (Teisl et al 2000). However, the results of this study indicate that very few consumers take the time to look at any promotional brochure placed in stores.

The purpose of the brochure was to define forest certification and describe why consumers may care about certification. One of the premises of the brochure was that previous studies indicated that consumers are not trusting of anything that appears to be certified by the company itself or the industry. To follow up on this premise, consumers who saw the brochure were asked what type of organization they associated GreenMark with. Twenty-nine respondents said that they were not sure, while 20 respondents correctly identified it as an independent organization. Ten respondents incorrectly identified GreenMark as associated with an industry-sponsored group (Figure 4.11). This shows that despite efforts to separate FSC as an organization from others, respondents did not understand or perhaps did not recognize these differences.

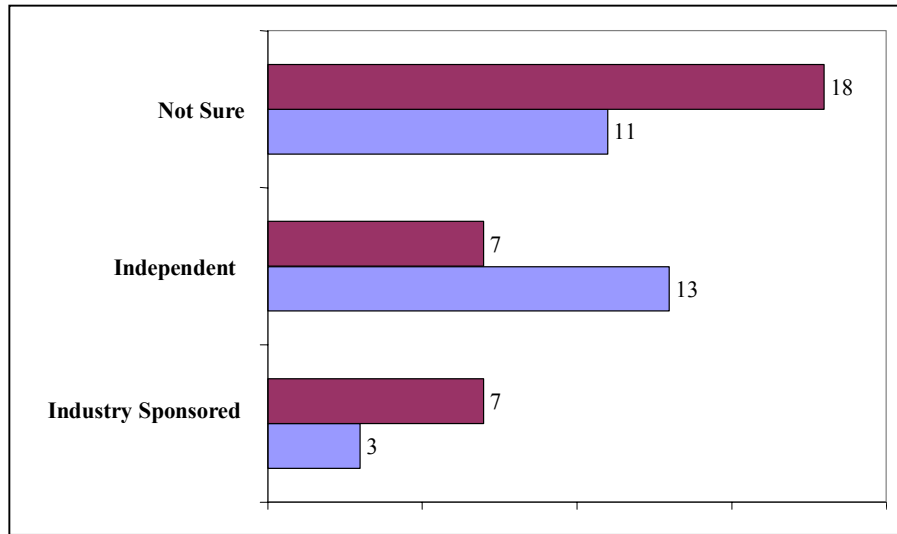


Figure 4.11: Consumers who saw the promotional brochure were asked what type of agency they associated with GreenMark.

Consumers' Preferences for Certifying Organizations

In addition to asking respondents to recall what type of organization certified GreenMark, respondents were also asked to give their confidence in the various certifying agencies. A question found in many previous studies was placed toward the end of this questionnaire. The question asked them to rate their confidence in environmental claims from each of the following: forest products companies, industry associations, and independent organizations. Results varied from those of other studies. Respondents were not particularly confident in the environmental claims made by any of the three organizations, with no organization seen as better than the others (Table 4.6).

Overall, forest products companies were ranked the most positive, followed by industry associations, and independent organizations (Figure 4.12). However, these were not shown to be significantly different from one another. The most positive ranking was rated 4.51 on a scale where 4.0 is neutral. This result may be more based on a lack of any type of strong feeling about specific groups. Past research has shown overall distrust in product claims, no matter who the claims are from (Kangun et al. 1991, Mohr et al. 1998, Bass 1996, Hansen 1997, Coddington 1993). This may be a factor in the lack of confidence in all three groups. Further, no statistically significant differences were found between how purchasers felt versus non-purchasers of GreenMark (Table 4.6).

Table 4.6: Comparison of the mean ratings and t-test results for first-, second-, and third-party certifying agencies based on respondents' overall confidence in each group.

		Mean rating*	p-value
Forest Product Company	Purchased	4.4	0.996
	Didn't Purchase	5.1	
	OVERALL	4.51	
Industry Association	Purchased	3.5	0.116
	Didn't Purchase	4.6	
	OVERALL	4.13	
Independent Organization	Purchased	3.8	0.445
	Didn't Purchase	4.9	
	OVERALL	3.81	

**based on a scale of 1 to 7.*

Discussion

This research examined the introduction of a new certified wood product to the marketplace, FSC certified hardwood boards. Key findings of this research were the significant interactions between store location and price premium, as well as the interaction between price premium and the presence of a promotional brochure. When the presence or absence of a price premium was combined with another factor, a strong interaction resulted in GreenMark's relative sales share. Unfortunately these strong interactions confined the analysis that could be made on the main effects since those ANOVA results could not be examined. It is recommended that additional research be conducted focusing on price premiums and promotion.

When interpreting the results based on the promotional brochure, the results should be interpreted with extreme caution because of a number of confounding factors that may have influenced these results. According to the results of the survey, few respondents stopped to examine the brochure. In further interviews with home center representatives, this was a typical consumer response across all product lines offered in home centers. The only exception to this is any promotional material that has instructions for a do-it yourself project. This implies that some type of promotional brochure is used to educate consumers about certification, the brochure needs to either contain information

on a project or be incorporated into the display design so that consumers don't take anything with them.

Based on the questionnaire data, when promotion was present consumers were more likely to purchase GreenMark at a premium price. This may reinforce the idea that consumers consciously make a decision that a higher price reflects higher quality. When consumers read the brochure, they may have considered that the higher price must be paid for environmental quality. When promotion was present and both products were the same price, consumers were less likely to purchase GreenMark. It is possible that consumers assumed that if the certified product was the same price as the non-certified product, they were giving up product quality for the environment. Experience in the early 1990's would have reinforced this trade-off. When environmental products were first introduced they were commonly of lesser quality than alternative products (Kangun et al. 1991, Mazumdar 1993). This was especially true with recycled content products.

However, the most likely possibility is simply that consumers did not look at the promotional brochure while shopping for this product, and therefore, it could not have affected their purchase decision. The very low number of survey respondents who stated that they had looked at the promotional brochure reinforces this. The few respondents who stated they read the brochure were more likely to purchase GreenMark.

Despite only approximately 20% of respondents remembering the brochure, almost 40% of respondents remembered seeing the GreenMark display, while another 10% stated that they learned about GreenMark during a previous visit to the store. These results illustrate that using a display as a type of promotion may be an opportunity that should be explored further. Given repeated exposure and a more streamlined promotional strategy, this could have a significant influence on consumer purchasing decisions. There is also potential to continue to market GreenMark and similar products without using a brochure. Instead, the message could be incorporated into the display itself and into on-product labeling.

Branding the FSC certified hardwood lumber "GreenMark" was effective. This is illustrated by the recall that respondents had for the product. Purchasers of GreenMark were found to be more likely to recall it as certified lumber. This illustrates that if they read the sign stating "GreenMark FSC Certified Lumber" then consumers automatically

linked GreenMark with certified. This is important to note for any future marketing efforts of this or similar products. Branding was an effective tool that should be used in future products in addition to eco-labeling.

The results from the questionnaire that examined consumers of hardwood lumber indicated that consumers do not understand the term “certification” in the context that the forest products industry uses it. Consumers linked the term as a measure of quality and excellence, rather than a term used in direct reference to the environment. Webster’s Dictionary (Merriam Webster 2002) defines ‘to certify’ as . . . “to attest as being true or as meeting a standard,” or “to guarantee . . . usually applying to a written statement, especially one carrying a signature or seal.” Respondents certainly agreed with the dictionary definition of certification. However from there, consumers may have assumed that “FSC certified lumber” meant a variety of things connected with product quality. Respondents could have associated quality with the grade of the lumber, a product guarantee, or that it was the cleanest appearing product. Another possibility is that consumers responded to the question with environmental in mind but saw it as a reflection of the total overall quality of the product.

Currently all of the popular forest product certification standards identify themselves by the organization name. For example, “FSC certified,” “SFI certified,” “ISO 14001 certified,” and “CSA certified.” Unless a large scale marketing campaign is launched to increase consumer’s awareness and recollection of specific certifying groups, the current description is not enough (Teisl et al. 2000). Another descriptor is needed to assist consumer interpretation to decipher what is meant by ‘certified.’

Results from the questionnaire indicate a great deal of consumer misunderstanding about forest certification. This reinforces the results of research addressing both environmental products in general (Kangun et al. 1991; Stevens et al. 1998), as well as research within the forest products industry (Michael and Smith 1994, Ozanne and Smith 1998, Hansen 1997). Many of the terms and claims used in promoting environmentally green products are foreign to consumers. For example, the average individual with no knowledge of forestry is less likely to understand terms such as “sustainable” or “reforested.” The common term that the industry uses to promote sustainable forestry, “certified,” therefore has almost no recognition in the marketplace.

Purchasers of GreenMark did not have a significantly positive attitude toward any certifying agency. That result is contradictory to some past studies (Hansen 1997, Teisel et al. 2000) but is consistent with general consumer research findings (Codington 1993, Kangun et al. 1991). One possibility for explaining this would be if the respondents did not link the term, “independent organizations” to encompass environmental organizations. If respondents linked this term only with accounting type verification this may have been seen more negatively, especially given the controversies surrounding accounting firms around the time of this survey. The beginnings of these scandals were being reported in the news at the same time that this survey was conducted.

Finally, another possibility to explain these differences is that most studies have examined overall populations of the United States. This study was conducted on a discreet population that currently uses wood products. This may result in a change in the pessimism regarding the industry. Specifically, the forest products industry may be seen more positively, while environmental groups are seen more negatively.

Discussion of Study Limitations

In analyzing the results of the ANOVA performed, all of the results should be examined with a large degree of caution. This project had a very complex research design. It was the first of its kind, making it difficult to correctly identify which factors should be controlled and monitored. This resulted in a small population of each individual treatment combination.

Traditional statistical tools such as ANOVA did not carry a great deal of power. The ANOVA analysis for this research carried only one degree of freedom. In addition, the significant interactions between the main effects of the ANOVA further limited the conclusions that could be drawn about the treatments tested.

Finally, there is confusion and ambiguity regarding two very important terms used in this research. This research has limited understanding as to how much consumers understood the term “FSC certified.” This has significant impact on the conclusions and recommendations that can be made from this research. The term, “high quality” was used by over 80% of respondents to describe certified wood, however this term is very vague. Respondents could have understood that certification was an environmental attribute and

then equated it as a part of overall high quality. In contrast, respondents could have defined high quality as strictly an indicator of the appearance and serviceability of the wood. The most likely possibility is that the definition of high quality was different for each respondent. Without further information about respondents' definitions of high quality, a true understanding of consumers' knowledge of the environmental aspects of GreenMark is not known.

Recommendations for Future Research

This research should be seen as the first step in a much larger analysis. Further investigation should be done to determine consumers' understanding of certification and its implications. This would allow a better understanding of what information consumers are lacking to make an educated decision, as well as what additional information should be provided.

A more in-depth investigation into consumers' perceptions of high quality wood is also of interest. This could be investigated by small focus groups and additional intercept surveying in home centers. Additional information on consumers' perceptions would be a valuable tool for marketers and would also shed additional light on the findings of this research.

Finally, although research has been done to explore which certifying agencies consumers trust, this research did not indicate any strong feelings regarding any particular type of certifying group. Additional research to probe into whether consumers trust any certifying agency would be helpful. This research should be in the form of an actual consumer survey and should focus on how much consumers understand and how they define what groups or organizations they trust. This information could allow further dialog among researchers and certifying agencies to pursue the idea of mutual recognition.

Conclusions

Certification provides an opportunity for the forest products industry to communicate to consumers the ideas of responsible forestry practices and to promote

forest products as a sustainable material choice. Certification could also be used as a response to the environmental advertising campaigns that have been successful for other materials. Trade associations for materials such as plastics and steel have marketed their recycling efforts. Their environmental advertising has resulted in an increase in sales share for these competing products.

GreenMark has shown very positive market potential. Within a short time period, GreenMark captured approximately 25% of the market within that product class. This is a significant achievement for a new product introduction in the earliest stages. This type of success within a short period of time indicates that this product has market potential.

For products like is one to be successful, substantial consumer education must be done. Before any additional advertising is done, a large-scale examination of the effectiveness of various eco-labels should be conducted. This examination should build on this research, as well as that of Teisl et al. (2000). The research could also be expanded by examining in-store promotion and labeling. This will allow the forest products industry to better understand the most effective communication tools for reaching consumers. After this more detailed promotional effectiveness study is completed, there are two potential approaches to marketing these products efficiently to consumers.

In order for the products to be offered as an alternative next to a non-green product, some type of labeling would be required. For example, the home center could have a small advertising campaign announcing the release of a logo that will label all environmentally friendly products in the store. This would eliminate confusion regarding various company labels, while at the same time providing the home center with a positive corporate image. A directory of these products could be located where consumers walk into the stores. This directory could show all environmentally conscious products available, as well as where each product is located in the store. The directory should also have a brief description of how the home center selected these products as environmentally friendly.

A more broad-based approach would be to create an advertising cooperative made up of certification organizations, certified companies who sell their products in home centers, as well as the home centers themselves. This advertising cooperative would then

use the results of the promotional effectiveness study to launch a large, national advertising campaign. This approach would require more cooperation between parties. However, it reduces the confusion to the consumer to have one message with a discrete definition of forest product certification.

Another strategy would be to create a specialty store for environmentally friendly products, either within existing home centers or as stand-alone smaller stores. However, creating a small area within existing stores would allow home centers to address the environmental concerns for various products carried in the store. This may also be a financially attractive option for home centers. A successful example of this is the gourmet or all-natural food stores that many large grocery chains now place within the larger store. This allows the capture of both consumers willing to pay more for certified products, while also foregoing the risk of losing those consumers not willing to pay more or purchase those types of products.

This portion of the store could have a different atmosphere than the warehouse environment, with more of a “gourmet” atmosphere. This allows the customer to feel as if they have walked into the local specialty hardware store. It could be better lit, with all of the products within a consumers’ reach without a forklift. This section could include all types of green products, such as certified flooring, mouldings, and cabinets. Other appropriate products for this section could include environmentally safe paints, products with recycled content, as well as products that increase your home’s energy efficiency.

These opportunities have a great deal of potential to increase profitability, while building consumer goodwill for active corporate environmental responsibility. However, one caution is that consumers will expect the same product attributes that a non-green product would offer.

In summary, this research helps give the forest products industry a clearer picture of consumers willing to purchase certified wood products and directly relates that to the home center do-it-yourselfer. Results can be used as a resource to build a green market for various wood products. Consumer interest still exists for environmentally green products, specifically FSC certified wood products. However, in order for those to be successful, a widespread promotional campaign is needed. This campaign should focus heavily on educating consumers. It is essential that the campaign be well planned and

comprehensive for it to be effective since consumers have a predisposition to be skeptical about environmental product claims. With proper planning and coordination a successful product or product line could be launched based on certified wood.

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Chapter Five: An Investigation of Consumers' Reactions to Charging a Price Premium for FSC Certified Boards

Introduction

Throughout the past thirty years, environmental issues have received increased attention from the media and special interest groups, reflecting public awareness and concern. During this era, companies have reevaluated their environmental image with consumers. Companies have increased selling environmentally sensitive products and have used this as a competitive advantage in the marketplace. This is seen as an avenue for market growth for companies interested in this area.

Green markets have been accepted in mainstream markets, but continue to grow and flourish in many industries. This is reinforced by the fact that green offerings represented 20-40% of all new products introduced in 1991 in health-beauty aids, pet care, and household and laundry product categories (Ottman 1992). During this same time, forestry practices in the United States came under scrutiny. One response to concern about environmental issues has been the formation of various forestland and forest product certification programs.

Certification in the Forest Products Industry

Certification programs act as a set of checks and balances for the industry by allowing some other organization to verify their forest practices by “certifying” their operations. Certification involves creating a verification scheme that can be used to ensure that wood products come from a sustainably managed forest, using a set of environmentally-sound criteria.

There has been a trend by some forest products companies to “certify” part or all of their forestlands, manufacturing, and/or distribution facilities. Some of the largest forest products companies in the United States have completed some type of certification process, including Anderson-Tully Lumber Company, Weyerhaeuser Company, and Columbia Forest Products. The two largest home improvement retailers in the United States, The Home Depot and Lowe’s Home Improvement Warehouse, have decided to support certification as well. They have both released buying policies related to products

that would be affected by this process. Both companies announced that they would give preference to certified products over non-certified ones where it was possible (The Home Depot 1999, Lowe's Home Improvement Warehouse 2000).

Although some forest products companies have embraced certification, the industry as a whole remains skeptical. This is due in large part to the costs associated with the certification process. The documented assumption is that this cost cannot be passed through the distribution chain to the final consumer. Rather, it has been assumed that the landowner and primary manufacturers must incur the cost. Companies are interested in whether they can pass some or all of the added expense of certification on to the final consumer. Other companies have expressed an interest in whether they may be missing untapped market potential.

Previous Studies on the Market Potential of Certified Forest Products

To address the concerns and questions of the industry, research has been done on a variety of different products and issues associated with the pricing and overall market potential of certified wood products. These products have included new homes, wooden household furniture, veneer, and softwood studs.

The examination of market potential for certified wood products in new home construction was studied by Gronroos and Bowyer (1999) in two major metropolitan areas: Chicago and the Minneapolis/St. Paul area. Results of Gronroos and Bowyer's study showed that 36% of respondents in Chicago and 24% of respondents in Minneapolis/St. Paul would have been willing to pay more for inclusion of certified lumber and wood products in their homes.

In addition, results indicated that consumers were more interested in purchasing environmentally certified lumber and wood products for features that they can see in the home after it is built, such as flooring, doors, cabinets, and furniture. Forty percent of Chicago respondents and 25% of Minneapolis/St. Paul respondents indicated that they would be more likely to buy furniture that is made of certified wood than building materials or other less visible products (Gronroos and Bowyer 1999).

These results have been verified by other studies. John McNulty, Vice President of Seven Islands Land Company, a company producing certified lumber, stated,

“consumers relate best to wood products they can see, such as flooring, moulding, doors, and stairways (Hammel and Ward 1996). Consumers will request these items while not even considering the 2x4s, studs, and framing which make up their homes.” Stevens et al. (1998) found that companies selling certified wood products indicated that certified flooring materials, furniture, architectural panels and mouldings were the certified products in the highest demand.

However, it should be noted that studying consumers’ willingness to pay typically overestimates the amount that consumers would pay more for these products. Likewise, the amount of a price premium that consumers will pay is also often overestimated, especially in items where it is considered socially desirable to answer that way. In general, with any socially desirable answer based on willingness, people are likely to overstate their willingness to take action (Spangenberg and Greenwald 1999).

Results from another study stated that although environmentally preferred characteristics were important, price and quality were still seen as the most important characteristics. Environmental concern was highest when participants purchased paper and was considered less important for other products. This was related to the high frequency of purchase for paper in comparison to other wood products (Teisl et al. 2000).

Pricing Strategies for Environmentally Green Products

A general theme through much of the previous research done on both forest certification and environmentally green products in general emphasizes the questions surrounding price. Many studies have examined whether companies are already receiving more for these products. While a series of studies have been done on consumers’ willingness to pay a premium, the question remains, can potential price premiums become standard practice for green products?

A study done by Humphries et al. (2001) compared the status of certified wood product merchants between 1995 and 1998. Much of the study surrounded corporate benefits of certification. The direct benefits identified were receiving green premiums and maintaining or increasing sales share. Surveys of merchants showed that market premiums are currently rare and that the indirect benefits of certification are often the most important reason for entering the certified wood products market (Humphries et al.

2001). Sixty-three percent of merchants did not apply a green premium for certified products, while 20% received a premium between one and five percent. Merchants indicated that the lack of a premium was due to the immaturity of the market. In addition, merchants often felt that certification was obtained based on the desire to expand sales share by distributing certified wood products. This reinforces the findings of Humphries et al. (2001). Other studies have showed similar results, finding little evidence that distributors were adding a green premium to the final cost (Stevens et al. 1998).

Ottman (1999) explains that many companies don't try charging a premium for green products because of past experiences after new products flopped when consumers did not pay a premium. She explains that many new green products are poorly marketed. The important question to ask is what other benefits does this green product offer? She argues that today's generation of green products must offer similar or better quality attributes compared to competing products. During the past four years there have been a number of new product introductions that have gained commercial success, with premiums ranging from 25 to 50%. For instance, Terra Verde's line of organic cotton sheets and towels, as well as aromatic candles and natural body oils are sold at premiums as high as 50%. Maytag's new Neptune Washer is designed to clean clothes better and save an estimated \$100 per year on water and energy bills. This product is sold at a 50% premium and retailers have trouble keeping it in stock (Ottman 1999).

Ottman emphasizes that the key to successfully getting a premium for green products is to go beyond the green aspect and focus on the primary benefits that consumers were seeking in the first place. In addition, she suggests that all of these benefits be communicated to the consumer, while keeping in mind that consumers do not understand a lot about environmental issues. Consumers may also think that green products are inferior quality as a result of the poor performance of early green products. A market-research analyst with the Hartman Group was quoted as saying "a lot of companies don't want to sell an organic product with a tree-hugger image anymore," says Michelle Barry (Fonda 2002). This illustrates the growing emphasis by marketers to treat environmental attributes just as another product attribute.

General Pricing Strategies

Some general strategies for pricing consumer products are to add a predetermined mark-up to what the product costs to manufacture or to compare the price of competitors products and price to be comparable. However, the part of pricing that marketers and salespeople most commonly forget to take into consideration is the emotional side of price. This includes broad assumptions on the consumers' part in correlating a higher price with better quality. Various studies have also shown that barring other cues for quality, consumers rely on price and brand name as indicators associated with quality.

O'Neill and Lambert (2001) validated the results of a previous study that illustrated the relationship between price and quality. They found that as a consumer's price-quality inference increases, the additional amount that they are willing to pay increases as well. The relationship between price and quality has also been examined in other ways. One study found that lacking other obvious cues, consumers will judge quality based on price (Noel and Hanna 1996). This study varied price on a group of 14 competitive products and evaluated the respondents' reactions in ranking them for quality. They found that product quality has a positive correlation to price assessment. The results indicated that consumer judgments about product quality influenced the price what they were willing to pay. Erickson and Johansson (1985) found that judgments of price are influenced by beliefs about a brand's quality. In some cases, higher priced products are often perceived to possess higher quality than they necessarily deserve (Noel and Hanna 1996).

Brucks et al. (2000) studied the effects of both price and brand name as indicators of perceived quality by consumers. The research showed that consumers evaluate quality in many different ways and using varying quality dimensions. Unlike the research by O'Neill and Lambert (2001), the findings of Brucks et al. closely examined when price and brand influences a consumer's perception of quality. The findings in this study indicate that price and product quality are not correlated under all circumstances. Potential explanations for this difference are explained. The price / product quality relationship could depend on specific quality dimensions that were relevant only to those products examined in previous studies. Consumers may only use price to infer for certain product types. For example, price would be more directly correlated with quality when

the product was seen as an item of prestige. Whereas, a consumer may rely less on linking price and quality when they are concerned with the ease of use or serviceability as indicators of quality (Brucks et al. 2000). These six dimensions are all proposed in this study as indicators of quality, although all six dimensions are not usually weighed for every product. In summary, the extent that consumers use price and brand name as cues depends on the availability of product-related attribute cues, the relationship of product attributes to quality dimensions, the reputation and consistency of a brand, as well as the consumer familiarity of a product category (Brucks et al. 2000, Mazumdar 1993).

In comparing previous research on the pricing strategies for wood products with other pricing strategies, there are significant variations between the two. To date, no research has used pricing strategies for other environmentally green products as a guide for selling certified forest products. This research seeks to address the assumptions of pricing and how pricing influences consumer purchase decisions.

Objectives

This research examined the introduction of FSC certified hardwood lumber into the marketplace. The primary objectives of the study were to:

1. determine if consumers would pay a 20% price premium for FSC certified forest products when a cheaper non-certified alternative was present; and
2. compare consumers' purchase decisions regarding these products when there is promotion present and a 20% price difference to determine if promotion makes consumers more likely to pay extra for FSC certified products.

Methods

The population of interest for this study consisted of do-it-yourself consumers of high-end hardwood boards. High-end is defined as clear and surfaced-four-sides (S4S) red oak and yellow poplar boards. The FSC certified product was provided by Anderson-Tully Lumber Company and was branded as GreenMark. GreenMark was placed in 12 selected home center stores throughout the Southeastern United States. The certified lumber was placed on the shelf directly next to the non-certified product. GreenMark was

labeled “FSC Certified Lumber” to identify it as the certified brand. The two products looked very similar, other than natural variability in wood. Three different states were included in the sample frame, including Florida, Alabama, and Georgia (Figure 5.1).

The 12 stores were split into two blocks of six stores each. The blocks were designated as “urban” and “suburban” stores. Stores were designated by the home center, using average population size and average stores sales per year. It should be noted

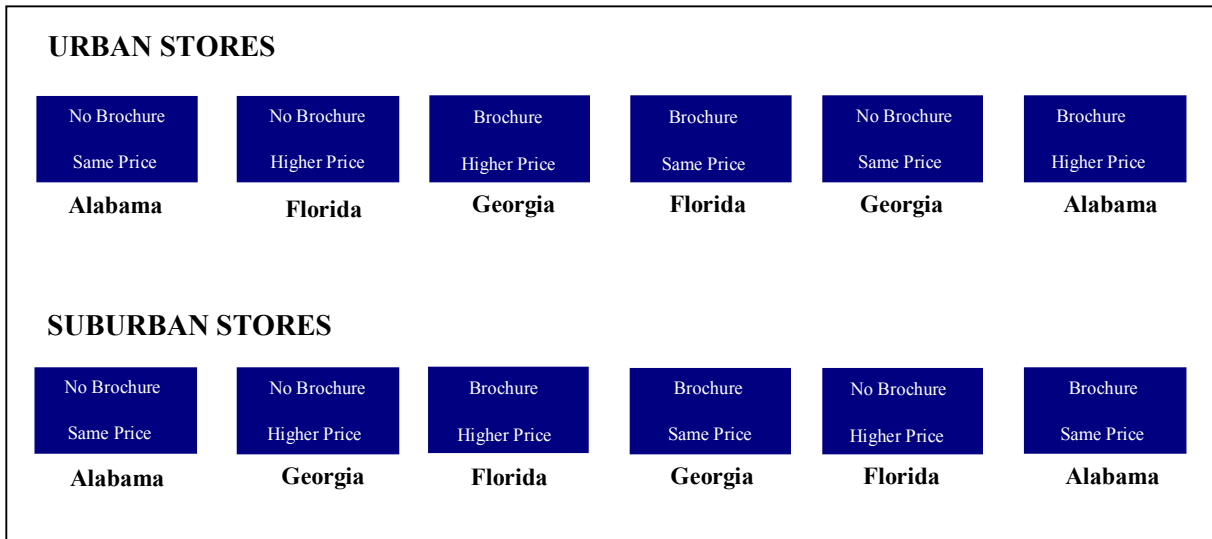


Figure 5.1: The experimental design used in this study was a 2 x 2 x 3 factorial.

that suburban stores are still located near major populations that can sustain a large home center. This assumes that shoppers from more suburban areas travel to these stores since they do not have an alternative store closer to them. Blocks were designated to allow the examination of differences in the purchase of certified S4S boards between consumers who shop in urban stores and those who shop in suburban stores.

Pricing Strategy

A price differential was set for half of the test stores. Using a price premium was done to examine whether manufacturers and suppliers would be able to recover the cost for certification and potentially, additional profit as well. If this were proven, it could become an incentive for forest products companies to pursue the certified market. A price premium also helped to accurately determine whether a promotional brochure helped to influence consumers to purchase GreenMark despite a higher cost.

The premium price for the FSC certified wood products was 20% more than the comparable non-certified product. This premium was chosen by examining other comparable environmentally sensitive products, such as organic produce and recycled content paper products. This is substantially more than the premiums used in other studies testing the willingness to pay for certified wood products. This was done intentionally to disregard industry perceptions of consumers' ability and willingness to pay a premium price. In addition, the difference in the prices was meant to be substantial enough that consumers knew they were paying more.

The premium was determined based on the cost of the non-certified product. For example, when pricing the 1 x 6 x 4 FSC certified red oak board, the non-certified board was the base price and an additional 20% was then added to the GreenMark price. This was done for each GreenMark product in the six stores that were selected to charge a premium for these certified products.

Promotional Design

In order to test whether the presence of a promotional brochure affects consumers' likelihood to purchase GreenMark at a higher price, part of this study involved the design of a promotional brochure. A study of the effectiveness of various labels was used as a guide for designing promotional material (Teisl et al. 2000).

The promotional brochure highlighted information relative to certification that previous studies have indicated consumers would like to know about wood products they are purchasing (Appendix 1). A tagline for the brand was also developed, which read, "Environmental. Responsible. Beautiful." The term beautiful was used to imply quality because of the consumer perception that green products cannot be high quality (Mazumdar 1993). In addition to the brochure, a wooden display and signage was designed. The sign also used the same tagline, as well as the term, "FSC Certified Lumber" (Appendix 2).

Data Collection and Analysis – Sales Volume

There are two parts to this study, each requiring different data collection methods. The first section was designed to study the changes in sales as a result of changing factors

within each block. The second portion of the study examined the results of the consumer survey and consumer perceptions regarding certification.

A large portion of the study was designed to determine the influence of promotion on consumer purchasing decisions. Sales of each product was tracked, using specifically designated UPC codes, and was recorded on a monthly basis. Sales of the similar non-certified hardwood lumber product were tracked as well. For this section of analysis, the dependent variable was the arc sine transformation of GreenMark's sales share per store.

Initially, other potential forms of data were examined. These were sales dollars, number of pieces sold, and the boardfeet sold. Sales dollars was determined to be confounded by the influence of the price premium within each store based on the pricing treatment. For example, if a store had a price premium and sold the exact same amount of GreenMark as a store with no price premium, there would appear to be a difference in the sales between those stores. The number of pieces sold was confounded by the variation in size of those pieces. One store could have sold a large number of small pieces of GreenMark, while another store could have sold the same number of large pieces. Using the number of pieces sold measure, these stores would appear to have sold the same amount of GreenMark, however the implications are very different for these two scenarios. The number of pieces sold was converted to the total boardfeet sold per store based on unit size, allowing for a better account of the actual volume sold. However, this value could not be used either. This is due to the large variation between individual stores in the total boardfoot sales of hardwood boards. Using this value would have detected differences in treatments that were actually differences in the store size and overall amount sold.

The final value that was determined to be a valid dependent variable was the arc sine of GreenMark's sales share per store. The sales share per store was calculated by taking the number of boardfeet purchased in that store and dividing it by the total sales volume in boardfeet in that store for both the FSC certified and non-certified brands. Once the sales share was calculated, the arc sine was taken, resulting in the relative sales share. This variable will be referred to as the relative sales share throughout this discussion.

Relative sales share was chosen to eliminate store-to-store variance in the total sales volume of hardwood boards sold. The arc sine transformation is common practice by statisticians in order to stabilize the variances. This transformation allowed further analysis to be done based on the relative sales share without concerns regarding the wide range of variances typically seen when examining proportions (Myers 1972, Ott 1993). This could have been addressed in other ways, such as using Analysis of Covariance (ANCOVA), however the arc sine transformation corrected any variance problems, while maintaining the maximum number of degrees of freedom (Myers 1972, Ott 1993).

The independent variables were the treatments: promotion and price premium. A price differential was set for some of test stores. The premium price for the FSC certified wood was 20% more than the comparable non-certified product. All of the stores received the same display to hold the product, as well as a sign stating that the products were “FSC Certified Lumber.” Half of the stores also received a promotional brochure explaining certified products.

Sales data was provided by the home center. The data was then inputted into a SPSS[®] Statistical Data Analysis package computer spreadsheet. It was coded to reflect the treatment for each specific store as shown in Figure 5.1 and reviewed for errors or omissions. Analysis of variance (ANOVA) was used to investigate the effects that each treatment had on the relative sales share. The difference between the overall mean and the mean for each treatment is known as the variance. The variance can be broken into two pieces: that which is attributable to the influence of the treatments and that which cannot be explained. ANOVA also allows for the calculation of significance levels for the main effects, as well as interactions between effects and between blocks (Winer et al. 1991). Interactions are the effects from putting two or more features in combination that cannot be predicted by knowing the effects of the two features separately (Lehmann et al. 1998).

In analyzing the ANOVA results, a significance level of .10 was used to determine whether the effect of a treatment was significant. Those main effects and interactions with $p < .10$ are considered to have significant evidence that they are different than the overall mean (Sahai and Ageel 2000). The statistically significant

effects helped to identify which actions are beneficial to the sale of GreenMark as well as those to avoid.

Data Collection and Analysis - Questionnaire

Before conducting the research, the questionnaire and interview questions were assessed for clarity, completeness, and content by a panel of experts in forest products marketing and survey design. Upon its completion, both research sponsors critiqued it as well. The questionnaire was administered by an outside market research company, who then contracted with local interviewers in each one of the markets.

The survey was conducted using intercept interviewing. This involved conducting interviews in the 12 home center stores where the new product was being sold. The shoppers were intercepted as they were leaving the aisle and had already committed to the purchase of some type of S4S hardwood board product. It was important to survey the shoppers after they had committed to their purchases to minimize the influence on their purchase decision. The shoppers were rewarded with a \$5 store coupon for completing the survey. This is especially important for lengthy questionnaires such as the one used in this study, which took approximately ten minutes to complete. This helped to bring the response rate close to 100%. This was critical to the success of this research because the individual sales occurrence for these products is low. Although the bulk of the research was collected during busier times, such as Saturdays, information was collected on Thursdays, Fridays, and Sundays as well. This was done to minimize sampling frame bias, resulting in a more even representation of consumers by representing those who shop on weekends as well as weekday shoppers.

Various formulas and rules of thumb exist for determining the optimum sample size. A proportion formula was used to estimate the desired sample size. This formula is commonly used for marketing research and is preferred because it does not require an estimate of the standard deviation. By setting the true population proportion estimate, p^* equal to .50, variation is maximized for a dichotomous question (Malhotra 1996). This value was used because most of the questions of particular interest in the questionnaire were dichotomous questions. The resulting value for sample size can be seen as a conservative estimate. Sample size was calculated as follows:

Confidence level (α) = 90%
Corresponding z-value = 1.645
Level of precision (e) = .05
Assumed value of p^* = 0.50

Formula for estimation of N:
$$N = z^2 (p^* (1 - p^*)) / e^2$$
$$N = (1.645^2) (.50 (1 - .50)) / .05^2$$
$$N = 270.6 \cong 271$$

Based on this sample size calculation, a determination was made that the initial target of this research should be to collect a minimum of 271 questionnaires. However another factor that was taken into consideration was the small number of stores per treatment type. This made the number of completed questionnaires per store important as well. The initial goal was to collect 50 completed questionnaires from each of the 12 stores. This would allow statistical analysis to occur on a per store basis. With a target response rate of 100%, the initial goal was to collect 600 questionnaires. However, due to differences in the occurrence of sales between stores, only a portion of the stores reached that goal.

Upon receiving the questionnaires from the market research company, they were examined for completeness and usability. Useable surveys were coded and entered into a SPSS® Statistical Data Analysis package computer spreadsheet. SPSS is designed for survey analysis and provides summary and comparison statistics for each individual question. The questionnaire data was categorical, which allowed for statistical analysis using cross tabulations and Pearson's chi-square test to detect differences between subsets of the population.

Results and Discussion

Sales Response to Treatments

The total amount of sales for both GreenMark and the alternative product were collected for the months of May, June, and July of 2002. The data was originally received as count data, but based on standard conversions, total boardfeet sold were calculated. From the boardfoot calculations, the sales share was calculated per store. All statistical comparisons discussed in the results are based on sales share comparisons.

A breakdown by store is shown in Table 5.1. The total hardwood board volume sold in the 12 home center stores was 168,909 boardfeet. Of the total, 22.2% or 37,421 boardfeet sold were GreenMark and 77.8% or 131,488 boardfeet were the alternative non-certified product.

Table 5.1: Volume totals and percent sales share sold for 3 month measurement period.

Store Location	GreenMark (bdft)	Sales share GreenMark (%)	Alternative Wood (bdft)	Sales share (%) Alternative Wood
Suburban Georgia	1651	22.4%	5706	77.6%
Suburban Georgia	5978	26.8%	16289	73.2%
Urban Georgia	3153	22.1%	11130	77.9%
Urban Alabama	2067	30.3%	4765	69.7%
Urban Florida	2621	20.1%	10406	79.9%
Suburban Florida	4251	22.2%	14869	77.8%
Suburban Alabama	3258	39.1%	5076	60.9%
Urban Alabama	3376	25.0%	10120	75.0%
Suburban Alabama	2923	32.1%	6170	67.9%
Urban Florida	1417	6.2%	21558	93.8%
Suburban Florida	3875	24.2%	12154	75.8%
Urban Georgia	2851	17.7%	13245	82.3%
OVERALL	37421	22.2%	131488	77.8%

Statistical analysis was used to examine what treatments significantly changed the relative sales share of GreenMark. This chapter focuses on the effects of adding a price premium to GreenMark. In addition to that factor, store location and the presence of a promotional brochure was also examined. These factors will be addressed as they apply related to a consumers' likelihood to pay a premium for GreenMark.

Before the statistical analysis was interpreted, the assumptions of the analysis used, analysis of variance (ANOVA), were tested. ANOVA depends on the following assumptions: independence of the observations, proper scale of measurement, as well as normality and homogeneity of variance in the distribution of the data. In this case all of these assumptions were satisfied. However, it should be taken into consideration that all of the statistical analysis that follows is based on a small population. With a lower population size, ANOVA has less analytical power (Norusis 1985).

Before the main effects can be examined in an ANOVA table, the interactions were examined (Figure 5.2). Strong interactions between the main effects would suggest that those main effects could not be examined individually because they are dependent on each other for their result (Norusis 2002). When these interactions were examined, two were found to be statistically significant. The interaction between a price premium and the promotional brochure was shown to have a statistically significant effect on the

Table 5.2: Analysis of variance table for dependent variable, relative GreenMark sales share (the arc sine of sales share).

	Source Type III Sum of Squares	df	Mean Square	F	Significance
Corrected Model	636.784 ^a	7	90.97	4.08	.096 ^b
Intercept	5897.98	1	5897.98	264.21	.000
<i>Store Location</i>	292.37	1	292.37	13.10	.022^b
Price Premium	12.76	1	12.76	.572	.492
Promotional Brochure	75.02	1	75.02	3.36	.141
<i>Store Location * Price</i>	205.53	1	205.53	9.21	.039^b
Urb/Sub * Brochure	6.58	1	6.58	.295	.616
<i>Price * Brochure</i>	190.22	1	190.22	8.52	.043^b
Urb/Sub * Price * Brochure	19.62	1	19.62	.879	.402
Error	89.29	4	22.32		
Total	7618.89	12			
Corrected Total	726.08	11			

^a $R^2 = .877$ Adjusted $R^2 = .662$

^b statistically significant at the .10 level

relative sales share of GreenMark ($p = 0.043$). This is an interesting result since both price premium and the promotional brochure were not found to be statistically significant when examining the ANOVA table. Further, the interaction between store location and price premium was also statistically significant ($p = 0.039$).

To further examine these interactions, they were plotted on profile plots in SPSS. A profile plot is a line plot in which each point indicates the estimated marginal mean of a dependent variable (adjusted for any covariates) at one level of a factor (Norusis 2002). The levels of a second factor can be used to make separate lines. Each level in a third factor can be used to create a separate plot. This was performed, with the relevant plots shown in Figures 5.2 and 5.3.

When the price premium was examined in relation to store location, there was a strong interaction illustrated through both the plot shown in Figure 5.2 and the p-statistic from the ANOVA table ($p = 0.039$). This interaction could be the result of the main effect, store location, since it is statistically significant. Or price may be influencing the main effect to be significant. However, because of this interaction that should not be examined.

In Figure 5.3, the strong interaction between the presence of a price premium and the presence of the promotional brochure is shown. This graph combined with a statistically significant interaction in the ANOVA table illustrated a very strong

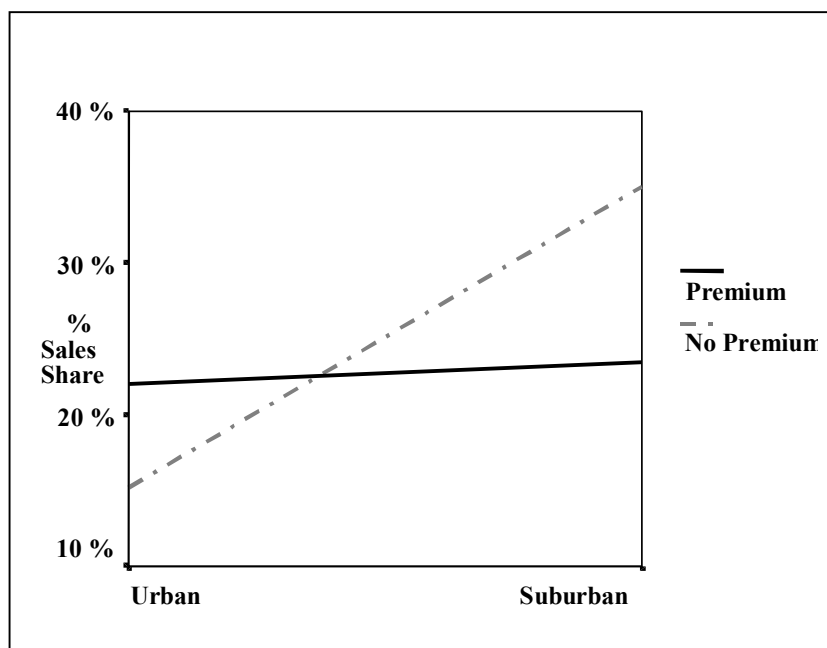


Figure 5.2 Profile plot showing the interaction between store location and the presence of a price premium.

interaction ($p = 0.043$). This interaction is strong enough to state that the ANOVA statistics for each of these main effects should not be examined. The combination of these two factors significantly influence the relative sales share for GreenMark.

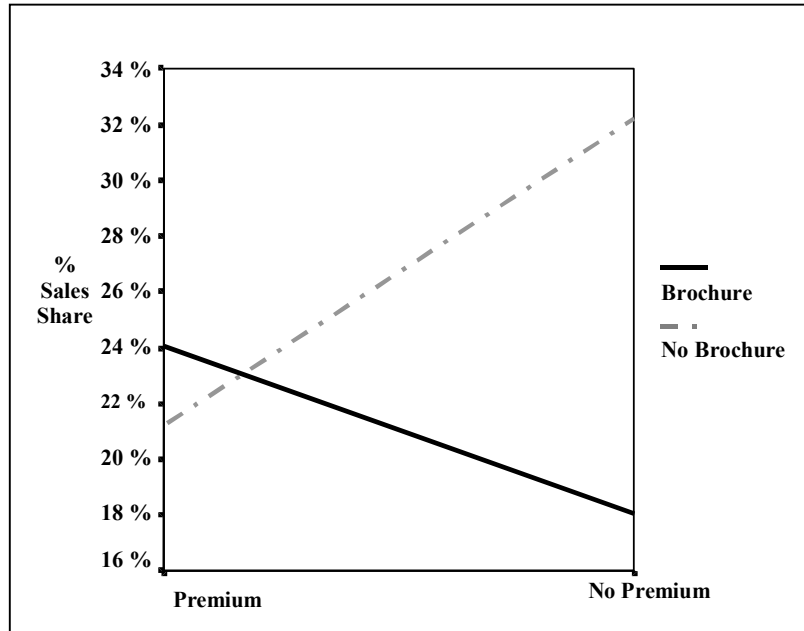


Figure 5.3 Profile plot showing the interaction between price premium and promotional brochure.

This indicates that when these two treatments are combined, they may result in a significant change in GreenMark’s relative sales share. The combination of conditions that results in the highest average sales share is no price premium and no promotional brochure, with an average sales share of 29.5 % (Table 5.3). This optimal combination of treatments is counter to previous research (Banerjee et al. 1995, Coddington 1993).

Table 5.3: Comparison of sales share averages by treatment combinations.

Treatment combination	Average sales share
Price premium with brochure	24.1 %
Price premium without brochure	21.5 %
No price premium with brochure	22.0 %
No price premium without brochure	29.5 %

In analyzing the results of the ANOVA performed, all of the results should be examined with a degree of caution. Because of the complexity of this project and because it is the first of its kind, traditional statistical tools such as ANOVA did not carry a great deal of power, with only one degree of freedom. This research should be seen as the first step in a much larger analysis. These results should be investigated in additional research before any action is taken based on this portion of the findings.

Table 5.4: Volume totals and percent sales share totals by treatment.

	GreenMark (bdft)	GreenMark (% sales share)	Other Wood (bdft)	Other Wood (% sales share)
Price Premium	18,926	22.7%	64,385	77.3%
No Price Premium	18,494	21.6%	67,102	78.4%
Urban	15,484	17.9%	71,223	82.1%
Suburban	21,936	26.7%	60,265	73.3%
Promotion	20,721	21.1%	77,421	78.9%
No Promotion	16,699	23.6%	54,067	76.4%

Consumer Questionnaire

Purchase of FSC Certified Wood

Survey respondents were first asked whether they purchased GreenMark. Eighty-two respondents purchased GreenMark, while 151 respondents purchased the alternative product. Five respondents purchased both brands. There were also a total of 63 respondents who incorrectly identified what they purchased under “other.” These included answers like “store brand” and identification by species and not brand. For example, responding that they purchased “red oak” or “yellow poplar.” It should be mentioned that this questionnaire only captured the occurrence of a sale. The purchases could have consisted of as little as one 2x2 board or a much larger quantity. Therefore, these results cannot be directly compared to those observed by calculating sales share using actual boardfeet purchased.

In addition to 82 respondents purchasing GreenMark, another 48 respondents considered purchasing it. This is important to note because with repeated exposure to the

product, the consumer can become a purchaser much easier than someone who did not consider it at all (Schiffman and Kanuk 2000).

Segmenting the Population Based on Price Sensitivity

In addition to understanding consumer reactions to price, promotion and their general attitudes about this product, the questionnaire addressed their reaction to the pricing strategy for GreenMark. First, respondents were asked whether GreenMark cost more, less, or the same price as other brands. This provided a better understanding of the price sensitivity for hardwood lumber products.

If all of the respondents had been able to correctly identify that GreenMark cost more in the stores where there was a price premium and that it was the same price in the stores that did not have a premium, this would indicate that consumers were very price conscious. Likewise, if none of the respondents were able to correctly identify the pricing of GreenMark, then consumers for this product would be considered price insensitive. However, the response was mixed, with some consumers correctly identifying the pricing and others admitting they did not know (Figure 5.4).

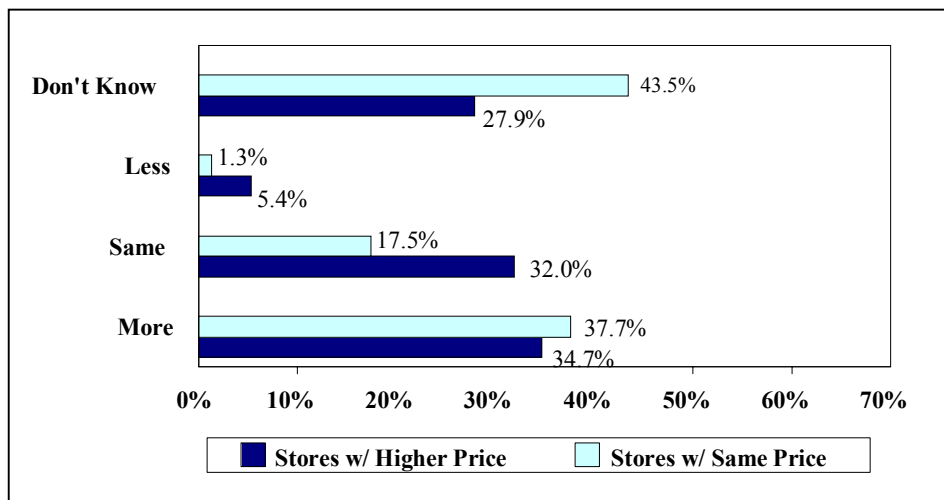


Figure 5.4: Consumer perceptions of the price of GreenMark compared to actual prices.

This mix of consumer sensitivity is reflected in the responses to this question. Approximately 38% of respondents stated that GreenMark was more expensive than the other brand, when it was in fact the same price. Further evidence is seen in the large

proportion of respondents, 32%, who stated that GreenMark was the same price, when it was actually a higher price. Almost 18% of respondents in stores where prices were the same reported this correctly. Finally, over 40% of respondents in stores where the prices were the same for both products, stated that they did not know the price. This confusion about price illustrates that only a portion of the overall market for hardwood lumber is price sensitive. The remainder of consumers may be influenced by other factors besides price. These other factors may include appearance, straightness of the board, convenience, size specifications, or perhaps the presence of promotion.

Further examination of only responses from stores with a higher price allowed the segmentation of consumers based on price sensitivity (Figure 5.5). Thirty-two percent of respondents who paid more for this product were aware that they were spending more. This group is considered the price conscious segment. These consumers were aware that they were spending more and purchased the product despite the higher price. Approximately 37% of respondents who did not purchase GreenMark recognized that it was more expensive. These individuals are seen as price prohibited consumers.

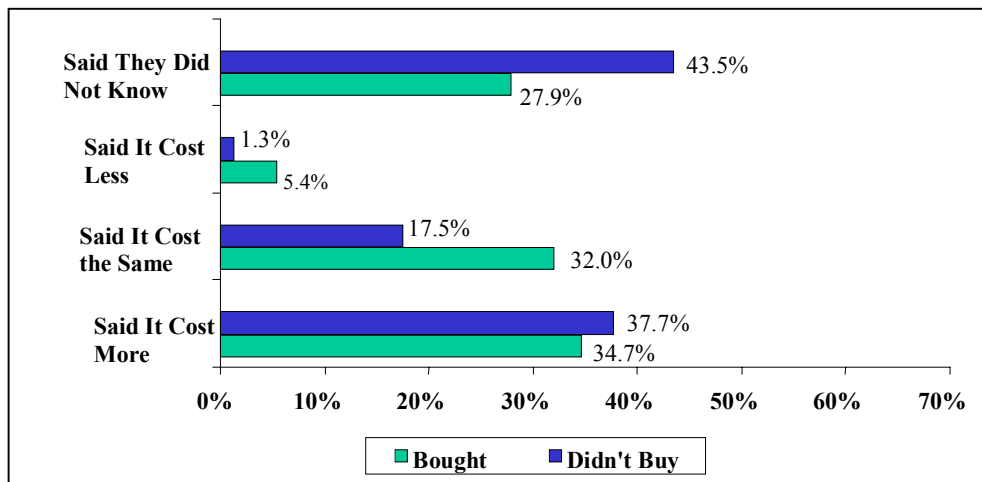


Figure 5.5: Consumer perceptions of price in stores with 20% price premium.

Forty-four percent of respondents who did pay more believed that they were paying the same price as the alternative would cost. Approximately seven percent of respondents who paid more for GreenMark responded that they were paying less than the alternative, and 18% stated that they did not know how much they paid. This portion of

consumers, a total of 69%, is considered the price insensitive segment. This price insensitive group paid a substantially higher price for FSC certified wood and was not aware of the added cost. This is a much larger segment of respondents than the price conscious group.

In examining respondents' purchasing habits, the consumers who did not purchase GreenMark were also examined. Approximately 81% of the respondents who did not know how much GreenMark cost were respondents who did not purchase the product (Figure 5.6). The proportion of consumers that did not purchase GreenMark and indicated they did not know the cost of GreenMark was a much larger proportion than those respondents who did purchase GreenMark and stated they did not know. This

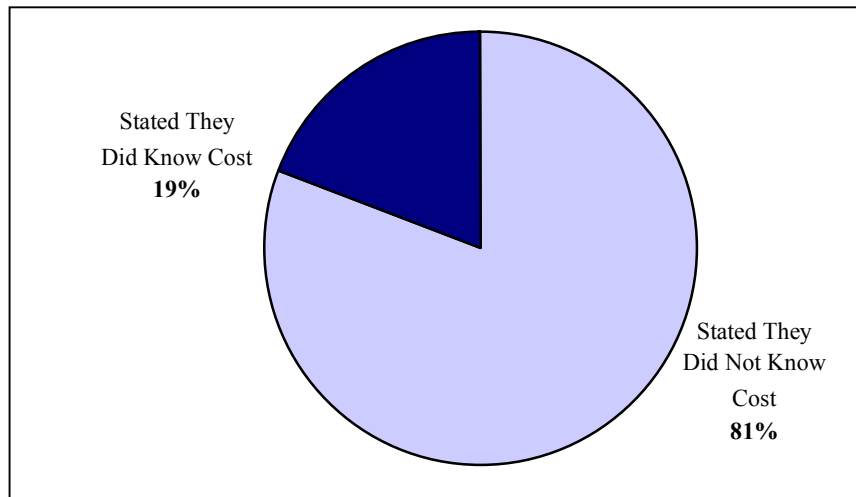


Figure 5.6: Proportion of purchasers and non-purchasers of GreenMark who stated they knew the cost.

indicates that respondents who purchased the product were much more likely to state that they knew how much GreenMark cost. This was found to be statistically significant when tested using Pearson's chi-square test, with $p < .01$. However, additional investigation showed that purchasers were no more likely to correctly identify the actual price of GreenMark than non-purchasers (Pearson's chi-square, $p = 0.864$).

Relationship of High Quality to Certification

Respondents were asked to define certification. This was asked in an open-ended manner to minimize the introduction of bias. The question was, "when you think of the term certified lumber, what comes to mind?" Overall, over 80% of respondents indicated

quality or guaranteed, while only one percent directly indicated a link to environmental standards (Figure 5.7). These results were then broken down based on whether respondents purchased GreenMark or not. When comparing those responses, purchasers were not any more likely to indicate that GreenMark was linked to an environmental standard. Using Pearson’s chi-square test, $p = 0.186$. Further investigation was done to determine whether purchasers of GreenMark were any more likely to state that GreenMark was a high quality product. This was also found not to be statistically significant, with Pearson’s chi-square, $p = 0.669$. Purchasers of GreenMark were just as likely as non-purchasers to state that certification was linked to high quality. Finally, a

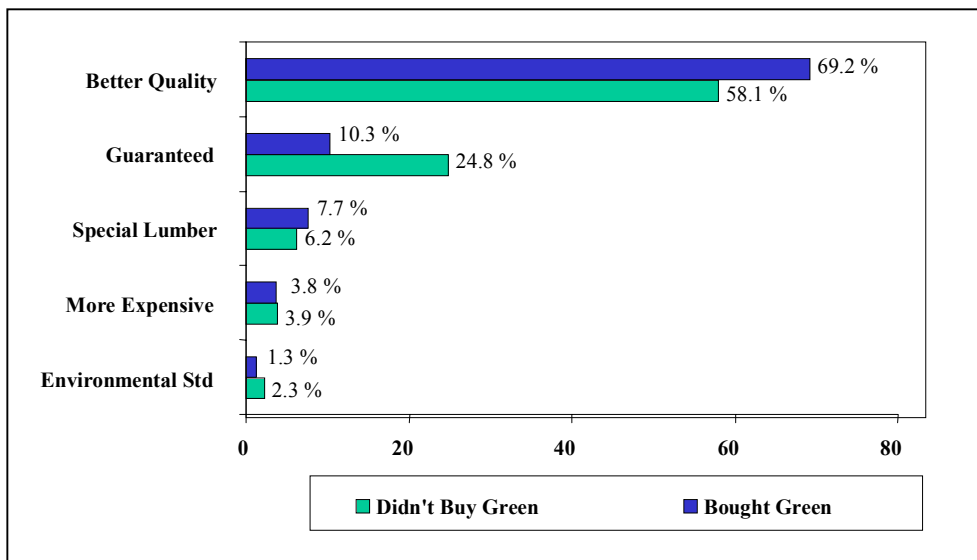


Figure 5.7: Consumer definitions of certification.

Pearson’s chi-square test was run to determine whether respondents who paid a premium for GreenMark were more likely to state that certification was linked to high quality. This was not the case. Purchasers who paid more for GreenMark were just as likely to state that certification was associated with high quality ($p = 0.541$).

Willingness to Pay

The last question that dealt with price was a hypothetical situation very similar to the market study conducted. It described a new product being tested for market potential called GreenMark. The survey question continues by explaining certification ... “because it is forest certified, GreenMark FSC certified lumber allows you to support responsible forestry practices such as, ensuring long term forest management, minimizing damage

done to the remaining forest, protecting habitats, preventing over-cutting, and planting trees on already cleared land, while at the same time delivering a quality product.” After the description, respondents were asked if this product were to be offered in the future, how much more would you pay for it than a similar non-certified product.

Respondents were then examined overall, as well as broken into whether they had purchased GreenMark. No differences were found between respondents who had purchased GreenMark and those who had not. Their willingness to pay was very similar and not statistically significant. Overall, only 18% of respondents said that they would not pay anymore for this product (Figure 5.8). While over 50% of respondents said they

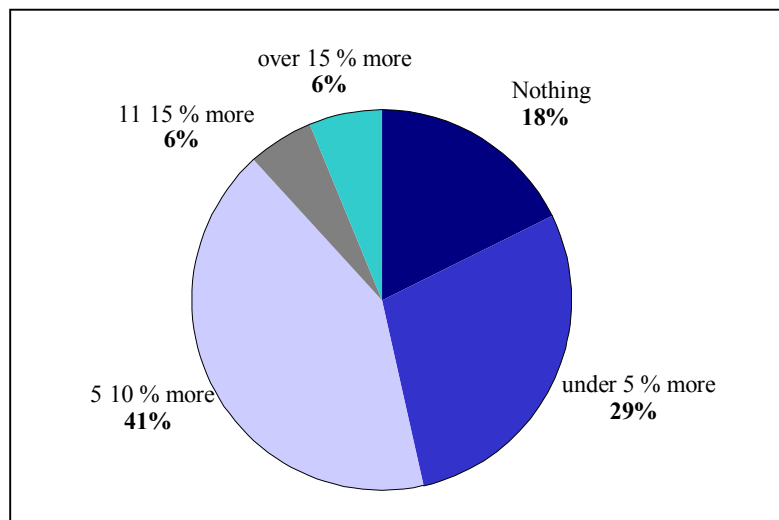


Figure 5.8: Respondents' willingness to pay more for the new environmentally friendly product, GreenMark.

were willing to pay more than five percent more for it. This illustrates that there is long-term market potential for a product like GreenMark.

In addition to examining respondents who had already purchased GreenMark, other comparisons were made to attempt to segment populations more willing to pay more for these type of products. This proved to be difficult. All of the demographic factors were individually tested to determine whether any group was more willing to pay more for GreenMark. Test results showed that no group was more or less willing to pay more for GreenMark.

Discussion

Investigating consumers' reactions to price premiums proved to be a challenging goal. Key findings of this research were the significant interactions between store location and price premium, as well as the interaction between price premium and the presence of a promotional brochure. When the presence or absence of a price premium was combined with another factor, a strong interaction resulted in GreenMark's relative sales share. Unfortunately these strong interactions confined the analysis that could be made on the main effects since those ANOVA results could not be examined. It is recommended that additional research be conducted focusing on price premiums and promotion.

A striking discovery from this research is that the majority of respondents did not correctly recall the price of GreenMark. This would indicate that most consumers of this type of product are not price sensitive. However, this result must be interpreted with care. Individuals who shop in these stores regularly may already be conditioned to purchasing the existing product and may not have even considered GreenMark. Roughly two-thirds of respondents who purchased GreenMark could not correctly recall how much it was. Forty-four percent of respondents who paid more for GreenMark responded that they believed it was the same price as the alternative product. One potential reason for this may be that these consumers were purchasing individual pieces or very small quantities where they would not have noticed the difference.

Both respondents who purchased GreenMark, as well as those who didn't, hold the opinion that GreenMark is a higher quality product. Consumers consistently linked the term, certification, as a measure of quality and excellence, rather than a term used in direct reference to the environment. It should be noted that respondents could have incorporated a number of product attributes into their vague response, "high quality." This could have included GreenMark's environmental excellence as a part of their high quality response, however this could not be examined any further by this research.

Placing added value on environmental quality seems to be reflected in respondents' willingness to pay for certification. Over 80% of respondents were willing

to pay some type of premium in order to gain a guarantee of environmentally certified lumber. Rather than trading product quality for an environmental guarantee, respondents were willing to incur added cost to ensure both quality and environmental reassurance.

Discussion of Study Limitations

The strong interactions between the price premium and the promotional brochure make it impossible to examine the true effects of each of these main effects on the relative sales share of GreenMark. This limits the conclusions that can be made from this research. In addition, only one price premium was examined in this research.

Although this premium was determined using previous research, it had an influence on the results of both the overall sales share of GreenMark, as well as some of the consumer responses regarding price. In addition, the infrequency of a consumers' purchase of surfaced boards must be taken into consideration. The results reporting levels of price sensitivity may be quite different for a product that is purchased either much more frequently or much less.

Recommendations for Future Research

The influence of a price premium and a promotional brochure were shown to be linked in this study. The combination of these two factors and their influence on relative sales share should be explored in further detail. For example, in this study when the relative sales share of GreenMark was separated by the presence or absence of a price premium, there is an intriguing result. GreenMark had a higher sales share when a price premium was present. Due to the significant interactions present, the statistical significance of this could not be examined using the ANOVA table. However, by comparing the two sales share figures, it would appear that a price premium helped GreenMark sell better. This apparent finding could be examined in much more detail in future research.

In addition, a question was posed during the analysis of this research that was not answered. This question could have significant influence into the findings presented here. In charging a price premium for this product, do consumers automatically draw a correlation between the higher price and high quality? This should be investigated in

future research. This relationship has held true in other marketing research work for the past thirty years. It is possible that consumers assumed that if the FSC certified product was the same price as the non-certified product, they were giving up product quality for the environment. Past experience in the early 1990's would have reinforced this trade-off between environmentally friendly products and high quality. This is supported in previous literature (Kangun et al. 1991, Mazumdar 1993).

Conclusions

GreenMark has shown very positive market potential. Within a short time period, GreenMark captured approximately 25% of the market within that product class. This is a significant achievement for a new product introduction in the earliest stages and illustrates true potential for this product. In addition, preliminary examination of both consumer's overall willingness to pay more for certified forest products and the inelasticity of actual purchase decisions, indicates that at least some of the costs associated with becoming certified could be recovered in the form of a price premium.

With a well thought out marketing plan, GreenMark and products like it could gain significant sales share, while offering certified wood at a higher price. Certified wood should be marketed as high overall quality, emphasizing both product quality, as well as environmental quality.

Given consumers' price insensitivity in the certified board market, both home centers and other manufacturers should offer certified boards exclusively at a premium price. The results of this study and previous research show that as a consumers' price-quality inference increases, the additional amount that they are willing to pay increases as well. By giving consumers cues, such as price as well as high-end packaging and display units, they will continue to purchase these products at higher prices. This may not hold true for other markets but should be examined before pricing any certified product equal to its alternatives.

However before these products are introduced, additional advertising should be done. Some type of comprehensive advertising campaign should be undertaken, including in-store promotion and labeling. This can be undertaken by either the companies on an

individual basis or the scope could be broadened to incorporate other environmentally certified products sold in home centers.

In summary, considerable market potential does exist for certified products. However, for companies to be successful, a comprehensive marketing strategy is needed. This strategy should emphasize the added value that consumers are paying to receive.

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Chapter 6: Conclusions

Certification provides an opportunity to communicate to consumers about responsible forestry practices and promote the forest products industry as the best material choice for sustainability. Certification is also a tool that can be used to counteract environmental advertising campaigns for competing products. Environmental advertising has been used successfully for materials like plastics and steel, and resulted in an increase in sales share for these products. Finally, certification provides niche markets for U.S. companies in both domestic markets as well as European markets.

GreenMark has shown very positive market potential. Within a short time period, GreenMark captured approximately 25% of the market within that product class. This is a significant achievement for a new product introduction in the earliest stages. This type of success within a short period of time indicates that this product has market potential. Based on these findings, forest products companies and home centers should further examine the opportunities for certified wood products.

This research showed a lack of statistically significant differences between purchasers and non-purchasers based on demographics. In general, the demographic trends of consumers of certified forest products do not differ a great deal from the green consumer for other products. These factors will allow a broad-based marketing approach without extensive segmenting of the population. This will make advertising this product and others more economical. It is recommended that before widespread introduction of this or similar products is done, a marketing plan be developed based on the findings of this research and previous research. With a well thought out marketing plan, GreenMark and products like it could gain more significant sales share.

Overall, 82% of consumers said they would pay more for certified lumber, with 53% willing to pay over 5% more for the lumber. This is reinforced by examining where GreenMark enjoyed the highest sales share success. This was in stores with a 20% price premium. Preliminary examination of both consumers' overall willingness to pay more for certified forest products and the inelasticity of actual purchase decisions, indicates that at least some of the costs associated with becoming certified could be recovered in the form of a price premium. Given consumers' price insensitivity in the certified board market, manufacturers should offer certified boards exclusively at a premium price.

The impression of inelasticity could possibly be in response to the consumers' assumptions in correlating a higher price with better quality. Certified wood should be marketed as high overall quality, emphasizing both product quality, as well as environmental quality. The results of this study and previous research show that as a consumers' price-quality inference increases, the additional amount that they are willing to pay increases as well. By giving consumers cues, such as higher price, as well as high-end packaging and display units, they will continue to purchase these products at higher prices. This may not hold true for other markets but should be examined before pricing any certified product equal to its alternatives.

However, in order for this product and others like it to be successful, a great deal of information needs to be disseminated to consumers to help them understand certification. Some type of comprehensive advertising campaign should be undertaken, including in-store promotion and labeling. This could be done by a cooperation of manufacturers or by the companies on an individual basis. An effort could also be done by the home centers, giving them an active role in teaching consumers about certified wood products.

Home centers could launch an advertising campaign announcing the release of a logo that would label all environmentally friendly products in the store. This would eliminate confusion regarding various company labels, while at the same time providing the home center with a positive corporate image. A directory of these products would be available as soon as consumers walked into the stores and would show all products available, as well as where each product is located in the store. The directory should also have a brief description of how the home center selected these products as environmentally friendly.

An even more broad-based approach would be to create a large advertising cooperative between certification organizations, certified companies, and those suppliers selling to the final consumer, including both home centers and others. This advertising cooperative would then use the results of a promotional effectiveness study to launch a large, national advertising campaign. This approach would require more cooperation between parties. However, it would significantly reduce the confusion to the consumer by having one message with a discrete definition of forest product certification.

Another possibility that should be considered further is creating mutual recognition among the various certifying agencies. This would allow more cooperation in any wide scale promotional efforts, while continuing to simplify the process for consumers to understand. This research showed that consumers in home centers did not show any strong feelings, either positive or negative, against any particular certifying group making environmental claims.

The scope of these recommendations could be broadened to incorporate other environmentally certified products sold in home centers. These products could be intermixed within product lines in the store or a separate specialty area could be designated. In order for the products to be offered as an alternative next to a non-green product, some type of on-product labeling will be required.

Another strategy would be to create a specialty store for environmentally friendly products, either within existing home centers or as stand-alone smaller stores. Creating a small area within existing stores would allow home centers to address the larger environmental concerns outside of just lumber products, while making it financially attractive. A successful example of this is the gourmet or all-natural food stores that many large grocery chains now place within the larger store. This allows you to capture both the opportunity of the consumers willing to pay more, as well as forego the risk of losing those consumers who are not willing to pay more or purchase those types of products.

The high-end portion of the store should have a different atmosphere than the warehouse environment, allowing the customer to feel like they walked into the local specialty hardware store. Changes in atmosphere could include better lit areas, with all of the products easily accessible without a forklift. This section could include all types of green products, such as certified flooring, mouldings, and cabinet. Other appropriate products for this section could include environmentally safe paints, products with recycled content, as well as products that increase your home's energy efficiency.

These opportunities have a great deal of potential to increase profitability, while building consumer goodwill for active corporate environmental responsibility. However, one caution is that the consumer will expect the same level of quality that a non-green product would offer. In addition, Teisl et al. (2000) warns that certification should not be

advertised at the expense of wood products harvested using traditional forestry practices. These certified products simply offer “a piece of mind” about where these products are coming from.

This research helps give the forest products industry a clearer picture of the consumer for certified wood products and directly relates that to the home center do-it-yourselfer. This can be used as a resource to build a green market for various wood products. Consumer interest still exists for environmentally green products.

A Review of the Limitations of this Study

This study is one of the first to specifically examine the green consumer within the do-it yourself home center market. Therefore no benchmarking studies could be found to directly compare the results of this research. In the absence of other similar studies, this research was compared against studies that examined the green consumer and the do-it yourselfer separately. By surveying only in home improvement stores, a direct comparison was not possible against the overall general population or the green population.

In this study, part of an ecoscale was used. The original scale was tested and designed to be used only in its complete form. Due to the nature of factorial analysis, using only a portion of the factors could result in an incomplete indicator. However, since the subscales used did emerge from a larger set, they can be legitimately treated as scales in their own right. The results from the modified subscales should not be seen as comparable in the predicting ability to those of the original scale. In addition, consumers shopping in a home center are not likely to match those who helped develop this ecoscale. Due to the much different demographic profile, this scale may not be as good of a predictor for typical consumers in the do-it-yourself market compared to overall consumers.

When analyzing the results of the ANOVA performed, all of the results should be examined with a large degree of caution. This project had a very complex research design. It was the first of its kind, making it difficult to correctly identify which factors should be controlled and monitored. This resulted in a small population of each individual treatment combination. The duration of the research was only three months long, with questionnaires collected for only two weeks of that period. This short duration resulted in a smaller than optimum amount of data. In addition, due to this short time period any effects of repeated exposure could not be studied.

Traditional statistical tools such as ANOVA did not carry a great deal of power. The ANOVA analysis for this research carried only one degree of freedom. The strong interactions between the price premium and the promotional brochure made it impossible to examine the true effects of each of these main effects on the relative sales share of GreenMark. This further limits the conclusions that can be made from this research.

There also appeared to be confusion and ambiguity regarding two very important terms used in this research. This research has limited understanding as to how much consumers understood the term “certified.” This has significant impact on the conclusions and recommendations that can be made from this research. The term, “high quality” was used by over 80% of respondents to describe certified wood, however this term is very vague. Respondents could have understood that certification was an environmental attribute and then equated it as a part of overall high quality. In contrast, respondents could have defined high quality as strictly an indicator of the appearance and serviceability of the wood. The most likely possibility is that the definition of high quality was different for each respondent. Without further information about respondents’ definitions of high quality, a true understanding of consumers’ knowledge of the environmental aspects of GreenMark is not known.

Only one price premium was examined in this research. Although this premium was determined using previous research, it had an influence on the results of both the overall sales share of GreenMark, as well as some of the consumer responses regarding price. In addition, the infrequency of a consumers’ purchase of surfaced boards must be taken into consideration. The results reporting levels of price sensitivity may be quite different for a product that is purchased either much more frequently or much less.

A minimal amount of on-product labeling was also a factor that could have influenced the results. At the time it was seen as an advantage to have both the certified and non-certified boards look as alike as possible. However this had the unexpected result of causing confusion among the store clerks who stocked the material. When the material was originally shipped to the stores, clerks assumed it was additional non-certified material. This confusion was remedied and material was stocked correctly. However if a consumer was looking through the boards and they weren’t labeled differently, an individual board may have been put into the wrong display unit. This was not seen as a large problem. It was noted so that this mistake is not duplicated in future studies.

The regionality of this study acts as a limitation. This research will reflect consumer reactions to FSC certified lumber in the Southeastern United States. This data may be difficult to extrapolate to represent the entire United States. Information related to

the purchasing habits of consumers in the Southeast can be used as a conservative estimate due to the overall conservative nature of these consumers.

There are confounding factors that cannot be controlled but should be recognized as part of any realistic study. These include the seasonality of hardwood lumber sales, quality and selection of the product, and variability between individual questionnaire interviewers. The home center stated that hardwood products are very seasonal, with the highest demand surrounding November and December and the lowest in January and February. Hardwood lumber is variable within each log that is cut, as well as in the quality that is sawn, dried, and dressed. A consumer may decide to purchase one product over another simply on the 'look' of that product. In addition, the FSC certified boards consisted of a more limited product selection (widths and lengths) as compared to a similar non-certified product. This may have an affect on which product the consumer purchased as well.

Recommendations for Future Research

This research should be seen as the basis for larger scale studies similar to this one. A larger replication of this research project taking into consideration the limitations and complications discovered would work to validate this study and provide additional information on the influences of price and promotion on certified wood products. Specifically, this study should be replicated with a reduction in the factors examined. Examining the influence of differences in urban and suburban stores unnecessarily complicated this research. By eliminating this, the influence and interactions of a price premium and promotion could be the sole focus. In addition, the promotional material should be changed so that it is incorporated into the display and packaging for the certified material. This removes the problem of consumers not taking a brochure to look at by incorporating it. Based on the willingness to pay results, it is suggested that the price premium of 20% be kept for a future study. This amount seemed to be an effective threshold.

With the home improvement segment totaling over \$200 billion in annual sales (Johnson and Wright 2003), additional research should be focused on all aspects of this booming market. Although there has been some research done, much more is needed to better understand this market. Specifically, additional studies are needed focusing on the consumer demographics of home center consumers, especially do-it yourselfers (as compared to contractors). More in depth studies are needed to profile the consumers who shop in home centers. Little work has been done in this area, despite the market growth that has occurred. This growth is projected to continue through at least 2007 (Johnson and Wright 2003).

Despite the announcement of environmental purchasing policies by most major home improvement companies, little research has been done to examine whether this has effected the consumer base that these stores attracts. Additional work related to this research would be helpful in better understanding how green consumers play into the home improvement store consumer profile. Replications of this research covering a more wide spread geographic area would be helpful in examining consumer demographics.

Although abundant research on green consumers was available to review, this information continues to vary on a few key demographic variables. Two variables that are

often debated are gender and education level. A more large-scale study focused solely on the demographics of green consumers should be tackled. The study should be based on actual purchase decisions and not simply their willingness to pay more for environmentally friendly products. It should be noted that one of the factors that makes consistency in demographic studies such as these difficult is the ever-changing political and economic climate.

Additional investigations into the development and testing of an ecoscale such as the one developed by Stone et al. (1995) would be helpful in correctly identifying the environmentally conscious consumer. Any work based on the work of this and Stone et al. should further investigate how to improve the predicting power of the subscales, opinions / beliefs and awareness. It is recommended that further testing be based on groups outside of college campuses to further validate this scale for general populations. Any work based on actual purchases would also be helpful in creating a scale that is a better predictor of purchasing habits.

Further research should be done to determine consumers' understanding of certification and its implications. This would allow a better understanding of what information consumers are lacking to make an educated decision, resulting in a better indication of what additional information should be provided. Although research has been done to explore which certifying agencies consumers trust, this research did not indicate a strong feeling regarding any particular type of certifying group. Additional research to probe into whether consumers trust any certifying agency would be helpful. This research should be in the form of an actual consumer survey and should focus on how much consumers understand and how they define what groups or organizations they trust. This information could allow further dialog among researchers and certifying agencies to pursue the idea of mutual recognition.

A more in-depth investigation into consumers' perceptions of high quality wood is also of interest. This could be investigated by small focus groups and additional intercept surveying in home centers. Additional information on consumers' perceptions would be a valuable tool for marketers and would also shed additional light on the findings of this research.

In addition, a question was posed during the analysis of this research that was not answered. This question could have significant influence into the findings presented here. In charging a price premium for this product, do consumers automatically draw a correlation between the higher price and high quality? This should be investigated in future research. This relationship has held true in other marketing research work for the past thirty years. It is possible that consumers assumed that if the certified product was the same price as the non-certified product, they were giving up product quality for the environment. Past experience in the early 1990's would have reinforced this trade-off between environmentally friendly products and high quality. This is supported in previous literature (Kangun et al. 1991, Mazumdar 1993).

Finally, additional advertising effectiveness should be conducted, based on this research and previous research done by Teisl et al. (2000). A large-scale examination of the effectiveness of various eco-labels should be conducted, expanding into in-store promotion and labeling. This will allow the forest products industry to better understand what the most effective communication are when dealing with consumers.

In summary, a great deal of intriguing research can be based on the results presented in this project. This project should be seen as a starting point for additional research. This should allow future researchers to avoid some of the mistakes made in this project while building on its strengths.

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Appendix 1: Consumer Questionnaire

Thank you for taking time to fill out this short questionnaire. This questionnaire is part of a study being conducted by Virginia Polytechnic Institute and State University. The purpose of the study is to help us better understand the preferences that you have for environmentally friendly products, as well as the market potential of new products in this area. Your answers will be kept confidential and the information will be combined and analyzed with those of all other people. Thank you for your help.

To be filled in by survey company:

Store # _____

Survey # _____

Date _____

1. Did you purchase lumber today?
 1. Yes [CONTINUE]
 2. No [TERMINATE]

2. What brand of lumber did you purchase?
 1. GreenMark [SKIP TO Q 3]
 2. Other (Specify) [CONTINUE]

- 2a. Did you consider GreenMark Lumber?
 1. Yes
 2. No

3. **What are you going to use this hardwood lumber for?**
 1. **I was hired to build / modify someone else's home**
 2. **I am building / modifying my own home**
 3. **I am using it for a small hobby project (such as a chest, toy, etc.)**
 4. **Other (Specify _____)**

4. Was the lumber you purchased today "Certified Lumber?"
 1. Yes [SKIP TO Q6]
 2. No [CONTINUE]
 3. Don't Know [CONTINUE]

5. Have you ever heard of "certified lumber?"
 1. Yes [CONTINUE]
 2. No [SKIP TO Q 7]

- 5a. **What was the major reason that you did not purchase "certified lumber?" (please check only one)**
 1. The price was too high.
 2. Certification wasn't important to me.
 3. I don't trust the certification to be accurate.
 4. Certification will not have a major environmental impact.
 5. Certification is just a gimmick.
 6. I didn't understand certification.
 7. The quality of the product was too low.
 8. Other (Specify)

6. How did you first learn about certified lumber? (please check one)

1. The in-store display.
2. The in-store brochure.
3. I learned about it during another visit to this store.
4. I knew about it before I came to the store today.
5. I saw an advertisement. (where was this advertisement? _____)
6. I never learned about it.

7. When you hear the term certified lumber, what comes to mind? [**PROBE:**
“Anything else” - **PROBE UNTIL UNPRODUCTIVE**]

8. Do you remember seeing a display for *GreenMark* brand hardwood lumber?

1. Yes
2. No

9. Did you know that *GreenMark* was certified lumber?

1. Yes
2. No

10. Do you remember seeing a brochure on the shelf giving environmental information on *GreenMark* brand hardwood lumber?

1. Yes [*CONTINUE*]
2. No [**SKIP TO Q.11**]

10a. Which of the following statements best describes what you did after seeing the brochure? [**READ LIST**]

1. I did not examine the brochure at all
2. I looked at part of the brochure
3. I skimmed the entire brochure
4. I read the entire brochure

You may realize that both industry-sponsored groups and independent organizations evaluate and rate the environmental sustainability of wood products. An industry-sponsored group is defined as any group whose funding and main interests are tied to a specific industry or product. For example, the Dairy Association represents the dairy industry. An independent organization is a group that does not participate in the industry, although it may regulate it. For example, Price Waterhouse is a consulting firm to many different industries.

10b. Was the GreenMark brochure information provided by an industry-sponsored group or an independent organization?

1. Industry-sponsored Group
2. Independent Organization
3. Not sure

11. To the best of your knowledge, would you say that GreenMark lumber costs [READ LIST]

1. More than other Brands **[SKIP TO Q 11A]**
2. Same as other brands **[SKIP TO Q 12]**
3. Less than other brands **[SKIP TO Q 11B]**
4. Don't Know **[SKIP TO Q. 12]**

11a. How much more would you say that GreenMark lumber costs than other brands?
Please answer in terms of the percentage difference.

11b How much less would you say that GreenMark lumber costs than other brands?
Please answer in terms of the percentage difference.

[READ]

12. This is a new product that is being tested for market potential. Because it is “Forest Certified”, GreenMark FSC certified lumber allows you to support responsible forestry practices such as, ensuring long term forest management, minimizing damage done to the remaining forest, protecting habitats, preventing over-cutting, and planting trees on already cleared land, while at the same time delivering a quality product.

If this product were to be offered in the future, how much more would you pay for it than a non-certified product similar to it? [SHOW CARD TO RESPONDENT]

- | | |
|-------------------------|---------------------|
| _____ nothing | _____ 16 – 20% more |
| _____ less than 5% more | _____ 21 – 25% more |
| _____ 5 – 10% more | _____ over 25% more |
| _____ 11 – 15% more | |

14. Please rank your confidence in statements regarding environmental responsibility from each of the following groups using the scale in this card. [SHOW CONFIDENCE CARD]

A Forest Products Company

Low level of Confidence	1 2 3 4 5 6 7	High level of confidence
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Industry-sponsored Groups

Low level of Confidence	1 2 3 4 5 6 7	High level of confidence
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Independent Organizations

Low level of Confidence	1 2 3 4 5 6 7	High level of confidence
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15. Please rate the following statements on a scale from 1 to 5, with 1 being **strongly disagree** and 5 being **strongly agree**. [SHOW AGREE-DISAGREE SCALE CARD]

The burning of the oil fields in Kuwait, the meltdown at Chernobyl, and the oil spill in Alaska are examples of environmental accidents whose impact is only short term.

Strongly disagree	1	2	3	4	5	Strongly agree
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The United States is the biggest producer of fluorocarbons, a major source of air pollution.

Strongly disagree 1 2 3 4 5 Strongly agree

The earth's population is now approaching 2 billion.

Strongly disagree 1 2 3 4 5 Strongly agree

Excess packaging is one source of pollution that could be avoided if manufacturers were more environmentally aware.

Strongly disagree 1 2 3 4 5 Strongly agree

Economic growth should take precedence over environmental considerations.

Strongly disagree 1 2 3 4 5 Strongly agree

The earth's resources are infinite and should be used to the fullest to increase the human standard of living.

Strongly disagree 1 2 3 4 5 Strongly agree

The amount of energy I use does not effect the environment to any significant degree.

Strongly disagree 1 2 3 4 5 Strongly agree

This country needs more restrictions on residential development (construction of new mall on farmland, new subdivisions, etc.).

Strongly disagree 1 2 3 4 5 Strongly agree

If I were a hunter or fisherman, I would kill or catch more if there were no limits.

Strongly disagree 1 2 3 4 5 Strongly agree

In order to save energy, we should not air condition our homes as much.

Strongly disagree 1 2 3 4 5 Strongly agree

For the purposes of classification only, please check each group to which you belong.

16. Age

under 24 25 to 34 35 to 44 45 to 54

55 to 64 54 to 74 over 74

17. Gender

Male Female

18. Household Income (please check one)

under \$25,000 \$50,000 to \$74,999

\$25,000 to \$34,999 over \$75,000

\$35,000 to \$49,999

19. Highest level of education completed? (please check one)

Not high school graduate College degree completed

High school graduate
degree Pursuing advanced college

Vocational school graduate
degree Obtained advanced college

Completed some college (1-3 years)

20. Political party affiliation? (please check one)

Democratic Republican Reform

Independent None

Appendix 2: Store Layout Photographs



Appendix 3: Sample of the Brochure

GREENMARK

FSC CERTIFIED HARDWOODS BY ANDERSON TULLY

Responsible. Sustainable. Beautiful.

Why is forest certification important?

Forest certification allows you, the consumer, to support responsible forestry and provides forest owners with an incentive to improve forest management practices. Forest certification allows you to easily identify products and practices that do not destroy or permanently damage our forests.



Who is the Forest Stewardship Council?

The Forest Stewardship Council (FSC) is an independent, nonprofit organization that supports environmentally sound, socially beneficial, and economically viable management of the world's forests. Wood that carries FSC certification is of the finest quality and comes from a forest operation that:

- Developed a plan to ensure good, long-term forest management.
- Minimized the damage done to the remaining forest during harvesting.
- Protected habitat for fish and wildlife.
- Prevented over-cutting.
- Planted trees on degraded or cleared land.

Anderson-Tully is proud to bring you GREENMARK, and equally proud to have received FSC certification. We are committed to being a good steward of the land.



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Vitae

Stephanie Gomon was born and raised in Syracuse, New York. She graduated from Thomas J. Corcoran High School in 1993. She then obtained her Bachelor of Science degree in Forest Resources Management from the SUNY College of Environmental Science and Forestry, with a minor in Business Management in 1997.

In 1997, Stephanie came to Virginia Polytechnic Institute and State University to work in the Department of Wood Science and Forest Products as the Communications and Marketing Manager for the Center for Forest Products Marketing and Management. In this capacity, she worked closely with the forest products industry to assist them with sales, marketing, and management issues. During this time, Stephanie started work on her master's degree focusing on forest products marketing issues. After three and a half years with the Department of Wood Science, she worked as the Director of Development for the College of Natural Resources for two years.

Stephanie is currently employed in Millwork Sales and Marketing for Babcock Lumber Company and lives in Warren, Pennsylvania.