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Marketing Strategies for Certified Wood Flooring in China: The Gap in Manufacturers' and Developers' Perceived Benefits



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Abstract

With the development of finished houses in China supported by the government, housing developers play a critical role in the purchase of flooring products. On the other hand, wood flooring manufacturers know the importance of forest certification for export, but pay less attention to the domestic market. This study evaluated both housing developers' and wood flooring manufacturers' perceived benefits of forest certification in China, using a survey. For manufacturers, the three most important benefits of adopting forest certification were to "meet foreign customers' purchasing requirements," "support sustainable forestry and protect the environment," and "meet corporate social responsibility goals." For housing developers, the most important benefits of using certified flooring were to "acquire new consumers from domestic market (e.g., green consumer)," "achieve product differentiation," and "brand the house with high-end image." The largest perception gap between the two groups of respondents was with respect to "gain financial aids (e.g., tax and loan)." The findings suggest that there is an increasing demand for forest certified products from housing developers in China, which requires manufacturers to enhance their marketing strategies to meet the domestic demands for certified flooring.

Keywords: wood flooring manufacturer, housing developer, perceived benefit of forest certification, CoC certification, China

1. Introduction

Wood and wood products utilization are related to the issue of climate change mitigation through carbon stocks, sustainable forest management, and greenhouse gas emissions (Sathre and O'Connor 2010, Griscom et al. 2017). Furthermore, they can provide economic benefits by increasing economic activities of wood products companies (e.g., Komata et al. 2012, Fuchigami et al. 2015, Kawamura and Inoue 2020), including those that provide construction building materials (Asif et al. 2007). Maintaining sustainable

forest management is an important prerequisite to achieving positive outcomes through utilizing wood products. Forest certification, such as by the Forest Stewardship Council (FSC), is critical in this aspect.

This study focuses on China because of its large and rapidly growing domestic market. China is the third largest flooring market in the world behind the United States and India (Statista 2020). The sales volume of wood flooring in China was 292 million m² in 2005, and had increased by 142% to 415 million m² in 2017 (CNFPIA 2018, Zhang 2008). This growth is closely tied to the fast development of residential housing construction and remodeling. Before the global financial crisis of 2008, the sales of wood flooring had enjoyed a high growth rate, above 8% on a year-on-year basis. Domestic demand for wood flooring reached 360 million m² in 2007. After the global financial crisis, the first growth peak of demand was in 2009 and 2010, when the growth

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rate reached 6% and 11%, respectively. China is also the world's largest producer of wood flooring. Wood flooring production in China reached 830 million m² in 2017, which accounts for 20% of the wood flooring produced worldwide (DCCC 2019, SFA 2017). This study considers that these two aspects make China a good example for clarifying the marketing strategies of wood flooring manufacturers.

This study focuses on the wood flooring market in China, where “rough” (unfinished) houses have taken the predominant share of the residential housing market over the past years (Furumi 2014, Li et al. 2017). Homebuyers purchase interior materials, including flooring products, in the building materials market on their own (Furumi 2014, Li et al. 2017). Wood flooring manufacturers sell products, which include solid hardwood, laminated, and engineered flooring, to end users through manufacturer-owned stores, including e-marketplaces and sales agencies in China (Figure 1).

However, according to the government, finished houses have been replacing rough houses in urban China in recent years, which reduces waste and pollution in the process of house decoration (MOHURD 2017). The government has also tightened housing measures and has suppressed real estate speculation. Housing developers now must purchase all interior materials, including flooring products, for homebuyers. This indicates that housing developers are replacing end users in becoming the major consumer segment for wood flooring. In the future, housing developers' activities will be considered an essential part of the supply chain of wood flooring (Figure 1). Thus, a change in marketing strategies will be critical for wood flooring manufacturers.

Presently, there are more than 2,300 wood flooring manufacturers in China, of which approximately 800 manufacture solid wood flooring, 500 produce engineered wood flooring, 900 produce laminate flooring, and 150 produce bamboo flooring (JFWIA 2017). Most are small-scale manufacturers; however, the 100 largest solid flooring manufacturers are estimated to account for 40% of all solid wood flooring, and the 10 largest engineered flooring manufacturers produced 50% of all engineered wood flooring in China (IWMG 2006).

The number of housing developers increases every year along with the rapid rate of economic

growth in China. To date, there are over 95,000 housing developers in China (National Bureau of Statistics 2019). More than 60% of the market is dominated by 100 housing developers. The 10 largest housing developers control 28% of the market share, and the combined sales reached 444 billion yuan in 2019 (CREA 2020). This is characteristic of the highly oligopolistic nature of China's real estate market.

Forest certification has emerged in response to social demands, such as the adoption of Forest Principles and Agenda 21 in the Earth Summit of 1992. There are two international certification schemes, namely, the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification (PEFC), that provide a guarantee that the wood used in the products comes from a well-managed forest. In China, one million hectares of forest had been certified by the FSC, with 9,161 chain of custody (CoC) holders as of December 2019. This accounted for 23% of FSC-CoC certificates in the world (FSC 2019). Since 2014, the Chinese forest certification scheme has been endorsed by PEFC (PEFC 2022). Two million hectares of forest have been certified by PEFC in China, with 418 CoC certificate holders as of June 2020 (PEFC 2020).

Moreover, the Chinese government recently issued incentive policies for the development of green buildings (MIIT & MOHURD 2015, MOHURD 2017). Green building programs assess the energy efficiency of a building. These programs also extend to several other sustainability criteria, including sustainable sourcing of building materials (UNECE/FAO 2011, Yu et al. 2014). This requires housing developers to use environmentally friendly materials; therefore, manufacturers have an opportunity to expand certified products in the domestic market. For instance, the most frequently used international green building certificate—the Leadership in Energy and Environment Design (LEED)—offers credit for using FSC-certified materials only (Räty et al. 2012, FSC 2015).

According to the review of green marketing research by Wymer and Polonsky (2015), consumers are concerned about environmental issues (National Geographic 2012), whereas their purchase behavior for green products is lackluster (Peattie and Crane 2005, Wong et al. 1996). There are gaps between consumer attitudes and behaviors in many cases

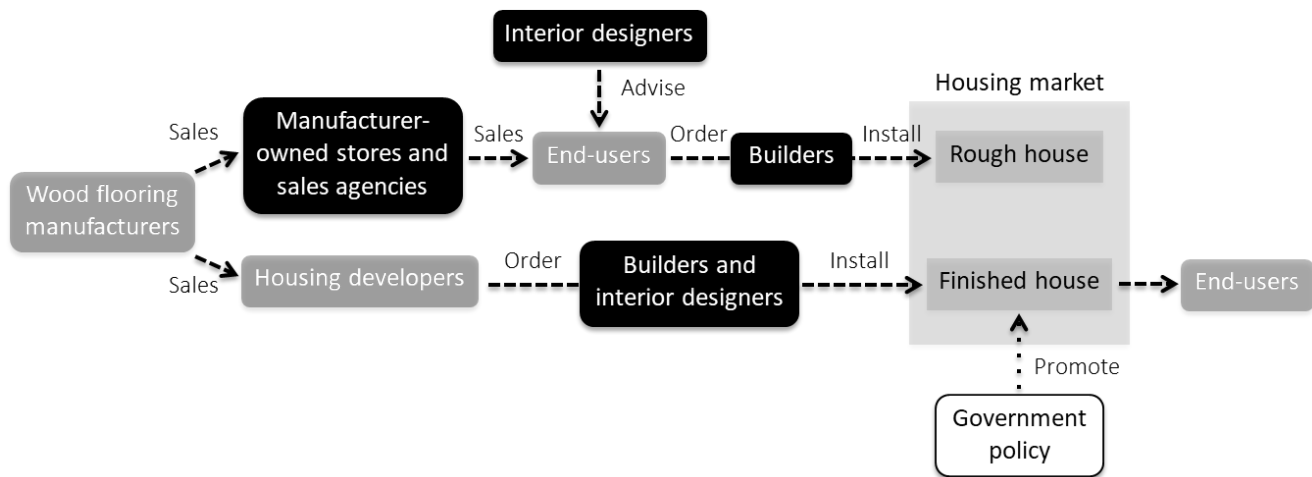


Figure 1. Supply chain of wood flooring in China considered in the study.

(Bamberg & Möser 2007, Thøgersen 2004, Wymer and Polonsky 2015). An eco-brand attribute is not sufficient to cause consumers to switch the purchase brand, especially when the eco-brand attribute is coupled with a premium price (Drozdenko et al. 2011, Wymer and Polonsky 2015). However, several marketing studies have shown that there is a niche for ecofriendly products in wood product markets (e.g., Anderson and Hansen 2004, Aguilar and Vlosky 2007). Additionally, more consumers have come to be concerned about forests and forestry and acknowledge forest certification in China (Luo et al. 2017, Tan et al. 2019). Previous studies showed that end users intended to buy certified wood products, although their willingness-to-pay was small (Vidal et al. 2005, Overdeest & Richenbach 2006, Liu et al. 2007, Wang et al. 2011). But recent studies have shown an increase in their willingness-to-pay (e.g., Liu et al. 2016, Luo et al. 2017, Tan et al. 2019). Considering the recent increase in Chinese consumers' demand for certified products, there is also potential demand for certified wood flooring. Tan et al. (2019) and Tan et al. (2020) reported high purchase intentions and price premiums for certified wood flooring among consumers in major Chinese cities. However, the attitudes of manufacturers and developers in China toward the adoption of forest certified wood flooring are not well understood.

Therefore, it is necessary to find the gap between their perceptions and demands for certified products. In this study, we assessed the gap between the

perceived benefits of forest certification held by the wood flooring manufacturers and housing developers in China. Manufacturers could better utilize certified wood flooring by recognizing the perceived benefits of the product for housing developers.

2. Literature Review

Chen et al. (2011) assessed the awareness and knowledge of forest certification among Chinese forest products manufacturers in order to analyze the extent to which they are considering adopting forest certification and what motivates such decisions. The results showed that although various efforts have been made to increase awareness of forest certification in China, the respondents' understanding of forest certification was very low. Potential economic benefits were the most frequently cited reason for adopting certification, with other reasons including gaining or maintaining competitive advantages over their counterparts, improved access to domestic and export markets, increasing customer awareness, and enhancing corporate social responsibility. Some respondents recognized that making certification mandatory was necessary for widespread certification, given the limited economic benefits of certification.

Montague (2011) identified the attitudes of primary hardwood manufacturers toward CoC certification in the Appalachian region in the United States. The majority of respondents were small, noncertified manufacturers and had negative attitudes toward CoC certification, although they perceived themselves

to be environmentally conscious. As for their reasons to gain CoC certification, most of them answered to follow the requests from their customers or to gain some type of market advantage.

Bowers et al. (2012) asked wood products manufacturers in China and Vietnam about the ways forest certification had been implemented in their business and challenges they faced when adopting forest certification, and they analyzed what factors contributed to the commitment to forest certification. In addition, they identified country-specific factors that influence companies' decisions to obtain forest certification by comparing the cases in China and Vietnam. The results showed that acquiring certified raw material supply, market awareness, and certification costs were the main constraints to adding certified wood products to the sales mix of the company. The results also indicated that there is a lack of domestic supply of certified materials, which leads to a heavy reliance on imported materials, which incurs additional costs. Perceived benefits of forest certification differed significantly between the two countries, with market benefits being the most effective driver for certification.

Tolunay and Türkoglu (2014) investigated the perspectives and attitudes towards CoC certification systems and certified forest products among companies of the forest products industry in Turkey. The results showed that there were differences in perspectives and attitudes towards CoC certification schemes among the four main branches of the forest products industry in Turkey. It was revealed that CoC certification was known mostly by the paper industry because companies had experienced sales problems due to the lack of CoC certification.

Roe (2015) assessed how regulations on illegal wood imports by Japan and Western countries affected the attitudes and perceptions of firms in China and Vietnam, their use of CoC certification, and the material sourcing and export market decisions of industry managers. The results showed that as firms increase in size, they sell less domestically and become more aware of and supportive of regulations, and that firm's awareness of timber legality regulations plays a major role in whether a firm decides to obtain certification. Vietnamese firms were found to have low awareness of the regulations, but high support for certification. Chinese firms had a more

negative attitude toward regulations, while having a higher awareness of them. There were differences between domestically-focused firms and those exporting to foreign markets in expectations for a potential market.

3. Method

3.1 Questionnaire design

Two types of questionnaires were prepared, one for manufacturers and one for developers. Both questionnaires were prepared in simplified Mandarin Chinese by the first author, who is a native speaker, and the other authors double-checked the English-translated questionnaires by the first author. The manufacturers' questionnaire comprised four parts:

- (1) The manufacturer's profile, which included the number of employees, annual turnover, products, business location, and information regarding wood flooring, including origins of the wood, export shares, and countries to which the flooring was exported
- (2) Information on CoC certification adoption containing adoption experience (year and times), future plans of adoption, and target customers
- (3) Perceived benefits of forest certification, as determined by asking manufacturers to measure 13 potential benefits on a 7-point Likert scale,¹ with the 13 items chosen based on previous research (Chen et al. 2011, Bowers et al. 2012)
- (4) Perceived challenges of adopting forest certification for manufacturers without the intention of adopting CoC certification, as determined by responses to a 5-point Likert scale question.

The housing developers' questionnaire was also comprised of four parts:

- (1) The housing developer's profile, including the number of employees, annual turnover, business location, and information regarding the flooring products, such as the purchasing process of flooring, purchase contracts, and areas covered by wood flooring per house

¹This study applied a 7-point Likert scale ("7" = strongly agree, "1" strongly disagree) according to Wakita et al. (2012) and Taherdoost (2019), who pointed out that it can reveal respondents' awareness more accurately.

- (2) Current use and intention for further use of certified wood flooring
- (3) Perceived benefits for the use of certified wood flooring, as determined by asking developers to measure 12 items on a 7-point Likert scale, referring to the manufacturers' perceived measurements
- (4) Perceived challenges of using certified wood flooring for housing developers that have never previously adopted certified wood flooring, as determined by responses to a 5-point Likert scale question.

3.2. Data collection and analysis

Sampling methods in survey research are divided into the probability and non-probability sampling methods (Bryman 2012, Till and Matei 2016, Vehovar et al. 2016). In the former method, the sample is stochastically collected from the population; hence it is possible to infer information about the population through statistical analysis. In the latter method, a sampling procedure is non-stochastically conducted; hence the representativeness of the sample to the population cannot be guaranteed. In general, non-probability sampling has a larger sample error and lower survey cost than probability sampling, but this is not always the case (Callegaro et al. 2014, Vehovar et al. 2016).

Non-probability sampling methods include convenience sampling, quota sampling, snowball sampling, and judgmental sampling (Bryman 2012, Vehovar et al. 2016). Convenience sampling targets people accidentally, haphazardly, or through an unrestricted approach such as in shopping malls or on the street. Quota sampling is an improved convenience sampling with some socio-demographic quotas (e.g., region, gender, age) in order to reflect the population of an area. Snowball sampling collects respondents through a chain of referrals in which existing respondents refer the survey to other people who meet the survey objective. Judgmental sampling targets representative people of a population based on the knowledge and credibility of the researcher.

For this study, we applied a snowball sampling method (according to Bryman 2012) because, based on the preliminary interviews with wood building manufacturers in Japan operating in China, we found

that it would be very difficult to have direct access to wood flooring manufacturers and housing developers concerning forest certification in China. Alternatively, we could ask them to introduce their affiliate firms or business acquaintances regarding our target business field in China to launch snowball sampling.

The survey was carried out from October 2019 to January 2020. The e-mail, consisting of an invitation letter for participating in the survey and a structured questionnaire, was sent to the wood flooring manufacturers and housing developers. In order to initiate snowball sampling, four research collaborators were selected from the authors' acquaintances who have contacts among Chinese wood flooring manufacturers and housing developers. Two of the research collaborators are employees of wood building material manufacturers in Japan, and the other two are university professors in China, who were then able to refer us to survey participants. Consequently, 27 questionnaires were returned, 10 from manufacturers and 17 from housing developers. All returned questionnaires were effectively completed.

The sample size of this study does not allow for conducting advanced quantitative analysis (e.g., clarifying the structure of company's awareness through exploratory factor analysis or evaluating the reliability of data by Cronbach's Alpha). Hence, this study conducted a qualitative explanation of each respondent company and discussed the potential for increased adoption of certified wood flooring in the real estate market of China. In order to examine the gap between manufacturers' and developers' awareness, this study compared the mean values of perceived benefits of forest certification.

4. Results and Discussion

4.1 General Profile of Manufacturers and Housing Developers

Most of the surveyed manufacturers were located in Yangtze Delta, including Shanghai City and the Jiangsu and Zhejiang provinces, where the largest wood-processing and exporting manufacturers operate. Classifying the company size by the number of employees, the ten manufacturers were divided into three groups: five small manufacturers (A–E) with 20–300 employees, four medium-sized manufacturers (F–I) with 301–1,000 employees, and one

Table 1. Basic information of the surveyed wood flooring manufacturers.

Manufacturer	Location	Number of employees	Turnover (million RMB) ^a	Revenue from exports (%)	Top exporting countries ^b	Top origins of wood ^b	Had already obtained CoC certification
A	Shanghai	20–300	20–400	30	Philippines, Korea, Canada	Russia, China, USA	No
B	Shanxi	20–300	20–400	0	—	N/A (c)	No
C	Zhejiang	20–300	20–400	0	—	China, USA, Canada	No
D	Liaoning	20–300	N/A ^c	100	Japan	China, Russia, Canada	Yes
E	Zhejiang	20–300	20–400	60	Europe, USA, Southeast Asia	China, Russia, USA	Yes
F	Jilin	301–1000	20–400	90	Europe, USA	Europe, Russia, China	Yes
G	Shanghai	301–1000	20–400	0	—	China	Yes
H	Shanghai	301–1000	20–400	40	USA, others	Russia	Yes
I	Guangdong	301–1000	20–400	20	USA, Europe	Peru, Cambodia	Yes
J	Zhejiang	Over 1000	Over 400	20	USA, Canada, Germany	N/A ^c	Yes

Note: (a) million RMB in 2018; (b) the questionnaire asked respondents to list up to three countries in a row; (c) the manufacturer preferred not to answer this question.

large manufacturer (J) with over 1,000 employees. Compared with the respondents in the study by Chen et al. (2011), which surveyed 20 wood product manufacturers in China, fewer respondents of this study were large-sized manufacturers and more were medium-sized manufacturers. Regarding the overall turnover in 2018, eight manufacturers had turnover in the range of 20–400 million RMB², one manufacturer had a turnover of over 1,000 million RMB, and the final manufacturer preferred to not answer this question.

Three manufacturers sold their products only on the domestic market, and six manufacturers sold products both in domestic and overseas markets (Table 1). Compared to Chen et al. (2011), where 30% of the respondents were export-oriented firms, the respondents in this study included more export-oriented firms. Regarding export markets, five manufacturers had exported products to the United States and Europe, markets that have imposed strict forest certification regulations on imported wood products. For instance, Manufacturer D exports all products to Japan. This study is similar to Chen et al. (2011) in that there are exporters to the United States and

Europe, whereas this study is unique in that there are exporters to Japan.

The findings on the origins of the wood indicated that geographic proximity presents an opportunity for manufacturers to acquire certified roundwood from foreign countries where forest certification is well developed. For instance, the manufacturers in Yangtze Delta (A, C, E, H, and J) imported wood from North America, and European and Russian timbers were acquired by manufacturers in northeastern China (D and F). According to the U.S. Lacey Act and the EU Timber Regulation, wood products sold in those markets are required to be made from legally logged woods (EC 2010, EFI 2012, USDA 2013). Additionally, the Russian Federation has been actively participating in the fight against illegal logging. The Forest Code of Russia, which was announced in 2006, sets out a detailed list of permitted forest uses, including wood harvesting (Schloenhardt 2008). The Russian government announced that it would be banning the export of unprocessed logs as of 2022 (European Parliament, 2021).

On the other hand, most of our 17 surveyed housing developers were located in the Yangtze River Delta. The respondents were divided into three groups according to “Issuing the Measures for Classification

2. RMB or yuan renminbi; the current conversion rate is 1 RMB = 0.15 USD (in June 2022).

Table 2. Basic information about the surveyed housing developers.

Housing developer	Location	Number of employees	Turnover (million RMB)*	Building experience of finished houses (years)	Long-term contract with manufacturers
K	Shanghai	Less than 600	More than 800	5–10	Yes
L	Anhui	Less than 600	Less than 60	10–15	Yes
M	Jiangsu	Less than 600	More than 800	Less than 5	Yes
N	Zhejiang	More than 3000	More than 800	5–10	No
O	Jiangsu	More than 3000	Less than 60	Less than 5	No
P	Jiangsu	More than 3000	Less than 60	Less than 5	No
Q	Shanghai	Less than 600	More than 800	5–10	Yes
R	Shanghai	Less than 600	More than 800	5–10	Yes
S	Jiangsu	600–3000	More than 800	5–10	Yes
T	Guangdong	Less than 600	60–800	5–10	Yes
U	Jiangsu	Less than 600	More than 800	10–15	Yes
V	Shanghai	Less than 600	60–800	More than 15	Yes
W	Shanghai	More than 3000	More than 800	10–15	Yes
X	Shanghai	Less than 600	More than 800	5–10	Yes
Y	Chongqing	600–3000	More than 800	Less than 5	Yes
Z	Shandong	More than 3000	More than 800	Less than 5	No
AA	Fujian	Less than 600	60–800	5–10	Yes

* Million RMB in 2018.

of Large, Medium, Small and Miniature Enterprises for the Purpose of Statistics” (National Bureau of Statistics 2017) as follows: 11 large-sized companies (64%) with turnover of more than 800 million RMB; three medium-sized companies (18%) with 60–800 million RMB; and three small-sized companies (18%) with less than 60 million RMB. The respondents in this study were mostly from large-sized housing development companies, which account for the majority of the share of China’s real estate market (CREA 2020).

All responding housing developers produced finished houses. Eight had 5 to 10 years’ experience, five had less than 5 years’ experience, three had 10 to 15 years’ experience, and one had more than 15 years’ experience (Table 2). It was found that 13 housing developers held long-term contracts with wood flooring manufacturers, showing that housing developers are an important flooring products customer group for Chinese manufacturers.

4.2 Manufacturers’ Experiences and Future Intentions of Forest Certification

Of all the surveyed manufacturers, seven (D–J) had obtained forest certification (CoC) at the time of the

survey, and they planned to renew the certificate when the current certificates expired. Among the seven, four large- and medium-sized manufacturers (G–J) had adopted the CoC certification more than once. This is different from the findings by Chen et al. (2011), where only one of the twenty wood product manufacturers that participated in their survey had obtained forest certification. The manufacturers’ main information resources regarding forest certification were forest certification institutions and wood products associations, such as China’s National Forest Products Industry Association. Some manufacturers also gained the information from their wood material suppliers and the Chinese government.

4.2.1 Perceived Benefits of Adopting Forest Certification

Regarding customer segments of certified products, nine manufacturers (with G the only exception) answered that the major demand came from overseas customers. On the other hand, four manufacturers (E, H, I, and J) answered that domestic housing developers were their target customers. While previous studies have already shown the motivation to meet regulations in developed countries (e.g., Yu and Xiao

2004, Chen et al. 2011, Tolunay and Türkoglu 2014), this study showed the importance of the demand from domestic housing developers, as well as overseas demand.

These four manufacturers mentioned that housing developers could find potential benefits in using certified products for their properties, such as achieving differentiation of their houses, gaining a positive public image, and meeting homebuyers' requirements of an eco-friendly indoor environment. This implies that some manufacturers have already perceived the advantages for housing developers to utilize certified products that are going to emerge during the early development stage of the finished housing market in China.

4.2.2 Perceived Challenges to Adopting Forest Certification

Of the three manufacturers that had not obtained CoC certification, manufacturer C indicated that they would not obtain it in the future. The others (A and B) were uncertain about obtaining it at the time of the survey. Each of these three manufacturers were small in scale. Previous studies showed that company size is an important factor in a manufacturer's commitment to CoC certification (Montague 2011, Bowers et al. 2012). The fee for CoC certification adoption was a major concern for smaller manufacturers. For instance, to join the organizations offering FSC-CoC certification costs between 2,500 and 10,000 USD, which is adjusted for company size, number of employees, and several other factors (McIlhenney and Hayter 2014).

There are also other fees, including the costs of annual inspections and management of an extensive audit trail (McIlhenney and Hayter 2014). Moreover, our findings revealed that the target market of each manufacturer might also influence their intentions. Manufacturers B and C targeted the domestic market, and manufacturer A's top two exporting countries were the Philippines and Korea, where illegal timber import regulations, such as the U.S. Lacey Act, have not yet come into force (Hoare 2015).

4.3 Housing Developers' Experiences and Future Intentions of Forest Certification

Among the 17 housing developer respondents, 15 had used wood flooring. Eleven of them answered

that wood flooring covered between 10% and 30% of the area per house they sold. Only four responding housing developers used wood flooring for more than 30% of the area per house. Two housing developers had not used wood flooring yet; however, they answered that they planned to purchase wood flooring for achieving profits and making environmental contributions.

Five housing developers indicated that they had used certified wood flooring in their properties. Eleven housing developers expressed a strong intention to use certified wood flooring in the future, and five of them reported that they already had a purchase plan that would be conducted in the next three years.

4.3.1 Perceived Benefits of Adopting Forest Certification

Eleven housing developers also cited the benefits of using CoC certified products in their properties. Seven of them mentioned that they intended to achieve economic benefits, such as increased house sales and price premiums. Six housing developers mentioned other benefits, such as contributing to the environment and gaining social benefits, including achieving corporate social responsibility (CSR) goals, and four housing developers mentioned increasing their public image. Prior studies of wood product manufacturers have identified potential economic benefits (Chen et al. 2011, Bowers et al. 2012): improved access to domestic and export markets (Yu and Xiao 2004, Chen et al. 2011, Tolunay and Türkoglu 2014); gaining or maintaining a competitive advantages over their counterparts (Chen et al. 2011, Montague 2011, Bowers et al. 2012); increasing customer awareness (Chen et al. 2011, Montague 2011); and enhancing CSR (Chen et al. 2011), corporate image, recognition, and reliability (Chen et al. 2011, Faggi et al. 2014, Paluš and Kaputa 2009) as reasons for adopting certified forest products.

4.3.2 Perceived Challenges to Adopting Forest Certification

Six housing developers reported that they were uncertain whether they would use CoC certified wood floorings in the future. Five of them mentioned that the high price of CoC certified wood floorings was a primary challenge. Cost concerns were followed by a lack of supply and low awareness of forest

Table 3. Housing developers' perceived important properties of flooring products.

Perceived benefit	Number of housing developers					
	In total		With experience using CoC certified wood flooring		Without experience using CoC certified wood flooring	
Price	12/17	71%	2/5	40%	10/12	83%
Quality	10/17	59%	4/5	80%	6/12	50%
Brand	2/17	12%	0/5	0%	2/12	17%
Design	2/17	12%	0/5	0%	2/12	17%
Eco-friendly	6/17	35%	3/5	60%	3/12	25%
Service	0/17	0%	0/5	0%	0/12	0%

certification on the part of both end users and the company's management groups. Other reasons were lack of government support, shortage of certified products from cooperative manufacturers, and low-price premiums. Bowers et al. (2012) pointed out that certified raw material supply, market awareness, and certification costs were the main constraints for Chinese manufacturers in adopting certified wood products. Housing developers are considered to have the same challenges as wood product manufacturers for adopting certified wood products.

This study then analyzed the perceived important properties of the flooring that influenced purchase decisions (Table 3). Eco-friendly properties and quality of the flooring (e.g., durability) were the two most important properties for housing developers who had used the certified wood flooring. By contrast, price and quality were perceived as the most important properties by housing developers who had not used wood flooring. This suggests that the higher price of the CoC certified products would be a major challenge for the housing developers who had not used CoC certified wood floorings.

4.4 Gap between Manufacturers and Housing Developers in Perceived Benefits of CoC Certification

Manufacturers expected to gain price premiums from foreign markets, but they had lower expectations from the domestic market (Table 4). Previous studies have indicated high price premiums for forest certification in North America and Europe (Grönroos and Bowyer 1999, Jensen et al. 2003, Kruger 2010, Thompson et al. 2010, Cai and Aguilar 2013) and those

are major export markets for Chinese wood flooring manufacturers (Roe 2015). Additionally, Bower et al. (2012) showed that FSC's market-related benefits are not recognized by Chinese manufacturers because of low public awareness in the domestic market.

Housing developers expected to gain price premiums from domestic end users through the use of certified products in their houses (Table 4). This expectation might be attributed to customer segmentation strategies implemented by housing developers. Most finished houses in China are concentrated in major cities (Hernández 2016, CRECC 2019). The 10 largest provinces and cities in term of the supply of finished houses reached a total of 1.82 million units in 2018 (CRECC 2019). The top four provinces, Guangdong, Jiangsu, Zhejiang, and Shan-dong, have high population densities and high per capita GDP (NBSC 2017). Thus, residents' economic ability is considered as a key incentive for developing finished houses. As long as end users intend to buy and pay a price premium for environmentally friendly houses, housing developers would be expected to increase the utilization of certified building materials.

Wood flooring manufacturers ranked "support sustainable forestry and protect the environment" and "meet CSR goals," which indicate the social and environmental benefits of forest certification, in second and third place, respectively. This was higher than the items on achieving economic benefits in the domestic market (Table 4). This finding aligned with Bowers et al. (2012), which suggested that the Chinese government had decreased its focus on the economic benefits of forest certification, but was increasingly encouraging wood products manufac-

Table 4. Mean values of perceived benefits of forest certification indicated by manufacturers and housing developers.

Items	Manufacturer	Housing developers
Support sustainable forestry and protect the environment	6.29	5.36
Meet CSR goals	6.14	5.09
Build an environmentally friendly corporate image and attract more investors	5.43	5.36
Gain financial aids (e.g., tax and loan)	5.43	3.41
Achieve product differentiation	5.14	5.73
Achieve price premiums from domestic market	4.29	5.45
Acquire new consumers from domestic market (e.g., green consumer)	5.29	5.82
Meet foreigner customers' purchasing requirements	6.43	—
Gain access to new market (e.g., EU and USA)	6.00	—
Achieve price premium from export market	5.57	—
Meet housing developers' purchasing requirements	5.29	—
Meet domestic end users' purchasing requirements	5.00	—
Reduce operating costs through developing green technologies	4.71	—
Brand the house with high-end image	—	5.64
Achieve green building certification (e.g., LEED)	—	4.93
Obtain government's affordable housing project	—	4.00
Obtain a longer payable period from manufacturers	—	3.27

Note: The responding manufacturers and housing developers measured items on a 7-point Likert scale, with "7" indicating "strongly agree" and "1" indicating "strongly disagree."

turers to place a high priority on environmental and social interests, such as the manufacturer's public reputation and employment.

Wood flooring manufacturers regarded CoC certification as a tool to gain market access to foreign markets, especially North American and European countries (Yu and Xiao 2004, Chen et al. 2011, Tolunay and Türkoglu 2014). The items "meet foreigner customers' purchasing requirements" and "gain access to new market (e.g., EU and USA)" were ranked first and fourth, respectively, among the perceived benefits of forest certification.

However, housing developers perceived the CoC certification differently. They expected to gain direct economic benefits and competitive advantages through the use of certified products in their houses. The items "acquire new consumers (e.g., green consumers)," "achieve product differentiation," "brand the house with high-end image," and "achieve price premiums" were ranked by housing developers as the top benefits (Table 4).

The largest gap between manufacturers and housing developers appeared with the item "gain financial aids (e.g., tax and loan)." Manufacturers

perceived financial aids, such as tax incentives and loans, to be an incentive to obtain a CoC certification (Table 4). Chinese government subsidies, such as export tax rebate and low-cost land use rent, have provided Chinese manufacturers significant support in obtaining forest certification to expand their international market share (Nie 2007, Cao et al. 2011). Thus, manufacturers might expect similar financial aid for domestic production from the government. However, housing developers have rather low expectations of financial aid from the government (Table 4). The Chinese government released a series of policy incentives (e.g., the "green credit guideline" and the "guidance on building green financial system") to encourage housing developers to promote green building programs (MEEC 2010, Wang et al. 2019). The green building program encourages housing developers to expand the use of environmentally friendly products, including certified products in their properties (Cao 2011). However, those financial aids have not yet been directed to the use of certified products in the finished houses.

Both manufacturers and housing developers rated "achieve product differentiation" as being important,

with mean ratings of over 5 points (Table 4). This response revealed that gaining competitive advantage associated with forest certification had been acknowledged by wood floorings manufacturers, as well as housing developers.

Moreover, the results showed that both manufacturers and housing developers perceived a benefit from expanding domestic market shares associated with forest certification; the items of “maintain or gain domestic market shares” and “acquire new consumers (e.g., green consumers)” were rated more than 5 points (Table 4). This finding confirmed that housing developers' interest in the widespread use of certified products was rooted in a concern for direct economic gains, along with other highly ranked economic benefits, such as “brand the house with high-end image” and “achieve price premiums.”

5. Conclusion

The adoption of forest certification was motivated by wood flooring manufacturers seeking to improve access to foreign markets. The manufacturers had fewer motivations for expanding CoC certified wood floorings for the domestic market in China than for the export market because of low public awareness among Chinese consumers, compared with the awareness of consumers in Europe or the USA.

Conversely, this study showed a strong demand for certified products, including flooring, from housing developers that induced the wood flooring manufacturers to produce CoC certified wood floorings for the expanding domestic market shares and the export market.

This study suggests that forest certification is an effective tool whereby manufacturers can satisfy housing developers' environmental requirements for their houses, and it can create a better relationship between manufacturers and housing developers.

The most critical property of wood flooring is its aesthetics. The most attractive wood species are relatively scarce, and their high economic value becomes a driver for conducting illegal logging. To prevent this, forest certification schemes should be expanded. The current Chinese housing developers' marketing strategies could encourage CoC certified wood floorings, which would eventually mitigate ongoing global environmental and economic issues.

Finally, the results of this study should be used carefully when trying to generalize about marketing strategies for wood flooring manufacturers and housing developers in China because the data in this study were obtained through non-probability sampling and the sample size is very small, compared to the total number of flooring manufacturers and housing developers there.

6. References

- Aguilar, F. X. & Vlosky, R. P. (2007). Consumer willingness to pay price premiums for environmentally certified wood products in the US. *Forest Policy and Economics*, 9(8): 1100–1112. doi.org/10.1016/j.forpol.2006.12.001.
- Anderson, R. C. & Hansen, E. N. (2004). The impact of environmental certification on preferences for wood furniture: A conjoint analysis approach. *Forest Products Journal*, 54(3): 42–50.
- Asif, M., Muneer, T. & Kelley, R. (2007). Life cycle assessment: A case study of a dwelling home in Scotland. *Building and Environment*, 42(3): 1391–1394. doi.org/10.1016/j.buildenv.2005.11.023.
- Bamberg, S. & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of proenvironmental behaviour. *Journal of Environmental Psychology*, 27(1): 14–25. doi:10.1016/j.jenvp.2006.12.002
- Bowers, T., Eastin, I. Ganguly, I., Cao, J. & Seol, M. (2012). Forest certification in Asia: The changing marketplace for value-added wood product manufacturers in China and Vietnam. *The Forestry Chronicle*, 88(5): 578–584. doi:10.5558/tfc2012-109.
- Bryman, A. (2012). *Social Research Methods* (4th ed.). Oxford: Oxford University Press.
- Cai, Z. & Aguilar, F. X. (2013). Meta-analysis of consumer's willingness-to-pay premiums for certified wood products. *Journal of Forest Economics*, 19(1): 15–31. doi: 10.1016/j.jfe.2012.06.007.
- Callegaro, M., Baker, R., Bethlehem, J., Göritz, A., Krosnick, J. & Lavrakas, P. (eds). (2014). *Online Panel Research: A Data Quality Perspective*. Chichester, UK: Wiley.
- Cao, X. (2011). Does it pay to be green? An integrated view of environmental marketing with evidence from the forest products industry in China. Doctoral dissertation. University of Washington, Seattle, WA, USA.
- Cao, X., M. Seol, & I. Eastin. (2011). An overview of forest certification in China: Benefits and constraints. In: *Proceedings of the 3rd International Scientific Conference on Hardwood Processing, USA*. pp. 169–196.
- DCCC. (2019). Direct China Chamber of Commerce. Chinese importers for quality wood flooring – China flooring market. Retrieved October 23, 2020, from <https://www.dcccchina.org/news/chinese-importers-for-quality-wood-flooring-china-flooring-market/>

- Chen, J., J. L. Innes, & R. A. Kozak. (2011). An exploratory assessment of the attitudes of Chinese wood products manufacturers towards forest certification. *Journal of Environmental Management*, 92(11): 2984–2992. doi:10.1016/j.jenvman.2011.07.012.
- CRECC. (2019). CRECC Full Decoration Council. Industry report of finished house in China 2019. Retrieved August 20, 2020, from: <http://www.quanzhuanglian.com/index.php?s=/new/index/g/c/id/420.html>
- CREA. (2020). Evaluation and research report of top 500 China real estate. China Real Estate Association. Retrieved from <http://www.fangchan.com/zt/top500/2020sj/index.html>
- CNFPIA. (2018). China National Forest Products Industry Association. Sales of wood flooring in China. Retrieved July 20, 2020, from <http://www.cnfpia.org/>
- Drozdhenko, R., Jensen, M. & Coelho, D. (2011). Pricing of green products: Premiums paid, consumer characteristics and incentives. *International Journal of Business, Marketing, and Decision Sciences*, 4(1): 106–116.
- EC. (2010). Regulation (EU) No. 995/2010 of the European Parliament and of the council of 20th October 2010 laying down the obligations of operators who place timber and timber products on the market. *OJ*. 295: 23–34. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32010R0995>
- EFI. (2012). All you need to know about the US Lacey Act, the EU Timber Regulation, and the Australian Illegal Logging Prohibition Act 2012. Retrieved from <http://www.euflegt.efi.int/documents/10180/23025/All+you+need+to+know+about+the+US+Lacey+Act%2C%20the+EU+Timber+Regulation+and+the+Australian+Illegal+Logging+Prohibition+Act+2012/b30e8b52-f093-448d-be57-9ae7677259f1>
- European Parliament. (2021). Question for written answer E-005452/2021. Subject: Russia stopping log exports to China and the situation in the EU and France (8 December 2021). Retrieved from https://www.europarl.europa.eu/doceo/document/E-9-2021-005452_EN.html#ref1
- Faggi, A.M., Zuleta, G.A., & Homberg, M. (2014). Motivations for implementing voluntary environmental actions in Argentine forest companies. *Land Use Policy*, 41: 541–549. <http://dx.doi.org/10.1016/j.landusepol.2014.04.011>.
- FSC. (2015). Market info pack 2015. Retrieved from <https://ca.fsc.org/download.fsc-market-info-pack-2015.729.htm>
- FSC. (2019). Forest stewardship council facts and figures. Retrieved from <https://ic.fsc.org/en/facts-and-figures>
- Fuchigami, Y., Kimura, Y., Komata, H., Sasaki, F. & Furuta, Y. (2015). Economic Repercussions of Using Local Wood Products for Public Buildings Discussion of a case for Kyoto prefecture. *Mokuzai Gakkaishi*, 61(5): 326–334. doi.org/10.2488/jwrs.61.326.
- Furumi, K. (2014). Chugoku muke kougyouka juutaku (Industrial housing for China). *Toshi-juutaku-gaku*, 84: 37–40. doi.org/10.11531/uhs.2014.84_37.
- Griscom, B. W., Adams, J., Ellis, P. W., Houghton, R. A., Lomax, G., Miteva, D. A., Schlesinger, W. H., Shoch, D., Siikamäki, J. V., Smith, P., Woodbury, P., Zganjar, C., Blackman, A., Campari, J., Conant, R. T., Delgado, C., Elias, P., Gopalakrishna, T., Hamsik, M. R., Herrero, M., Kiesecker, J., Landis, E., Laestadius, L., Leavitt, S. M., Minnemeyer, S., Polasky, S., Potapov, P., Putz, F. E., Sanderman, J., Silvius, M., Wollenberg, E. & Fargione, J. (2017). Natural climate solutions. *PNAS*, 114(44): 11645–11650. doi.org/10.1073/pnas.1710465114
- Grönroos, J. & Bowyer, J. (1999). Assessment of the market potential for environmentally certified wood products in new homes in Minneapolis/St. Paul and Chicago. *Forest Products Journal*, 49(6): 28–34.
- Hernández, M. (2016). China city tiers. South China Morning Post. Retrieved June 9, 2020, from <https://multimedia.scmp.com/2016/cities/>
- Hoare, A. (2015). *Tackling Illegal Logging and the Related Trade: What Progress and Where Next?* Chatham House, The Royal Institute of International Affairs, London. Retrieved from <https://www.chathamhouse.org/2015/07/tackling-illegal-logging-and-related-trade-what-progress-and-where-next>
- IWMG. (2006). The solid wood products outlook 2006 to 2010: A global market perspective with a detailed analysis of North America. International Wood Markets Group Inc. (IWMG). Vancouver, B.C.
- Jensen, K., Jakus, P., English, B. & Menard, J. (2003). Market participation and willingness to pay for environmentally certified products. *Forest Science*, 49(4): 632–641.
- JFWIA. (2017). Timber industry, timber trade and timber legality in China. Japan Federation of Wood Industry Associations (JFWIA). Retrieved from https://www.rinya.maff.go.jp/j/riyou/goho/jouhou/pdf/h28/h28report_china1.pdf.
- Kawamura, S., & Inoue, M. (2020). Economic Impacts of Increases in Domestic Timber Utilization in Wooden Framework for Residential Construction. *Mokuzai Gakkaishi*, 66(1): 23–30. doi.org/10.2488/jwrs.66.23.
- Komata H., Kato, Y., Ohashi, Y., Ishikawa, Y., Ishikawa, S. & Yamamoto, N. (2012). Economic Repercussion Effects Using Local Wood Products for Wood Frame Construction in Hokkaido. *Mokuzai Gakkaishi*, 58(4): 209–215. doi.org/10.2488/jwrs.58.209.
- Kruger, C. R. (2010). Public preferences for SFM: Case studies in tenure policy and forest certification. Master's thesis. University of Alberta, Edmonton, AB, Canada. doi:10.7939/R3K13M
- Li, V. (2011). A methodology to assess the competitiveness of real estate developers in China. Doctoral dissertation. Queensland University of Technology, Brisbane City, QLD, Australia.
- Li, L., Morinaga, R. & Kobayashi, H. (2017). A comparative study on the condominium housing and cooperative housing in China. The cases of condominium housing in Changsha China, "Lixiangjiayuan" and "Guanshan-yanyue." *Journal of Architecture and Planning (Trans-*

- actions of AII*), 82(740):2469–2478. doi.org/10.3130/aija.82.2469.
- Liu, R., Li, X. & Zhang, Y. (2016). Analysis of consumers' willingness to pay for wood floor products with forest certification. *Resource Development and Market*, 32:453–458.
- Liu, Y., Tian, M. & Ruan, F. (2007). Investigate and analysis on the consumer willingness to pay for products of forest certification. In: *Proceeding of the 2nd Chinese Forum of Forest Economic Development Theory and Practice*, Society of Technology Economics, Fuzhou, China. pp. 82–85.
- Luo, D., Zhang, Z., Chen, Y. & Gu, S. (2017). Research on the identification and consumption tendency of green wood process. *China Forest Economics*, 2:26–31.
- McIlhenney, K. & R. Hayter. (2014). Sustaining jobs and environment? The value-added wood industry in Metro Vancouver, British Columbia. *Local Environment*, 19(6): 605–625. doi:10.1080/13549839.2013.854755
- MEEC. (2010). National conference on environmental science and technology 2010. Ministry of Ecology and Environment of China (MEEC). Retrieved July 1, 2020, from http://www.mee.gov.cn/gkml/sthjbgw/qt/201004/t20100419_188337_wh.htm
- MIIT & MOHURD. (2015). The action plan for promoting the production and application of green building materials No. 309. Ministry of Industry and Information Technology (MIIT) and the Ministry of Housing and Urban-Rural Development (MOHURD). Retrieved from https://www.gov.cn/zw/gk/2013-01/06/content_2305793.htm.
- MOHURD. (2017). Building industry development of the 13th Five-Year plan. Ministry of Housing and Urban-Rural Development of China. Retrieved from http://www.gov.cn/xinwen/2017-05/04/content_5190836.htm.
- Montague, I. B. (2011). Understanding chain-of-custody certification in the Appalachian hardwood region: primary manufacturers' practices and perceptions. In: *Proceedings of the 17th Central Hardwood Forest Conference, Pennsylvania, USA*. pp. 607–616.
- National Bureau of Statistics. (2017). Issuing the measures for classification of large, medium, small and miniature enterprises for the purpose of statistics. Retrieved from http://www.stats.gov.cn/tjsj/tjbz/201801/t20180103_1569357.html.
- National Bureau of Statistics. (2019). General profile of the real estate market in China. Retrieved from <http://www.stats.gov.cn/tjsj/ndsj/2019/indexch.htm>
- National Geographic. (2012). Greendex 2012: Consumer choice and the environment—a worldwide tracking survey. Retrieved from <https://globescan.com/2012/07/13/greendex-2012-consumer-choice-and-the-environment-a-worldwide-tracking-survey-full-report/>
- NBSC. (2017). National data of the production of wood and wood products. National Bureau of Statistics of China (NBSC). Retrieved from <http://www.stats.gov.cn/tjsj/ndsj/>
- Nie, Y. (2007). *Chinese Forest Product Circulation Market and Trade*. Beijing: Forestry Press.
- Overdeest, C. & Rickenbach, M. G. (2006). Forest certification and institutional governance: An empirical study of forest stewardship council certificate holders in the United States. *Forest Policy and Economics*, 9:93–102. doi:10.1016/j.forpol.2005.03.014
- Paluš, H. & Kaputa, V. (2009). Survey of attitudes towards forest and chain of custody certification in the Slovak Republic. *Drewno: prace naukowe, doniesienia, komunikaty*, 52: 65–81.
- Peattie, K. & Crane, A. (2005). Green marketing: Legend, myth, farce or prophesy? *Qualitative Market Research: An International Journal*, 8(4): 357–370. doi:10.1108/13522750510619733.
- PEFC. (2020). *PEFC Global Statistics*. Programme for the Endorsement of Forest Certification (PEFC). Geneva: PEFC International. Retrieved from <https://cdn.pefc.org/pefc.org/media/2020-08/d48bcf2b-562f-4feb-bde6-e5a6316ec7c1/5948cc30-e0ea-59bd-b3bc-6dabbb108685.pdf>.
- PEFC. (2022). China Forest Certification Council (CFCC). Programme for the Endorsement of Forest Certification. Retrieved from <https://www.pefc.org/discover-pefc/our-pefc-members/national-members/china-forest-certification-council-cfcc>.
- Räty, T., Lindqvist, D., Nuutinen, T., Nyrud, A. Q., Perttula, S., Riala, M., Roos, A., Tellnes, L. G. F., Toppinen, A. & Wang, L. (2012). In: *Proceeding of Communicating the Environmental Performance of Wood Products*. Working Papers of the Finnish Forest Research Institute 230.
- Roe, B. (2015). The influence of timber legality regulations on Chinese and Vietnamese wood products manufacturers. Master's thesis. University of Washington, Seattle, WA, USA.
- Sathre, R., O'Connor, J. (2010). Meta-analysis of greenhouse gas displacement factors of wood product substitution. *Environmental Science & Policy*, 13(2): 104–114. doi.org/10.1016/j.envsci.2009.12.005.
- Schloenhardt, A. (2008). *The Illegal Trade in Timber and Timber Products in the Asia-Pacific Region*. Australian Institute of Criminology Research and Public Policy Series, no. 89. Canberra, ACT: Australian Institute of Criminology. Retrieved from <https://core.ac.uk/download/pdf/30687625.pdf>.
- SFA (2017). The State Forestry Administration of China. China forestry development report 2000-2017. Retrieved November 27, 2020, from <http://www.forestry.gov.cn/>
- Statista. (2020). Floor covering of China. Retrieved November 13, 2020, from <https://www.statista.com/outlook/17070000/117/floor-covering/china#market-revenue>
- Taherdoost, H. (2019). What Is the Best Response Scale for Survey and Questionnaire Design; Review of Different Lengths of Rating Scale / Attitude Scale / Likert Scale. *International Journal of Academic Research in Management* 8(1): 1–10.

- Tan, Q., Imamura, K., Nagasaka, K. & Inoue, M. (2019). Effects of an eco-label knowledge on Chinese consumer preferences for certified wood flooring: A case study in Chongqing City. *Forest Products Journal*, 69(19): 1–9. doi:10.13073/FPJ-D-19-00017.
- Tan, Q., Imamura, K., Nagasaka, K. & Inoue, M. (2020). Consumer Price Premiums for FSC-Labelled Wood Flooring: A Comparison of Five Chinese Cities. *Bioproducts Business*, 5(2): 13–24. doi.org/10.22382/bpb-2020-002.
- Thompson, D., Anderson, R., Hansen, E. & Kahle, L. (2010). Green segmentation and environmental certification: Insights from forest products. *Business Strategy and the Environment*, 19: 319–334.
- Thøgersen, J. (2004). A cognitive dissonance interpretation of consistencies and inconsistencies in environmentally responsible behavior. *Journal of Environmental Psychology*, 24(1): 93–103. doi:10.1016/S0272-4944(03)00039-2.
- Till, Y. & Matei, A. (2016). Basics of sampling for survey research. In: *The SAGE Handbook of Survey Methodology*, ed. C. Wolf, D. Joye, T. Smith & Yang-chih Fu. Los Angeles, CA: SAGE Publications Ltd, pp. 311–328. doi.org/10.4135/9781473957893.
- Tolunay, A., & T. Türkoglu. (2014). Perspectives and attitudes of forest products industry companies on the chain of custody certification: A case study from Turkey. *Sustainability*, 6(2):857–871. doi:10.3390/su6020857.
- UNECE/FAO. (2011). Forest Products Annual Market Review 2010–2011. Geneva Timber and Forest Study Paper 27. Geneva: United Nations Economic Commission for Europe (UNECE)/Food and Agriculture Organization of the United Nations (FAO). Retrieved from https://www.unece.org/fileadmin/DAM/publications/timber/FPAMR_2010-2011_HQ.pdf
- USDA. (2013). *Lacey Act Primer and Updates*. United States Department of Agriculture Animal and Plant Health Inspection Service. Plant Protection and Quarantine. Washington, DC: USDA. Retrieved from https://slidelegend.com/lacey-act-primer-and-updates-usda-aphis_59ce8c7d1723dd405b488f0d.html.
- Vehovar, V., Toepoel, V. & Steinmetz, S. (2016). Non-probability sampling. In *The SAGE Handbook of Survey Methodology*, ed. C. Wolf, D. Joye, T. Smith & Yang-chih Fu. Los Angeles, CA: SAGE Publications Ltd, pp. 329–345. doi.org/10.4135/9781473957893.
- Vidal, N., Kozak, R. & Cohen, D. (2005). Chain of custody certification: An assessment of the North American solid wood sector. *Forest Policy and Economics*, 7: 345–355.
- Wakita, T., Ueshima, N., & Noguchi, H. (2012). Psychological Distance Between Categories in the Likert Scale: Comparing Different Numbers of Options. *Educational Psychological Measurement* 72(4):533–546. doi: 10.1177/0013164411431162.
- Wang, J., Xu, Z., Zheng, Q. & He, S. (2011). Analysis on the consumer willingness to pay for products of forest certification. *Money China*, 6: 121–122.
- Wang, J. (2013). Research on the adaptability and strategy of FSC-COC certificate in Chinese furniture industry. Doctoral dissertation. Nanjing Forestry University, China.
- Wang, F., Yang, S., Reisner, A., & Liu, N. (2019). Does green credit policy work in China? The correlation between green credit and corporate environmental information disclosure quality. *Sustainability*, 11(3). doi:10.3390/su11030733
- Wong, V., Turner, W., & Stoneman, P. (1996). Marketing strategies and market prospects for environmentally-friendly consumer products. *British Journal of Management*, 7(3): 263–281. doi:10.1111/bjom.1996.7.issue-3.
- Wymer, W. & Polonsky, M. J. (2015). The Limitations and Potentialities of Green Marketing. *Journal of Non-profit & Public Sector Marketing*, 27(3): 239–262. doi: 10.1080/10495142.2015.1053341
- Yu, S., & S. L. Xiao. (2004). Forest certification and woody product market in China. *Forest Engineering*, 2: 6–8.
- Yu, S., Evans, M. & Shi, Q. (2014). Analysis of the Chinese Market for Building Energy Efficiency. Pacific Northwest National Laboratory Report PNNL-22761. Oak Ridge, TN: U.S. Department of Energy. Retrieved from https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22761.pdf.
- Zhang, X. (2008). An analysis of the supply chain in China's wood flooring industry. Master's thesis. Zhejiang University of Technology, China. Retrieved from <https://cdmd.cnki.com.cn/Article/CDMD-10337-2009216362.htm>