The Case for Urban and Reclaimed Wood in the Circular Economy

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Circular economy production, or upcycling of traditional waste products, has evolved in alignment with consumer driven accountability and demand for environmentally friendly alternatives. In recent years, industries have emerged to upcycle materials for value-added production. This paper presents case study interview results used to gather information about current marketing practices within the urban and reclaimed wood industries, which upcycles trees felled in urban areas and wood generated through construction and demolition. Firms reported entering the industry for a variety of reasons, most frequently surrounding intangible raw material and product attributes. Interviewees reported generating primarily made-to-order products, made-to-stock furniture, mantels, slabs, lumber, beams, flooring, millwork, and other products priced largely in line with their competition. Promotion consisted primarily of word of mouth, company webpages, social media, and event participation, such as craft fairs or trade shows. Firms relayed messages of sustainability, local production, quality, and emotional value. Companies primarily participate in direct, retail, or online sales, which have become increasingly prevalent. This paper outlines opportunities to explore, as well as barriers to overcome through examination of strengths, weaknesses, opportunities, and threats present in the internal and external environments of the urban and reclaimed wood industries.

Keywords: Urban wood; Reclaimed wood; Marketing; Forest products; Case studies

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INTRODUCTION

As demand for products and services with lower environmental impact grows, companies have felt pressure to strategically approach sustainable operations. A growing number of companies now include sustainability as an essential component of their corporate social responsibility plans and have incorporated sustainability into their business strategies. For example, a growing number of companies link executives' pay to sustainability goals (Shumsky 2019). One area that has received considerable attention is the circular economy, which is an economic system that aims to reduce waste and design products that can be reused or recycled at the end of their useful life, effectively increasing the valuation of what has traditionally been considered waste (Sillanpaa and Neibi 2019; Ellen McArthur Foundation 2020).

With the purpose of increasing the valuation of sustainable products, there has been a rise in environmental marketing, or integrating messages of ethical sourcing, social responsibility, and environmental sustainability in corporate promotional strategies to appeal to consumer demand for lower environmental impacts (Juslin and Hansen 2003;

Hansen *et al*. 2014). In general, there is a high correlation between a firm's sustainability performance and their delivery on consumer expectations; thus, sustainable marketing can help to differentiate a brand, establish loyalty, mitigate risks, and cut costs (Trivedi *et al*. 2018). The impact of environmental marketing has grown steadily over the past several years, with sustainable, fast-moving consumer goods reaching an estimated $128.5 billion in sales in 2018, with plenty of anticipated future growth (Nielsen 2018). These trends present a clear consumer desire to live a sustainable, feel-good lifestyle, and a majority (approximately 88%) of consumers want firms to assist them in doing so (Townsend 2018).

Urban and reclaimed wood materials, or logs from trees residing in urban areas, and wood elements generated from construction and demolition (C&D), are generated in large quantities throughout the United States, and historically they have been disposed of as waste. In recent years, industries have emerged to salvage these materials and increase their use for higher value products. Through their inherent product design, the urban and reclaimed wood industries fit into a circular economy business model, upcycling traditional waste products, and extending the life of raw materials. Urban and reclaimed wood production allows for landfill diversion, economic growth, local production, and opportunities for raw material management. This paper presents the results of a research project with the goal of understanding the marketing practices implemented in the urban and reclaimed wood industries, with the intent of expanding markets for this material and further contributing to a circular economy.

Circular Economy

The current, linear economy focuses on a *take, make, waste* model for production, effectively leading to resource depletion, potentially toxic emissions, and landfill contributions (Beaulieu *et al*. 2016; Ellen McArthur Foundation 2020). Historically, there has been a direct link between economic development and resource consumption, driving growth and contributing to gross domestic product; however, this concept engrains inherently positive notions of extraction and utilization, often leading to resource scarcity (Beaulieu *et al*. 2016). For this reason, there is a call to design out waste, keep materials in use, and regenerate natural systems through a transition to a circular economy (Ellen McArthur Foundation 2020).

A circular economy (CE)has been defined in a number of ways. For example, the European Commission states that CE is "a production and consumption model which involves reusing, repairing, refurbishing, and recycling existing materials and products to keep materials within the economy wherever possible," largely increasing the value of waste product as a resource (Sillanpaa and Neibi 2019). Generally, a circular economy transforms goods at the end of their traditionally useful life into resources for another purpose, closing loops in industrial ecosystems (Stahel 2016). In addition, it seeks economic growth while also demanding sustainable goals for environmental preservation and societal wellbeing, effectively providing social, economic, and natural capital (Lieder and Rashid 2016; Sillanpaa and Neibi 2019). The social component of a circular economy utilizes a multi-level production approach that takes into account both human wellbeing and the implications of extraction or utilization practices on future generations, focusing on the potential for resource regeneration (Lieder and Rashid 2016; Sillanpaa and Neibi 2019). A circular economy contributes to natural capital by reducing impacts to the environment, such as emissions and solid waste, while generating profits through innovative business models, product designs, and supply chains (Lieder and Rashid 2016; Sillanpaa and Neibi 2019).

Consumer concerns regarding detrimental environmental impacts and resource availability are incentivizing firms to explore circular economy concepts and product designs, often allowing firms to differentiate themselves from their competition (Stahel 2016). To help drive "radical, restorative, regenerative approaches to business," The Circular Design Guide was developed by the Ellen McArthur Foundation, which helped to define the circular economy concept and provided firms with resources to transition to a circular economy (Ellen McArthur Foundation and IDEO 2020). By replacing "disposability" with "restoration," firms participating in a circular economy generate value through lasting, regenerative resources; linked value chains, often identifying waste outputs as inputs to further production; and longer life cycles, associated with longevity and utility beyond a *take, make, waste* production model (Beaulieu *et al.* 2016).

Urban and Reclaimed Wood Industries

Currently, there are 74 billion urban trees throughout the United States and the number is expanding; articles in the *Journal of Forestry* estimate that between 2000 and 2050 urban area expansion will subsume forested area equivalent to the size of Pennsylvania (Nowak and Walton 2005; Sherrill 2017). There are a number of benefits to urban forests, including lower air temperatures, pollutant filtration, carbon sequestration, storm water management, and lower heating and cooling costs (Nowak *et al.* 2010). However, when urban trees need to be removed for a variety of reasons, such as storm damage, disease, or development, residues from urban trees are typically regarded as waste and discarded in landfills or utilized in low-value applications such as energy generation, compost, or landscaping mulch. In 2010, approximately 18.4 million tons of woody yard trimmings were generated in the US, including logs and limbs, of which approximately 4.0 million tons were available for recovery (Howe *et al.* 2013). Additionally, when buildings are torn down, significant amounts of "construction and demolition" (C&D) debris is generated. C&D debris from old structures, such as barns and buildings, resulted in the generation of 36.4 million tons of wood waste, with 17.3 million tons available for recovery in 2010 (Bratkovich *et al.* 2014; Howe *et al.* 2013). Similarly, C&D waste has traditionally been underutilized or wasted, largely ending up in landfills.

Realizing the untapped potential of these raw materials, industries have emerged to utilize urban and reclaimed wood for value-added production, specifically offering consumers unique, inimitable attributes. Urban and reclaimed wood companies, which for this research are defined as firms producing value-added products with logs from trees residing in urban areas and wood components generated through construction and demolition (C&D), respectively, provide consumers with unique aesthetics, historic significance, local production, and sustainability, among other benefits. When considering the sustainable nature of urban and reclaimed wood products associated with upcycling a traditional waste product, the circular nature of these industries is brought to light.

Urban & Reclaimed Wood: Sustainable Production for a Circular Economy

The urban and reclaimed wood industries inherently fit into a circular economy business model, contributing to landfill diversion, material regeneration, and local economies through the utilization of a traditional waste product as input for production. Circular economy business models consist of two distinct groups: firms centered around reuse and extension of product life, largely through remanufacturing, upgrades, and retrofits, and firms that produce as-new goods using resources that have been upcycled (Stahel 2016). The urban and reclaimed wood industries fit into both categorizations of

circular economy business models, each using slightly different raw materials. The reclaimed wood industry extends product life by remanufacturing previously utilized components from old structures, and the urban wood industry produces as-new, value-added products using salvaged urban logs as raw material input.

Life cycle assessment studies have demonstrated that wood is a renewable material with lower environmental impacts than other materials, like steel, concrete, or plastic (Lippke *et al*. 2004; Bergman and Bowe 2008, 2010, 2012; Lippke and Edmonds 2009; Hubbard and Bowe 2010; Bolin and Smith 2011). A life cycle inventory assessment was conducted to gather an understanding of reclaimed wood energy consumption and global warming potential, indicating that production with virgin wood required 11 to 13 times greater energy consumption than using reclaimed wood overall, in addition to having 3 to 5 times greater global warming potential, or GWP (Bergman *et al.* 2010). Another study outlined the increased carbon sequestration potential of urban wood products, in pounds of CO_2e, where it was determined that a white oak dining table with 10 chairs produced using 120 board feet of urban wood sequesters an estimated 730 pounds of CO_2e (Sherrill and Bratkovich 2018). Accounting for annual production and inventory, there is potential for a small- to medium-sized firm to sequester more than thirty tons of CO_2e annually (Sherrill and Bratkovich 2018). Results from these studies reinforce the sustainable nature of urban and reclaimed wood products, which is often used as a successful marketing message. There is anecdotal evidence that urban and reclaimed wood companies use sustainability as a differentiation factor and emphasize related messaging in their promotional efforts. However, limited research exists on the marketing practices of these industries, including strategies for product, pricing, promotion, and distribution.

OBJECTIVES

The objective of this research was to identify current marketing practices in the urban and reclaimed wood industries. To accomplish this, the following specific objectives were proposed: (1) develop a profile of value-added urban and reclaimed wood producers, (2) identify current marketing practices used by these industries, and (3) identify opportunities and barriers for market expansion.

METHODOLOGY

Case studies of urban and reclaimed wood firms and supporting organizations were used as the primary data collection method. Company visits and interviews were conducted over the span of six months in the Mid Atlantic, Pacific Northwest, and Midwest regions of the US. Cities with active urban and reclaimed wood industries were identified and selected, namely Milwaukee, Minneapolis, Baltimore, Charlottesville, Richmond, Seattle, Olympia, Portland, Detroit, Lansing, and Ann Arbor. Companies were identified from a list compiled for a previous component of this study (Pitti *et al.* 2019).

Case studies consisted of one hour, semi-structured interviews conducted with company owners, managers, and employees to provide insights with regard to company characteristics, consumer characteristics, marketing practices, opportunities, and barriers, as outlined in Table 1. The majority of case studies were carried out as in-person site visits and four were executed over the phone.

Table 1. Topics Covered in Case Study Interviews

Category	Topics
Company and respondent information	Raw material, years of operation, firm size and location Interviewee position
Products	Primary products and species Stock *vs* custom product offerings
Sourcing and production	Sourcing partnerships, raw material availability Raw material processing
Main markets	Target consumer, market segment
Price	Structure, relative pricing
Placement	Distribution channels
Promotion	Promotional platforms, messages
Opportunities	Anticipated growth, sustainable competitive advantage
Barriers	Barriers present, approaches to overcome

In addition to those surrounding production, case study visits were conducted with city, county, and state government entities in the Northwestern U.S. to gather an understanding of policy programs implemented to promote urban and reclaimed wood diversion and utilization. These interviews gathered information regarding the length of program implementation, guidelines in place, outlets and industry partnerships, common issues, financing, and feedback received.

Results from the case study interviews and a survey conducted as a previous component of this project provide a clear picture of the urban and reclaimed wood industries. Survey results provided a statistical representation of marketing practices implemented in these industries (Pitti *et al.* 2019). Case studies were carried out to collect data unattainable using a survey, particularly highlighting specialized products, pricing strategies and structures, promotional events and correspondence, and aligned messaging and branding.

Data gathered from both methods was used to conduct a SWOT (strength, weaknesses, opportunities, and threats) analysis. This tool was used to summarize the urban and reclaimed wood internal and external environments, with the intent of identifying ways for firms to capitalize on their strengths and take advantage of opportunities, as well as addressing weaknesses and threats.

RESULTS AND DISCUSSION

Company and Interviewee Characteristics

Twenty-nine site visits and interviews were conducted, and 39 individuals participated in the interviews, representing 19 companies, 7 city governments, four federal and state agencies, two industry networks, one consignment center, and one university.

Table 2. Marketing Centered Interviewee Characteristics

Company / Organization *	Raw material	State	Interviewee Position
Wisconsin Urban Wood	Urban	WI	Founding Member; Owner, Member Company Owner, Member Mill
Company A	Urban	MN	Co-owner
Citer Operation	Urban	MD	Yard Master, City Forestry Division
Social Enterprise	Reclaimed	MD	Vice President
U.S. Forest Service	Mixed Source	MD	Urban Field Station Network Coordinator
Company B	Mixed Source	MD	Co-owner
Virginia Urban Wood Group	Urban	VA	Department of Forestry, Member City of Harrisonburg, Member City of Woodstock, Advocate
Company C	Urban	VA	Co-owner
Company D	Reclaimed	VA	Employee
Company E	Reclaimed	WA	Owner
Company F	Urban	WA	Sales
Company G	Reclaimed	WA	Managing Partner
Company H	Mixed source	WA	Marketing Director
Company I	Reclaimed	OR	Inside Sales
Company J	Urban	MI	Co-founder, Director of Sales and Marketing
Company K	Mixed Source	MI	Owner
University Operation	Urban	MI	Dept. of Forestry Academic Specialist
Consignment Operation	Urban	MI	Manager
Company L	Urban	MI	Employee
Company M	Reclaimed	MI	Co-owner, Designer
Company N	Mixed source	MI	Co-owner
Company O	Reclaimed	MI	Co-owner
Company P	Mixed source	MI	Co-founder, CEO
* Companies were anonymized to protect confidentiality			

Ten participating companies produced products with urban wood, seven used reclaimed wood, and six reported both urban and reclaimed wood ("mix source" firms). Tables 2 and 3 report the position of each interviewee within the participating organization. Almost all of the company representatives interviewed were owners, co-owners, or sales employees. City representatives worked in the Parks and Recreation Department or Forestry Department, networks were represented primarily by their coordinators and facilitated additional meetings with their members, and consignment and university operations were represented by their managers.

Table 3. Policy Centered Interviewee Characteristics

Company / Organization *	Raw material	State	Interviewee Position
Clackamas County	Urban	OR	Urban Lumber & Forestry Project Coordinator
Washington Dept. of Natural Resources	Urban	WA	Urban & Community Forestry Program Manager
City of Olympia	Urban	WA	Urban Forestry Program Manager
City of Seattle Parks & Recreation	Urban	WA	Arboriculturalist, Urban Forestry

Sourcing, Partnerships, and Production

Due to the variability of raw material quality and quantity, largely associated with nontraditional supply chains and growing conditions, partnerships are an important component of the urban and reclaimed wood sourcing strategies. Firms collaborate with a number of private, municipal, and residential entities to source raw materials, often providing their partners with a variety of benefits, such as decreased dumping costs, decreased stress to landfills, and compensation for raw materials, among others. Urban wood firms typically partner with tree removal firms, arborists, homeowners, and city governments to procure raw materials largely free of charge, and reclaimed wood firms partner with deconstruction and demolition firms, building owners, and construction and remodeling firms, which can require payment for delivering quality raw material supplies. Urban wood firms, in particular, come together in unique ways through the formation of statewide and national networks, which bring a number of benefits to their members, such as consumer education, market research and analysis, advocacy, brand recognition or credibility, and opportunities for large-scale projects. Networks, such as Wisconsin Urban Wood and the Virginia Urban Wood Group, work to develop a brand that can collaboratively increase the successes of urban wood operations throughout the supply chain, working to increase awareness of the product, as well as its benefits and reliability.

The urban and reclaimed wood companies interviewed indicated unique approaches to sourcing their raw materials. One Virginia-based reclaimed wood firm reported sourcing old-growth beams from warehouses, homes, factories, and other structures throughout the country, partnering with reputable deconstruction firms to transport and deliver these rare and valuable raw materials. A Minneapolis-based firm noted a close partnership with the city to source urban logs, often helping to identify and supply quality raw materials to the firm. Operations in Baltimore highlight production with both urban and reclaimed wood, namely an urban log diversion program for the sale of chips, brush, logs, and other products, as well as a tri-pronged reclaimed wood utilization approach, including a social enterprise to create jobs for people with barriers to employment, deconstruction firm, and retail location for end-products. Reclaimed wood operations in Baltimore leverage contracts with the city to secure a steady supply of buildings to deconstruct and further supply raw materials for production.

Processing urban and reclaimed wood has its challenges, and it is common to encounter metals or other foreign objects in both urban logs and reclaimed wood. For this reason, firms often need to use metal detectors or visual indicators to mitigate risks to personnel safety and to protect tools and machinery. Drying these raw materials presents particular difficulties, often due to the high variability in moisture content, dimensions, and species. Additionally, the presence of diseases or pests may require special handling and treatment, for example trees affected by the Emerald Ash Borer. Sawing and machining

present other challenges, mostly due to the highly variable nature of the raw material.

Regarding production, processes differ significantly between urban and reclaimed wood companies. Urban logs are typically air-dried prior to production to save energy during kiln-drying. It is common for urban logs to be sawn into live-edge slabs (or rough sawn lumber that incorporates the natural edge of the wood) using a portable sawmill and stacked to air-dry. Lumber is then kiln-dried, often using a dehumidification kiln, and sold as slabs or used to manufacture higher value-added products, like furniture or millwork. Reclaimed wood interviewees frequently reported pressure-washing or sanding components to remove paints or coatings, which can contain lead and require specific handling. Although reclaimed wood materials usually have a relatively low moisture content, it is common to kiln-dry these materials to achieve an adequate and uniform moisture content, as well as to remove potential pests. Raw material supplies are subsequently cut to consumer specification or standardized stock sizes. Finally, the raw materials undergo machining, assembly, and finishing, depending on the end-product specifications.

Policies to promote urban and reclaimed wood utilization

From policy interviews conducted in the Northwestern US, it was found that there are few guidelines and minimal communal support surrounding urban wood utilization, despite the fact that several interviewees represented programs that have been in place for upwards of ten years. Issues arise around private property rights and concerns of profiting from a public resource, as well as public perception of urban wood utilization. However, with proper education, a majority of stakeholders see the value in production with these resources over landfilling, whether it be through the sale of logs to local firms for value-added production or through chipping, firewood, or other low value uses. Other issues associated with production were the costs and liabilities associated with removal, as well as drying, transporting, and others. In general, the emerging urban wood markets are often not matched by government initiatives. However, when the two entities work together, there has been significant success in localized markets. In this regard, interviewees noted the potential to bridge the relationship gaps between the involved parties to promote better communication, advertising, and education, specifically highlighting the potential for tree care firm education in expanding urban wood utilization. These interviews emphasized the importance of partnerships to make urban wood utilization possible and profitable for the company and municipality.

Marketing Practices

Marketing strategies are used to effectively identify and target specific market segments, which are often defined by breaking consumers into groups based on similar attributes. Urban and reclaimed wood companies sell to intermediate users, such as architects, designers, contractors, developers, wholesalers, and retailers, as well as to final users, such as individual consumers and hobbyists, who purchase raw material for their projects. For this study, the marketing mix framework, or the "4P's" of marketing (Borden 1964), was used to outline current strategies implemented in the urban and reclaimed wood industries, specifically regarding product, price, promotion, and placement (distribution). This section details the marketing strategies used by the firms interviewed for this study.

Product

A product includes any object, service, or concept that brings value to a consumer; products can be categorized as commodity, specialized, or differentiated products (Espinoza and Smith 2015). Commodity products are produced to a standard specification, specialty products are produced for a niche market, and differentiated products appeal to consumers by offering variability and setting themselves apart from the competition (Espinoza and Smith 2015).

From this study, it was determined that urban and reclaimed wood firms offer a wide variety of differentiated products, from large-section structural beams to small kitchen accessories. A majority of participating companies reported producing largely custom products against firm orders (made-to-order, or MTO), as opposed to products for stock (made-to-stock, or MTS). This is in alignment with the results of a nation-wide survey of the urban and reclaimed wood industries, which found that 61% and 39% of firms sold MTO *vs.* MTS, respectively (Pitti *et al.* 2019). Although most firms sell a mix of MTO and MTS, two interviewees reported selling primarily stock lumber, and one firm reported producing solely stock products, primarily cookies (cross sections from smaller diameter logs or limbs) and live-edge slabs. Almost all participating firms reported producing custom-made furniture (*i.e.* tables, chairs, or desks). Other products consisted of mantels, live-edge slabs, lumber, beams, flooring, millwork, stair parts, doors, byproduct, cabinets, accessories, tableware, and windows. Byproducts (*i.e.* cut-offs, sawdust, shavings, or chips) are typically used for accessory production, animal bedding, energy generation, or specialist purposes, such as using sawdust as substrate for gourmet mushroom cultivation.

Components salvaged from deconstructed or demolished structures, otherwise referred to as architectural salvage, are offered by reclaimed wood firms to generate additional profit streams and reinforce messages of reuse and historic significance. In general, live-edge slabs, tables, countertops, and cookies are unique to urban wood production, and architectural salvage, beams, barn doors, and millwork are commonly associated with reclaimed wood firms (Pitti *et al.* 2019). To enhance differentiation and appeal to niche markets, firms can obtain and market environmental certifications to their consumers, including FSC Reclaimed (Forest Stewardship Council 2011), or Leadership in Energy and Environmental Design (LEED) accreditation for reclaimed wood firms (U.S. Green Building Council 2019a). Additionally, there is potential for urban wood certification through the Program for Endorsement of Forest Certification (PEFC)'s "Trees Outside Forests" program (Fernholz *et al.* 2018). In general, intangible product attributes and unique aesthetics set urban and reclaimed wood products apart from the competition, specifically live-edge, natural urban wood aesthetics and weathered, reclaimed wood aesthetics. Figure 1 shows examples of finished products (left) and stock products sold at retail warehouses (right).

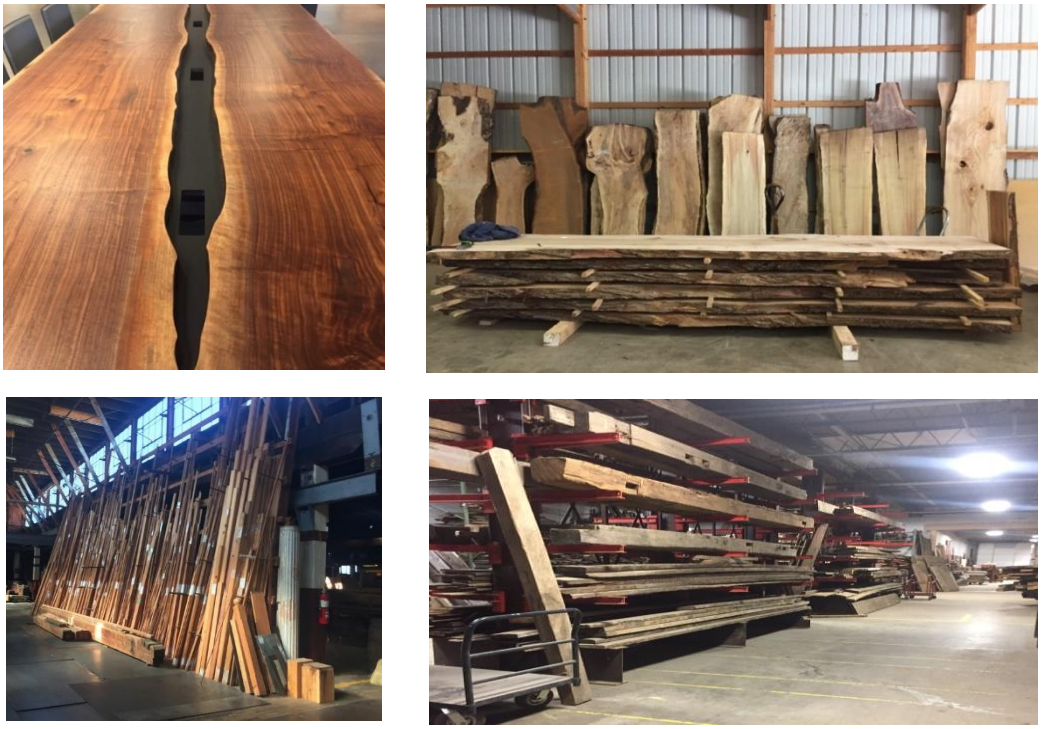

Fig. 1. Live-edge urban wood table and slabs (top); reclaimed flooring and beams (bottom)

A Seattle-based firm capitalizes on customer valuation of their craftsmanship and product quality, offering high-end products at significant premiums, often upwards of five figures. A Detroit-based urban wood firm utilizes a retail warehouse to sell stock lumber to hobbyists for their projects. By filling an underserviced segment of the market, this firm has been successful in bolstering sales, and through recommendation to their customers, they have generated business for other local businesses that offer finishing services. High visibility projects are useful for creating awareness regarding urban or reclaimed wood products. For example, a project carried out by Wisconsin Urban Wood integrates the work of Wisconsin producers into the interior of a basketball arena and allows urban and reclaimed wood firms to compete with traditional forest products firms for architectural contracts, differentiating their products based on the local nature of the materials and industrial aesthetics. Some companies explore alternative customization models, such as a mass customization production model utilized in Seattle that standardizes production and offers consumers the opportunity to tailor their product based on size, finish, and base styles for tables. In Portland, a firm partnered with national commercial chains to produce customized paneling products painted with brand-specific colors. Ready-to-install paneling options are also available, appealing to a residential consumer with ease of installation and time savings.

Price

Pricing should reflect consumer valuation and willingness to pay, as well as consider company costs and desired profit margins, which affect business operations from daily operations to annual sales (Espinoza and Smith 2015). Interviewees reported that a majority of urban and reclaimed wood products are priced in line with, or slightly higher than, the competition, largely classified as other value-added forest products companies. These results reinforce the outcome of the survey component of this research, specifically

that more than 60% of participating firms reported pricing products the same or slightly higher than the competition (Pitti *et al.* 2019). Several firms interviewed for this study reported pricing products at a premium in accordance with consumer valuation of intangible attributes like exclusivity, design, and quality; others highlighted the desire to offer products at all price points to further utilize the available raw material supplies. Additionally, a number of firms noted the implementation of proprietary pricing structures, allowing them to consistently and transparently price their products. For example, an East Coast reclaimed wood company utilizes a proprietary, self-graded system based on product aesthetics and weathering. Other firms price their products based on board foot or square foot, standardizing between species and product types. A mass customization model utilized in Seattle allows the firm to structure their pricing around customer preferences, pricing each component individually and calculating price on a case-by-case basis.

Promotion

As the most visible component of the marketing mix, promotion helps to increase the likelihood that consumers will purchase products by informing, persuading, reminding, and associating (Espinoza and Smith 2015). Advertising, personal selling, sales promotion, and publicity are used to reach consumers, which include platforms like television, salespeople, trade shows, social media, direct mailed advertising, online advertising, or news articles. Interviewees were asked to report on the importance of various promotional platforms to their marketing strategies. Respondents identified primarily: word of mouth, company webpages, social media, and event participation, such as craft fairs or trade shows (Table 4).

Table 4. Promotional Platforms Noted by Participating Interviewees

Promotional platform	Reponses
Word of Mouth	24
Company Webpage	21
Social Media	19
Events	15
Public Relations	11
Newspapers or Magazines	5

Similarly, the previous survey component of this research project found that urban and reclaimed wood firms rank the importance of word of mouth, company webpage, and social media as the most significant promotional platforms in reaching their consumers, with 93%, 81%, and 66% of firms ranking them with high importance, respectively (Pitti *et al.* 2019). Online content, such as a company webpage or social media, provides firms with opportunities to build a brand, as well as inform consumers of available products, capitalize on globalization trends, and receive consumer feedback. Interviewees also noted leveraging public relations, such as press releases and local news coverage, to highlight the unique urban and reclaimed wood business model. Interviewees identified newspapers and magazines as the least important promotional platforms, reflecting long-term consumer trends. Through the utilization of both network collaboration and educational event attendance, urban wood firms, in particular, access additional opportunities, such as sample promotional material and a recognizable brand to back their messages. "Telling the Story" of the wood material was also an important aspect of product promotion. Many firms tied the origin of the wood to its current use. One firm would allow the customer to trace the

wood back to its original landscape. This history of where the wood came from was an important aspect of the promotional efforts for some companies.

Using Facebook, one Michigan firm appeals to buyers by posting photos of projects completed by hobbyists, highlighting the potential of their lumber and unfinished components, and often noting the historic significance and unique aesthetics of the material. A number of firms highlighted the importance of showrooms in depicting and communicating quality and unique aesthetics to consumers, specifically a Seattle-based firm noted that customers visit their showroom multiple times prior to purchase. Additionally, large-scale projects help to increase visibility and receptivity of urban and reclaimed wood products by mainstream architecture firms, such as urban and reclaimed wood utilization in a basketball arena in Milwaukee, Wisconsin. The importance of trade show attendance was reported by a Detroit-based firm, which indicated success at "lifestyle" shows using an enticing display that exposes consumers to product offerings. Other types of events attended by urban and reclaimed wood firms are "home and garden" shows, seasonal markets, and educational events, among others. Several urban wood firms reported arranging educational events to effectively source and process raw materials, where firms often put on demonstrations using a portable sawmill to show consumers the production process and raw materials, as well as educate producers on how to increase efficiency and production capabilities (Fig. 2).

Fig. 2. Sample educational event used at Virginia Tech to promote urban wood utilization (Photo courtesy of Ed Thomas)

Additionally, promotional messages are vital to successfully reaching target consumers by informing and educating them on product offerings, firm values, and other differentiating attributes. Promotional messages employed by participating urban and reclaimed wood firms primarily emphasized the importance of intangible attributes that differentiate products from the competition, specifically sustainability (often highlighted through environmental certification systems like FSC or LEED accreditation), local and domestic production, quality, emotional value, and aesthetics (Table 5). Interviewees also emphasized design, collaboration, social capital and community betterment, durability, and time savings as important messages to branding or promotional material.

Table 5. Promotional Messages Noted by Participating Interviewees

Promotional message	Reponses
Sustainability	17
Local/domestic production	14
Quality	10
Emotional value	10
Aesthetics	6
Design	6
Collaboration	4
Social capital	4

Many firms reported that successful promotional messaging aligned with their values. For example, the reclaimed wood program operating in conjunction with the City of Baltimore identifies itself as a social enterprise, emphasizing employment of a disadvantaged workforce and social change associated with addressing urban blight through deconstruction. In Detroit, design innovation and trend adaptability were noted as sustainable competitive advantages for one reclaimed wood firm, particularly in their ability to appeal to a wide variety of consumers, ranging from residential to corporate consumers. Historical significance was highlighted prominently by some participating reclaimed wood firms, with several providing end consumers with historic documentation and raw material origin stories. Two firms place the zip code of the location where raw materials were procured on their final products, highlighting local production. Sentimentality is also stressed by a university operation in Michigan, directly appealing to alumnae by utilizing logs from campus trees and placing the University logo onto products, providing a consistent consumer base and a product that consumers relate to. One firm operating in Portland promotes time savings to both residential and commercial consumers, noting their ability to produce easy-to-install products with quick lead times at capacity with traditional forest products firms. Exporting firms stated the importance of messages of quality and exclusivity in reaching international consumers.

Placement (Distribution)

Placement involves the distribution of products to the end consumer, often varying in feasibility, desirability, and profitability between firms (Espinoza and Smith 2015). Direct, retail, and online sales were reported as the most frequently utilized distribution strategies by interviewees, reinforcing previous survey results, which indicated that 89% of firms sold products directly to their customers and 53% used some form of online commerce (Pitti *et al.* 2019). Online sales were not implemented industrywide but are growing in prevalence in the urban and reclaimed wood industries. Similarly, few urban or reclaimed wood firms reported leveraging wholesaler, distributor, export, or broker sales, assumedly due to capacity constraints and unpredictable raw material supplies.

Distribution strategies highlighted by case study interviews included direct sales, retail sales, online sales, wholesale, consignment, and exports (Table 6). In Michigan, two urban wood operations were identified that offer unfinished products to hobbyist consumers, including a retail warehouse location and consignment operation that brings a number of mills together under one roof, both of which provide unfinished, live-edge urban slabs. Consignment operations were unique to urban wood firms, where a specific retail location sells goods for the owner, who compensates the consignor accordingly. In Michigan, a reclaimed wood firm utilizes a wholesaler to sell products to big box stores,

allowing them to compete at high capacities. Few urban and reclaimed wood firms capitalize on online sales as a main channel of distribution, but one Seattle-based firm offers a product line exclusively online to provide residential consumers with ready-to-install paneling options, reaching atypical forest products consumers through an alternative channel. Three participating firms reported participating in export sales, specifically targeting markets in Europe or Asia. Additionally, firms with export operations tend to have larger production capacities and specialize in specific products, such as furniture or lumber.

Table 6. Distribution Strategies Noted by Participating Interviewees

Distribution Strategy	Reponses
Direct sales	19
Retail sales	14
Online sales	7
Wholesaler	4
Consignment	3
Export sales	3
Sale to a distributor	3
Broker	2

SWOT Analysis

Table 7. SWOT Analysis Summary

Strengths:	Weaknesses:
• Supply chain partnerships for effective procurement • Circular product design, environmental sustainability • Unique aesthetics, exclusivity • High-end, handcrafted products • Focus on customization • Sentimentality and emotional appeal • Local and domestic production	• Lack of financial resources • Lack of storage space • Under-performing or insufficient marketing • Lack of consumer awareness • Pricing challenges – matching consumer valuation with premium prices • Variable raw materials, processing challenges • Specialty, niche market
Opportunities:	Threats:

• Growing demand for:
  ○ Unique, customized, and high-end products
  ○ Modern, rustic, and industrial designs
  ○ Local, sustainable products
• Urban area growth, raw material availability
• Globalization, export opportunities
• Certification potential: PEFC, FSC, LEED*
• Participation in municipal sustainability or urban forest management plans
	• Industry fragmentation
	• Risk of market saturation
	• Potential for competition-driven raw material scarcity and/or price increases
	• Limited recognition by green labeling systems
	• Lack of industry standards
	• Availability of cheaper, substitute products
	• Competition from low-value uses, private property rights.
	• Limited customer base (environmental consumer)

***** PEFC=Program for the Endorsement of Forest Certification (PEFC 2020), FSC=Forest Stewardship Council (FSC 2020), LEED=Leadership in Energy and Environmental Design (U.S. Green Building Council 2019b)	

A SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis is a tool used to outline internal and external environments and formulate strategies accordingly, particularly for specialty markets. The internal environment is analyzed to identify core business competencies that should be sustained or developed to compete successfully, and an external analysis is conducted to identify potential developments that should be taken advantage of or protected from, which are largely out of the company's control (Sammut-Bonnici and Galea 2015). From the personal interviews, information was gathered to conduct a SWOT analysis on the niche urban and reclaimed wood industries. Table 7 includes a summary of the analysis and detailed explanation of each component follows.

Strengths

The strengths of the urban and reclaimed wood industries are largely associated with intangible product attributes, including environmental sustainability, unique aesthetics, sentimentality, customizability, local and domestic production, and others. To facilitate production, firms leverage supply chain partnerships for efficient raw material procurement, namely city governments, private firms, and building owners. The urban and reclaimed wood industries upcycle raw materials traditionally discarded as waste, highlighting the inherently circular design, as well as requiring less energy for production and maintaining an overall lower global warming potential compared to traditional forest products (Lippke *et al.* 2004; Bergman and Bowe 2008, 2010, 2012; Lippke and Edmonds 2009; Hubbard and Bowe 2010; Bolin and Smith 2011). These benefits appeal to environmentally conscious consumers who are often willing to pay a price premium for such intangible attributes (Lieder and Rashid 2016). Unique aesthetics also drive demand for urban and reclaimed wood products, particularly when considering inimitable grain patterns, live-edge offerings, and color. From this study, it was revealed that urban and reclaimed wood companies often focus on high-end, handcrafted, exclusive, and custom production, appealing to market segments where price is not the main decision factor. Similarly, sentimentality and emotional appeal are vital to demand for urban and reclaimed wood products, where they add value for consumers through local and domestic production, community partnerships, or historic significance.

Weaknesses

Barriers identified by this research include lack of financial resources, lack of storage space, under-performing or insufficient marketing efforts, and lack of consumer awareness, as well as difficulties associated with raw material sourcing, pricing, and distribution. Most firms identified financing as an inhibiting factor, especially for startups, who typically underestimate raw material acquisition and processing costs, which, in turn, leads to a lower than anticipated return on investment. Lack of storage space was listed as an inhibiting factor to production, particularly when considering firms typically accumulate raw material inventories over long periods of time and are almost invariably located close to or in urban areas, where real state is at a premium. Respondents mentioned underperforming or insufficient marketing strategies as a barrier, an example of which is the use of an overwhelming number of messages, possibly leading to confusion among their target audience. Due to the nature of the raw materials, urban and reclaimed wood firms are presented with highly variable supplies, specifically associated with susceptibility to invasive pests, embedded metals, and decay, or risk from de-nailing and removal of potentially toxic paints, respectively. Furthermore, unpredictable urban and reclaimed wood product supplies make it difficult for firms to establish relationships with

intermediaries who facilitate large volume sales, often at their detriment.

Opportunities

Interviewee responses indicated an optimistic outlook for future operations and expectations for industry growth. To achieve this growth, firms must capitalize on available opportunities, including demand for unique and high-end products, demand for local and sustainable products, design trends, and globalization. Demand for high-end, differentiated urban and reclaimed wood products offers potential for market expansion. For example, firms could leverage unique aesthetics associated with live-edge urban wood products or inimitable wood grains from historic raw materials or the ability to provide both rustic and modern designs that are on-trend with current demand. Study findings support that growing consumer demand for sustainably sourced forest products presents opportunities for the urban and reclaimed wood industries, particularly with the expansion of FSC Reclaimed Certification and LEED accreditation, as well as future potential for international third-party recognition through the Program of the Endorsement of Forest Certification (PEFC)'s "Trees Outside Forests" program (Fernholz *et al.* 2018). Globalization is also a growing trend that allows firms to expand into international markets and reach overseas customers that value sustainability, quality, and exclusivity. Urban area growth affects the supplies of urban and reclaimed wood, and as cities subsume significant forest area and require construction or demolition to accommodate infrastructure, ample raw materials will become available, incentivizing municipal support for urban and reclaimed wood utilization (Nowak and Walton 2005). Uniquely, urban wood firms are presented with opportunities to integrate their business models into municipal sustainability and urban forest management, as well as influence the implementation or expansion of government policy to include urban wood utilization as a material management tool.

Threats

Threats to the urban and reclaimed wood industries include consumer trend changes, industry fragmentation, market saturation, supply availability, low adoption of raw material certifications or standards, and substitute product availability. Industry fragmentation and the presence of many small capacity producers without a cohesive strategy inhibits industry expansion, highlighting the need for increased network participation and the formation of industry associations. As the industry grows and demand increases, a number of firms will enter the market, with the risk of causing market saturation. Increased competition may lead to limited supplies of quality raw materials, raising acquisition costs and, in turn, end consumer prices. Additionally, there is little incentive for consumers, especially in the commercial and institutional construction sectors, to adopt urban or reclaimed wood due to the low awareness and adoption of green building systems, like LEED. Based on findings from the interviews, it was determined that a lack of material standards or grading systems can be an inhibiting factor for adoption, especially in B2B transactions, due to the lack of mutual understanding and common language for material specification. The availability of imitation products, such as fabricated live-edge furniture and imitation weathered products, provides consumers with a low-cost alternative and threatens urban and reclaimed wood exclusivity. The urban and reclaimed wood industries also experience threats regarding raw material acquisition, including continued low-value utilization, unwillingness to establish partnerships with firms, and costs. It should be noted that urban wood firms, in particular, are presented with threats associated with competition from low-value, traditional disposal methods,

particularly log-chipping, bioenergy, and firewood production, as was determined from policy interviews conducted in the Northwestern US. Similarly, the reclaimed wood industry is presented with threats associated with economic feasibility, as deconstruction must remain cost-competitive with demolition to incentivize raw material salvage.

CONCLUSIONS

Information on prevalent marketing practices in the urban and reclaimed wood industries was gleaned from company representatives (owners, co-owners, or sales employees), Forestry or Parks and Recreation Department employees, network coordinators, and university and consignment operation managers. From these interviewees, the researchers found that:

1. Products were primarily made to order, noting a high prevalence in furniture production. Other products included byproduct, slabs, lumber, accessories, flooring, paneling, and architectural salvage.
2. Pricing was largely in line with the competition, where a number of firms promoted messages of affordability at any price point and others utilized stringent, proprietary pricing strategies.
3. Firms primarily leveraged word of mouth, company webpages, social media, and event participation to relay promotional messages of sustainability, local production, and quality, among others. The importance of social involvement and community betterment to branding and promotional messages was also brought to light by a number of interviewees.
4. Finally, products were distributed to end consumers through a variety of channels, primarily direct, retail, and online sales; however, several firms also noted the involvement of intermediaries like brokers or distributors in high volume exchanges.
5. Firms have emerged to produce circular urban and reclaimed wood products and provide their consumers with differentiated, intangible attributes, such as unique aesthetics, inherent sustainability, local production, historic significance, and sentimentality. Through urban and reclaimed wood raw material utilization for value-added production, these industries offer products with less global warming potential, less energy consumption, decreased stress to landfills, and other significant environmental benefits.

ACKNOWLEDGMENTS

The authors would like to thank all participating companies. The work upon which this publication was funded, in part, came through a grant awarded by the Wood Education and Resource Center, Northeastern Area State and Private Forestry, USDA Forest Service. This institution is an equal opportunity provider.

REFERENCES CITED

Beaulieu, L., van Durne, G., Arpin, M. L., and Revéret, J.-P. (2016). *Circular Economy: A Critical Literature Review of Concepts*, International Reference Center for the Life Cycle of Products, Processes, and Services (CIRAIG), Montreal, Canada.

Bergman, R. D., Gu, H., Falk, R. H., and Napier, T. R. (2010). "Using reclaimed lumber and wood flooring in construction: Measuring environmental impact using life-cycle inventory analysis," *Proceedings of the International Convention of Society of Wood Science and Technology and United Nations Economic Commission for Europe*, Geneva, Switzerland.

Bergman, R. D., and Bowe, S. A. (2008). "Environmental impact of producing hardwood lumber using life-cycle inventory," *Wood and Fiber Science* 40(3), 448-458.

Bergman, R. D., and Bowe, S. A. (2010). "Environmental impact of manufacturing softwood lumber in northeastern and north central United States," *Wood and Fiber Science* 42(Special Issue), 67-78.

Bergman, R. D., and Bowe, S. A. (2012). "Life-cycle inventory of manufacturing hardwood lumber in southeastern US," *Wood and Fiber Science* 44(1), 71-84.

Bolin, C. A., and Smith, S. (2011). "Life cycle assessment of ACQ-treated lumber with comparison to wood plastic composite decking," *Journal of Cleaner Production* 19(6–7), 620-629. DOI: 10.1016/j.jclepro.2010.12.004

Borden, N. H. (1964). "The concept of the marketing mix," *Journal of Advertising Research* 4(2), 2-7.

Bratkovich, S., Howe, J., Bowyer, J., Pepke, E., Frank, M., and Fernholz, K. (2014). *Municipal Solid Waste (MSW) and Construction and Demolition (C&D) Wood Waste Generation Recovery in the United States*, Dovetail Partners, Inc., Minneapolis, MN, USA, (http://www.dovetailinc.org/report_pdfs/2014/dovetailwoodrecovery0914.pdf).

Ellen McArthur Foundation. (2020). "What is the Circular Economy?," (https://www.ellenmacarthurfoundation.org/circular-economy/what-is-the-circular-economy), accessed 13 May 2019.

Ellen McArthur Foundation, and IDEO. (2020). "The Circular Design Guide," (https://www.circulardesignguide.com/), accessed 13 May 2019.

Espinoza, O., and Smith, R. (2015). *Business Management Practices for Small to Medium Sized Forest Products Firms*, Virginia Polytechnic Institute and State University, Blacksburg, VA.

Fernholz, K., Bratkovich, S., Henderson, C., Groot, H., and Pepke, E. (2018). *Increasing Urban Wood Use Awareness and Product Demand, An Analysis of Green Market Opportunities*, Dovetail Partners, Inc., Minneapolis, MN, USA, (http://www.dovetailinc.org/report_pdfs/2019/DovetailUrbanWood1218.pdf).

Forest Stewardship Council (FSC) (2011). *FSC Standard: Sourcing reclaimed material for use in FSC Product Groups or FSC Certified Projects*, Bonn, Germany, (https://us.fsc.org/preview.fsc-standard-for-sourcing-reclaimed-materials.a-474.pdf).

Forest Stewardship Council (FSC) (2020). "Forest Stewardship Council," (https://us.fsc.org/en-us), accessed 7 April 2019.

Hansen, E., Panwar, R., and Vlosky, R. (2014). *The Global Forest Sector: Changes, Practices, and Prospects*, CRC Press, Boca Raton, FL, USA. DOI: 10.1201/b16186

Howe, J., Bratkovich, S., Bowyer, J., Frank, M., and Fernholz, K. (2013). *The Current State of Wood Reuse and Recycling in North America and Recommendations for Improvements*, Dovetail Partners, Inc., Minneapolis, MN, USA,

(http://www.dovetailinc.org/report_pdfs/2013/wood_reuse_and_recycling/current_state_wood_reuse_recycling_namerica.pdf).

Hubbard, S. S., and Bowe, S. A. (2010). "A gate-to-gate life-cycle inventory of solid hardwood flooring in the Eastern US," *Wood and Fiber Science* 42(Special Issue), 79-89.

Juslin, H., and Hansen, E. (2003). "Strategic marketing in the global forest industries," Oregon State University, Corvallis, OR.

Lieder, M., and Rashid, A. (2016). "Towards circular economy implementation: A comprehensive review in context of manufacturing industry," *Journal of Cleaner Production* 115, 36-51. DOI: 10.1016/j.jclepro.2015.12.042

Lippke, B., and Edmonds, L. (2009). *Life-Cycle Assessments of Subassemblies Evaluated at the Component Level*, The Consortium for Research on Renewable Industrial Materials, Seattle, WA, USA.

Lippke, B., Wilson, J., Perez-Garcia, J., Bowyer, J., and Meil, J. (2004). "CORRIM: Life-cycle environmental performance of renewable building materials," *Forest Products Journal* 54(6), 8-19.

Nielsen. (2018). "Was 2018 the year of the influential sustainable consumer?" (https://www.nielsen.com/us/en/insights/article/2018/was-2018-the-year-of-the-influential-sustainable-consumer/2/), accessed 18 September 2019.

Nowak, D. J., Stein, S. M., Randler, P. B., Greenfield, E. J., Comas, S. J., Carr, M. A., and Alig, R. J. (2010). *Sustaining America's Urban Trees and Forests*, United States Department of Agriculture, Forest Service Northern Research Station, Washington, D.C., USA. DOI: 10.2737/NRS-GTR-62

Nowak, D. J., and Walton, J. T. (2005). "Projected urban growth (2000-2050) and its estimated impact on the US forest resource," *Journal of Forestry* 103(8), 383-389.

PEFC. (2020). "Programme for the Endorsement of Forest Certification," (http://www.pefc.org/), accessed 17 February 2017.

Pitti, A., Espinoza, O., and Smith, R. (2019). "Marketing practices in the urban and reclaimed wood industries," *Bioproducts Business* 4(2), 15-26. DOI: 10.22382/bpb-2019-002

Sammut-Bonnici, T., and Galea, D. (2015). "SWOT Analysis," in: *Wiley Encyclopedia of Management*, John Wiley & Sons, Ltd. DOI: 10.1002/9781118785317.weom120103.

Sherrill, S. (2017). "Harvesting urban timber: The complete guide," Echo Point Books & Media.

Sherrill, S., and Bratkovich, S. (2018). "Estimates of carbon dioxide withheld from the atmosphere by urban hardwood products," Dovetail Partners, Inc., Minneapolis, MN, USA, (https://dovetailinc.org/portfoliodetail.php?id=5e260f4243877).

Shumsky, T. (2019). "More companies link executive pay to sustainability targets," *The Wall Street Journal*, (https://www.wsj.com/articles/more-companies-link-executive-pay-to-sustainability-targets-11561379745).

Sillanpaa, M., and Neibi, C. (2019). "Getting hold of the circular economy concept," in: *The Circular Economy: Case Studies About the Transition from the Linear Economy*, Academic Press, Cambridge, MA, USA, pp. 1-35. DOI: 10.1016/B978-0-12-815267-6.00001-3

Stahel, W. R. (2016). "Circular economy," *Nature* 531, (https://www.nature.com/polopoly_fs/1.19594!/menu/main/topColumns/topLeftColumn/pdf/531435a.pdf). DOI: 10.1038/531435a

Townsend, S. (2018). "88% of consumers want you to help them make a difference,"

Forbes, (https://www.forbes.com/sites/solitairetownsend/2018/11/21/consumers-want-you-to-help-them-make-a-difference/#37596ac96954), accessed 18 September 2019.

Trivedi, K., Trivedi, P., and Goswami, V. (2018). "Sustainable marketing strategies: Creating business value by meeting consumer expectation," *International Journal of Management, Economics and Social Sciences* 7(2), 186-205.

U.S. Green Building Council. (2019a). "LEED v4 for Building Design and Construction," (https://www.usgbc.org/resources/leed-v4-building-design-and-construction-current-version), accessed 4 February 2019.

U.S. Green Building Council (2019b). "Leadership in energy and environmental design," (https://new.usgbc.org/leed), accessed 18 October 2019.

Article submitted: March 27, 2020; Peer review completed: May 3, 2020; Revised version received and accepted: May 13, 2020; Published: May 19, 2020.
DOI: 10.15376/biores.15.3.5226-5245