

Chinese Consumers' Attitudes Toward Certified Wood Products

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Abstract

While environmental nongovernmental organizations (NGOs) have been active in China in promoting forest certification, Chinese consumers' perceptions of certified wood products in the marketplace are unclear. A survey focused on consumers' wood-product consumption patterns was conducted in three cities—Beijing, Guangzhou, and Shanghai—from July to August 2015. This study used data from the survey to assess urban Chinese consumers' attitudes toward certified wood products and the demographic differences affecting these attitudes. Regression analysis was conducted to test whether consumers' social-economic characteristics link with their attitudes toward certified wood. We found mixed correlations between these consumers' attitudes and their demographics and positive correlations between their attitudes and exposure to environmental campaigns and environmental education. The results from this study will improve the understanding of Chinese consumers' attitudes toward certified wood products and help producers and marketers better understand the market potential for certified products and more efficiently meet consumers' needs. This study will also help NGOs interested in conservation to develop their future programs in China.

Environmental issues have become increasingly relevant in selecting wood products, and there are increasing concerns about the production, markets, and disposal of wood products (Gan et al. 2008). With consumers' increased concern over environmental impacts, the wood products industry feels increasing pressure to offer more environmentally friendly products (Aguilar and Vlosky 2007). Some market-based tools have been created to meet these market needs for sustainability, e.g., forest certification. Forest certification is a tool by which an independent third party evaluates and determines whether forest management satisfies pre-established ecological, economic, and social standards and verifies it through a written document, i.e., a certificate (Kozak et al. 2004, Panico et al. 2018). In the early 1990s, forest certification was created initially to address concerns in Europe about deforestation and forest degradation in the tropics. Over time, the scope of certification has expanded globally to cover temperate and tropical forests in other regions (Rametsteiner and Simular 2003). A group of NGOs and commercial companies have actively promoted forest certification schemes in the main forest product-producing and consuming countries, including China (Aguilar and Vlosky 2007, FSC 2014, Meidinger et al. 2003, Trishkin et al. 2014, PEFC 2015).

These certification schemes were designed with hopes that companies may consider forest certification a marketing tool to boost their public image (Ratnasingam et al. 2008, Chen

et al. 2011), and consumers may use it to evaluate their environmental and sustainability impacts when making purchase decisions (Espinoza et al. 2012). The former goal has been successful in many markets. For example, in China many forest product manufacturers have obtained forest certification, and their production activities have been certified. Certified wood flooring and furniture have become more readily available in the marketplace. By 2020, more than 9,000 Chinese enterprises had received Forest Stewardship Council Chain of Custody (FSC CoC) certification—more enterprises than any other country (World Economic Forum 2022). By June 2022, over one million hectares of forests in China have been certified by the Program for the Endorsement of Forest Certification

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(PEFC), and 472 Chinese enterprises have received the PEFC CoC certification (PEFC 2022). But it is unclear how well the forest certification has resonated with consumers (Rametsteiner and Simula 2003, Panico et al. 2018). Previous literature on consumers' attitudes toward certified wood products has primarily focused on developed countries (e.g., Anderson and Hansen 2004, Kozak et al. 2004, Hansmann et al. 2006, Ralf et al. 2006, Aguilar and Vlosky 2007, Gan et al. 2008, Paluš 2009, Yamamoto et al. 2014, Michal et al. 2019, Panico et al. 2022). Few studies have examined Chinese consumers' environmental awareness related to purchasing behavior, but these were either in broader terms, e.g., 'eco,' 'green,' 'environment-friendly,' etc. (e.g., Chan 2001, HKTDC 2015, Wan et al. 2015), or were focused on particular types of wood product, regions, or other attributes (e.g., Tan et al. 2019, 2020).

Environmental awareness among Chinese consumers has been increasing, and socially responsible behavior is now more common in China. According to a Hong Kong Trade Development Council (HKTDC) survey, increasing mid-to-high income and children's furniture consumers choose to embrace new living concepts, such as the "eco home." It also reported that over 90 percent of the respondents are interested in using green, eco-friendly materials and are willing to pay a premium of 14 percent on average to purchase products made of green materials (HKTDC 2015). WildAid, an NGO whose mission is to end the illegal wildlife trade, aggressively raised awareness about the market for shark fin soup through focused advertisements. WildAid worked with media network partners in China to broadcast "Say No to Shark Fin" campaign messages via television, and other media outlets, including video boards in subway and train stations, airports, and university campuses. The campaigns, in combination with government bans at official events, have contributed to a 50 percent to 70 percent decrease in China's shark fin consumption (WildAid 2014).

Although this is encouraging news, when considering certified wood products this situation seems to be different. A survey revealed that consumers have a strong preference for "eco," "green," and "environment-friendly" furniture, such as odor-free and formaldehyde-free products, even though, in many cases, prices of such furniture are higher (HKTDC 2015). This suggests that in China, consumers are more likely to associate environment-friendly with human health than with sustainable forest management. Wan et al. (2015) further confirmed this notion by revealing that Chinese consumers consider odorless and nonpoisonous the top two crucial attributes of eco-friendly furniture. Nonetheless, a case study (Tan et al. 2019) found that the knowledge of the FSC positively affected consumers' purchase intention and price premium for wood flooring in Chongqing, a city in Southwest China.

We are interested in whether wood product consumers will likely shape their purchasing behavior to protect the environment via forest certification. Therefore, it is essential to know to what extent consumers understand forest certification and what demographic factors contribute to differences in consumers' attitudes and buying practices.

When we drafted this paper, there had not been a study focusing on Chinese consumers' perceptions of forest certification, and to fill the gap, this research presents a profile of urban Chinese consumers of furniture and fixtures, examining their demographics, environmental awareness, and perceptions of forest certification (awareness and willingness to pay premiums).

Furthermore, we are also interested in how demographic variables affect the consumers' perception of forest certification. Previous studies reported inconsistent associations of age, education, and income level (Bigsby and Ozanne 2002, Aguilar and Vlosky 2007, Mohamed and Ibrahim 2007, Gan et al. 2008) on buying preferences or paying a premium for certified wood products. This paper incorporates the two perception measures to provide more observations to the existing literature. It will also help stakeholders (e.g., the environmental protection and sustainability NGOs) to better develop their future engagement in China and improve the efficiency of the wood products industry's marketing strategies.

Methodology

The purpose of this study is to better understand Chinese consumers' attitudes toward certified wood products, such as wood floorings and wood furniture, and to explore any demographic difference contributing to such attitudes. A consumer's attitude toward certified wood products involves both awareness and acceptance. In this study, awareness is defined as the degree to which an individual understands forest certification when he or she purchases wood products. Acceptance is equivalent to willingness to pay, i.e., an individual's stated readiness to spend more on certified products than he/she would spend on the same product that is not certified. Chan (2001) suggested that consumers' indication of their intention to purchase green products can be used as a predictor of green purchasing behavior.

Consumers' attitudes toward certified wood products can be influenced by demographic factors. Previous studies showed that the environmentally conscious consumer tends to be better educated and have higher income (or socio-economic status; Gan et al. 2008). Consumers with higher education have better knowledge and stronger awareness of environmental protection and influences on lifestyles (Wan et al. 2015). Some studies reported that females are more pro-environment and willing to pay more for environment-friendly products than were males (Mohamed and Ibrahim 2007). Gan et al. (2008) reported that gender, income, ethnic, and number of children have no effect on the probability of consumers' green purchasing decision in New Zealand. Mohamed and Ibrahim (2007) revealed the influence of education, household income level, and ethnicity on consumers' willingness to pay increased prices for certified wood products. Nevertheless, as Aguilar and Vlosky (2007) suggested, it can be hypothesized that the more affluent and educated consumers are, the more willing they are to pay a premium for certified wood products. There have been mixed results when examining the effect of age and education level on the buying preferences or paying a premium for certified wood products (Aguilar and Vlosky 2007). Previous literature (e.g., Mohamed and Ibrahim 2007) indicated that age is not a significant factor that affects consumers' attitudes. However, the case is likely different in China. Environmental education has been growing in China in recent years, which leads to inclusion of environmental certification programs in the primary and high school curriculum. Thus, consumers from younger generations are likely to have more opportunities to learn about environmental issues at school, thus becoming more aware of certified wood products and willing to pay price premium. Furthermore, consumers' knowledge and exposure to environment-related programs in general can also influence their awareness and acceptance of

Table 1.—A summary of the demographics of respondents in this study.

Items	Beijing		Shanghai		Guangzhou	
	Onsite	Online	Onsite	Online	Onsite	Online
Sample size	519	502	495	502	526	492
Age group (yr of age)						
20–29	18%	28%	29%	25%	23%	49%
30–39	29%	40%	40%	54%	21%	34%
40–49	37%	27%	18%	17%	30%	14%
50–60	16%	5%	13%	4%	26%	3%
Monthly income in CNY						
Under 3,000	4%	5%	4%	5%	16%	17%
3,001–6,000	49%	45%	29%	27%	54%	44%
6,001–8,000	21%	22%	33%	19%	20%	12%
8,001–10,000	16%	15%	21%	29%	9%	19%
10,001–20,000	9%	11%	11%	18%	1%	7%
Above 20,001	1%	2%	2%	2%	0	1%
Education level						
Junior high and below	11%	0	3%	0	2%	2%
High and/or vocational school	42%	5%	29%	6%	50%	11%
Junior college (3 yr)	24%	14%	28%	15%	34%	18%
College (4 yr)	18%	69%	37%	72%	14%	63%
Postgraduate	5%	12%	3%	7%	0	6%

certified wood products. These programs include environmental campaigns using mass media like “Say No to Shark Fin,” and environment classes offered at schools. It is hypothesized that exposure positively influence consumers’ awareness and acceptance of certified wood products. Therefore, we also include two variables: Sharkfin—exposure to “Say No to Shark Fin”; and Envedu—Environment education.

Based on existing research and available data, it is hypothesized that consumers’ awareness and acceptance of certified wood products are influenced by socio-economic characteristics such as income, education, and age, as well as exposure to formal environmental education and environmental activities such as the No Shark Fin campaign. The empirical logit model can be expressed as follows:

$$AW = a + b_1 \times age + b_2 \times age + b_3 \times education + b_4 \times sharkfin + b_5 \times envedu + e$$

$$AC = a + b_1 \times age + b_2 \times age + b_3 \times education + b_4 \times sharkfin + b_5 \times envedu + e$$

where, *AW* represents consumer awareness and *AC* represents acceptance of certified wood products. The independent variables, including age, income, education, Sharkfin, and envedu, are defined in the data section below. *a* is an intercept term, *e* is an error term, and *b_i* (*i* = 1–5) are parameters of interest.

Data

In July and August 2015, Forest Trends, a Washington-based nonprofit organization conducted a wood product consumer survey in China. This study utilizes a partition of data collected

The survey administered a structured questionnaire in the three largest Chinese cities—Beijing, Shanghai, and Guangzhou. These cities were selected for their social and economic importance, and diversified profiles of consumers.

Online shopping has become increasingly popular in recent years as a result of the rapid growth of the internet. In order to capture this trend, the survey was conducted both onsite and online to include both in-store consumers and online shoppers.

Although there is limited literature specifically focused on online shopping for home furnishing and furniture products, much research has been conducted on comparing online and in-store shopping behaviors and the demographic factors that affect shopping preferences. For instance, Punj (2011) found that age plays a significant role in online shopping preferences, with younger individuals being more sensitive to innovations and more likely to use the internet for shopping. Lubis (2018) stated that the higher a shopper’s income, the more likely they are to choose to shop online. In our survey, we anticipate differences between online and onsite shoppers in terms of demographics and their attitudes toward certified wood products. Our hypothesis is that online shoppers are younger and more educated, and therefore will exhibit distinctive attitudes towards certified forest products compared to traditional shoppers.

For the onsite survey, trained research interviewers were positioned at the entrance of the large home-improvement outlets (including B&Q, Easy Homes, IKEA, Oriental Home, and Red Star Macalline). Customers visiting the store were approached consistently (every five shoppers) and asked if they would be willing to participate in a survey. Once the passers-by agreed to participate, the interviewers read out the questions and recorded the shopper’s answers to the questionnaires. The online survey was randomly distributed to registered users in the Netranking online survey database, targeting individuals in the three cities of Beijing, Shanghai, and Guangzhou. Netranking is a commercial survey company based in Beijing.

All participants were anonymous in this survey. The potential participants were asked whether “they have purchased or are considering purchasing wooden furniture or interior wood materials (trim, doors, windows, etc.),” and only those respondents that responded “Yes” would be identified as “consumers,” and the survey continued.

Respondents were asked, “Have you heard of forest certification?” and responses to this question (“Yes” or “No”) were used as “Awareness” (*AW*) in this study.

When participants responded “Yes” to the question above, a follow-up question would be asked, “Are you willing to pay more for certified wood products?” Responses to these questions constituted the variable of “Acceptance” (*AC*) in this study.

The survey collected the participants’ demographic information. From this data set, three social-economic characters were selected as independent variables, i.e., age group (“age”), income level (“income”), and education level (“education”). There were four age groups: 20–29, 30–39, 40–49, and 50–60 years old. The income measure (monthly earnings in May 2015 in CNY, US\$1.00 = CNY6.12 on May 31, 2015) had six levels: under 3,000, 3,001–6,000, 6,001–8,000, 8,001–10,000, 10,001–20,000, and above 20,001. The education level was listed in five categories: completed junior high or less (below), completed high school or vocational school, junior college (3 yr), college (4 yr), and postgraduate. For exposures to environmental campaigns and education, the participants

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Table 2.—The respondents' exposure to environmental campaigns and education.

Items	Beijing		Shanghai		Guangzhou	
	Onsite	Online	Onsite	Online	Onsite	Online
Sample size	519	502	495	502	526	492
Respondents aware of the "Say No to Shark Fin" campaign	74% (384)	86% (432)	80% (396)	84% (422)	43% (226)	76% (374)
Respondents had an environmental education in school	71% (368)	74% (371)	59% (292)	60% (301)	38% (200)	75% (369)

were asked, "Have you heard of the 'Say No to Shark Fin' campaign?" ("Sharkfin"); and "Have you had any environmental classes at school?" ("envedu"). Both these variables are binary.

Results

This section presents a descriptive summary of our samples as a sketch of the urban Chinese wood furniture and fixture consumers (Table 1–3) and the regression results investigating which factors might influence the consumers' attitudes.

Table 1 summarizes the demographic of our sample. There were 3,036 responses with 1,540 onsite samples and 1,496 online samples. The samples were well-balanced among the three cities. The onsite samples comprised 519 from Beijing, 495 from Shanghai, and 526 from Guangzhou; and the online samples contained 502 from Beijing, 502 from Shanghai, and 492 from Guangzhou.

Regarding the four age groups in the survey, almost all localities had a higher proportion from the middle two age groups (30–39 and 40–49) except for the online samples from Guangzhou, where only 48 percent were from these two age groups. Online respondents were generally younger than the onsite ones, especially in Guangzhou, where 49 percent of the online samples were under 30 years old.

Overall, a large share of the respondents had a monthly income between CNY3,000 and CNY10,000. About half of the respondents had a monthly income lower than CNY6,000. Shanghai had a larger share of high-income (above CNY10,000) respondents than the other two cities.

When measuring education level, the online respondents had a higher level of education. Nearly 70 percent of the online respondents completed college (i.e., bachelors) or above, while this number for onsite was 23 percent.

Table 2 presents our observations on the respondents' exposure to environmental campaigns and education. Over 70 percent of the respondents had heard of the "Say No to Shark Fin" campaigns, with a larger share online (82%) than the onsite (65%). Nearly two-thirds of the respondents claimed

they had environmental classes in school (72% in Beijing, 60% in Shanghai, and 56% in Guangzhou).

Table 3 reports the responses to the questions regarding forest certification. During the survey, the respondent was first asked, "Have you heard of forest certification?", and if the answer was "Yes," they were asked, "Will you pay more for certified forest products?" Less than half of all respondents indicated they had heard of forest certification. Of the onsite survey respondents, almost 40 percent had heard of forest certification. Of those respondents that had heard of forest certification, over 60 percent were willing to pay more for certified forest products. Among the online respondents, 47 percent had heard of forest certification; and among these 701 respondents, 88 percent were willing to pay more for certificated products.

A particular price premium was not specified for respondents to select. Instead, they were asked to write down the percentage of the price they were willing to pay as a premium for certification. Most respondents accepted a price premium of 10 percent or below for certified wood products, with a median of 5 percent and a mean of 9.64 percent. Unfortunately, this measure could not be considered for further analysis because of a data matching issue.

Table 4 summarizes the regression results. This analysis was conducted with all samples, onsite samples only, and online samples only. In all six models, the Sharkfin and envedu variables show positive correlations with awareness and acceptance with a significance level of <0.05 . The demographic characteristics' linkages with the attitude measures are not consistent between the two subsets. For example, age positively correlated with both awareness and acceptance within the onsite model, but the correlation was negative in the online model. Education level is not significantly correlated with awareness and acceptance in all models except for all sample models with acceptance, which is positively correlated. Income positively correlates with awareness in the online and all sample models and negatively in the onsite model.

Table 3.—The respondents' knowledge of forest certification and stated willingness to pay at three locations.

Items	Beijing		Shanghai		Guangzhou	
	Onsite	Online	Onsite	Online	Onsite	Online
Sample size	519	502	495	502	526	492
Awareness (Number of respondents aware of forest certification)	263	268	121	263	214	264
Acceptance (Number of respondents willing to pay a premium for certification)	183	223	81	238	97	234

Table 4.—The regression results showing the correlations between two binary dependent variables (Awareness and Acceptance) and five categorical independent variables.

	Age	Income	Education	Sharkfin	envedu
All					
Awareness	−0.06	0.12***	0.02	0.40***	0.53***
Acceptance	−0.20**	0.08	0.25**	0.53**	1.11***
Onsite					
Awareness	0.18**	−0.02	0.12	0.40**	0.45***
Acceptance	0.08	0.14	0.02	0.25*	1.15***
Online					
Awareness	−0.28**	0.28***	−0.10	0.50***	0.66***
Acceptance	−0.52**	0.08	0.09	0.75**	1.04**

^a Significant decoder: * if $0.01 < P < 0.05$, ** if $0.001 < P < 0.01$, and *** if $P < 0.001$.

Discussion and Conclusions

Environmental awareness among Chinese consumers has increased, and socially responsible behavior is now more common in China. Notably, nearly half of the respondents have heard of or know about forest certification, and roughly 30 percent of all the respondents stated their willingness to pay a higher price for certified wood products. Given the nature of survey data, it is hard to ignore that people may have overstated their awareness and willingness to pay. However, with limited existence or access to data on the consumers' revealed preference over these products, our results provide a decent reference profile for consumers' attitudes and show that forest certification has some market potential in the Chinese markets.

We find that consumers with some exposure to other environmental campaigns and education are much higher than the proportion of respondents with awareness of forest certification. This fact indicates that there are still spaces for commercial organizations and NGOs to promote the certification scheme to the public.

Meanwhile, our result revealed that consumers willing to pay for certification in this research would pay an average premium of 9 percent. In contrast, consumers in Hong Kong and Malaysia were willing to pay a premium of 14 percent (Mohamed and Ibrahim 2007, HKTDC 2015). Aguilar and Cai (2010) indicated UK consumers may be willing to pay a 39.3 percent premium for a bedside night table. Directly comparing the figures may not be meaningful, but they suggest a substantial market potential for certified products.

The differences between online and in-person shoppers are intriguing, particularly in light of the rise of e-commerce as a platform for promoting sustainability. Our findings indicate that online shoppers are more conscious of certification and willing to pay for it. Given the popularity of online shopping, it is crucial to conduct further research to gain a better understanding of the purchasing behavior of online shoppers regarding certification. Investigating the effectiveness of promoting sustainability online versus in-shop is also essential because this information will help stakeholders improve their efficiency. Further research is necessary to achieve these goals.

The regional differences we discovered are noteworthy. Notably, the proportion of consumers willing to pay for certification is significantly lower in Shanghai and Guangzhou than in Beijing. One possible explanation for the regional differences in consumer willingness to pay for certification is that Shanghai and Guangzhou may be more market-driven than Beijing. This could mean that consumers in these cities are more focused on the market value of a product and may be less inclined to prioritize environmental concerns when making purchasing decisions. Additionally, consumers in these cities may be less likely to overtly signal their environmental friendliness through their buying habits compared with consumers in Beijing, where there may be a higher likelihood that customers valued environmental sustainability. Alternatively, it may be due to a greater concentration of environmental NGO campaigns in Beijing compared with the other two cities. This guess aligns with the results of a case study conducted in Chongqing, China (Tan et al. 2019), which showed that awareness of the FSC positively affected consumers' purchase intention and willingness to pay premium for certified wood flooring. However, further research would be needed to explore these hypotheses. Despite the limitations of our study, our findings provide

valuable insights into the differences in consumer attitudes toward certification across different regions in China. Our results suggest that consumer awareness and willingness to pay for certification vary significantly across cities, highlighting the importance of targeted marketing strategies and outreach efforts to promote sustainable consumption. The relationship between demographic factors and consumer awareness and acceptance is complex and our result has proven the multifaceted nature of these decisions. Our finding is consistent with previous research, which has shown varying effects of demographic variables on consumer behavior. For instance, Aguilar and Vlosky (2007) observed an age and education level paradox, where these factors positively correlated with willingness to pay premiums for some certified wood products, but negatively for others.

Limitations

Previous research has investigated how consumer perceptions are influenced by factors such as gender, ethnicity, and the number of children (Mohamed and Ibrahim 2007, Gan et al. 2008). However, these variables were not included in our study. We were unable to explore the effects of these factors in our research, but future studies could benefit from examining their impact on consumer behavior and attitudes toward sustainable products. In this article, the profile of a wood product consumer was outlined using a data set obtained from the three largest cities in China. We considered ourselves fortunate to have had access to this data set. However, we acknowledge that it may be challenging to determine the extent to which our findings reflect the situation in China or even in urban areas. Our research was conducted when most environmental organizations were focused only on these large cities, but over time, the consumption patterns in smaller towns have become increasingly important. Understanding the behavior of consumers in these areas is now crucial. Therefore, expanding the scope of our research to a broader range of cities would be highly beneficial.

Although our study has some limitations, it does provide valuable insights into promoting certification awareness and acceptance among Chinese consumers. Our research aimed to identify which consumer groups and localities are most receptive to sustainable products, which can guide future marketing and outreach efforts.

Considering the immense size of the Chinese market and the relatively low level of attention given to sustainable purchasing, the potential impact of our work is significant. Increasing consumer awareness and acceptance of certification for wood products might potentially have far-reaching environmental and social benefits.

Overall, our study contributes to the growing body of research on sustainable consumption in China and underscores the importance of promoting certification awareness and acceptance among consumers. We hope that our findings can inform future initiatives aimed at promoting sustainable sourcing practices and improving the overall sustainability of the wood products industry in China.

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