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https://doi.org/10.5109/6770296

出版情報：九州大学大学院農学研究院紀要. 68 (1), pp.91-100, 2023-03. 九州大学大学院農学研究院
バージョン：
権利関係：

J. Fac. Agr., Kyushu Univ., **68** (1), 91–100 (2023)

Estimating Willingness to Pay for Switching to Bring Shopping Bags in Vietnam

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(*Received October 26, 2022 and accepted November 2, 2022*)

This study aims to estimate the factors affecting consumers' willingness to pay (WTP) plastic bag fees that make them agree to carry their own bags during shopping in Vietnam. Structural Equation Modelling (SEM) was applied to determine the meaningful relationship between WTP and Attitude (AT), Subjective norms (SN), Perceived behavior (PB), and Eco–Literature (EL). The survey was conducted online using a structured questionnaire through nationwide social media distribution. The main findings indicate that three latent variables AT, SN, and PB have insignificant effects on WTP. Only EL had a significant relationship with WTP. More precisely, in this relationship, the responses of environmentally aware women were stronger than those of men who agreed to bring their bags. Additionally, the fee that could affect consumers' behavior toward reducing plastic bags was found to be at least 850.5 dong/bag (≈ 0.04 USD). This research contributes valuable evidence for the policymakers to complete Directive No. 33 which would issue a fee for plastic bags in the future. Besides, the research also provides better knowledge of consumers for using shopping bags.

Key words: Contingent Valuation Method, plastic bag, Structural Equation Modelling, Theory of Planned Behavior, willingness to pay

INTRODUCTION

Invented in 1965, plastic bags have rapidly become the global products (UNEP, 2018), bringing outstanding economic growth because of the benefits such as low cost, super light, waterproofness, chemical resistance, and anti–rust features (Sanghi, 2008). However, few consumers have realized that these petroleum–based plastic bags are non–renewable. A plastic bag is used on average for only 12 minutes, but it would take a long time to decompose. Particularly, this material does not degrade completely and eventually forms microplastics that absorb toxins, causing environmental pollution and health hazards for humans (Laskar and Kumar, 2019).

To reduce plastic bag consumption, consumers are the components that require influence. Jarod (2012) stated that consumers were very elastic to a plastic bag tax, with the introduction of only a nominal tax that could cause tremendous consumption decline. A plastic bag levy can stimulate consumers to change toward pro–environmental behavior (Zen *et al.*, 2013). Thomas *et al.* (2016) also confirmed that plastic bag charges have a strong positive impact on people's behaviors and attitudes. A plastic bag charge results in the effective use of grocery bags (Jakovcevic *et al.*, 2014). This policy has proven effective in many countries, such as Denmark, the United Kingdom, Ireland, South Africa, others (Zen *et al.*, 2013).

Bringing the own shopping bags has become one of the options that many consumers have chosen to avoid paying the tax (Zen *et al.*, 2013). The plastic bag fees also encourage consumers to bring their own shopping bags more regularly (Thomas *et al.*, 2016).

Presently, Vietnamese consumers still use free plastic bags. This has led to a sharp increase in plastic bag waste, although the treatment system is still limited. According to research, the average number of plastic bags used in Vietnam is 48 bags/person/month. At the household level, one household uses an average of 223 plastic bags (equivalent to one kg) per month (Ta, 2019). Approximately 26.9 thousand tons of plastic bags are used and consequently discharged monthly in Vietnam (calculated based on the number of households from the General Statistics Office in 2019).

It is important to note that there is an increasing tendency of Vietnamese consumers to buy food from supermarkets, safe stores, and convenience stores than traditional markets (AC Nielsen, 2018).

Most of the used plastic bags are thrown directly into the environment, burnt or buried, leading to serious environmental and health consequences. Cuong *et al.* (2020) reported that the amount of plastic waste and plastic bags in Vietnam is high, accounting for approximately 8–12% of domestic solid waste. By recognizing the necessity of applying a plastic bag fee for consumers to cut down on plastic bag waste, the Vietnamese government issued Directive No.33, the regulation that was issued to complete the Law of Environmental Protection

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Tax in the direction of expanding the taxpayers, namely plastic bag users. However, there is no evidence of the application of a tax rate. Hence, it is necessary to conduct research on WTP for plastic bag fees that make consumers switch to bring their own shopping bags. The objective was to identify WTP level for the plastic bag fee and its determinants. Consequently, recommendations should be made to change consumer habits and reduce plastic bag waste.

LITERATURE REVIEW AND HYPOTHESES

The Theory of Planned Behavior (TPB)

The TPB is an extension of the Theory of Reasoned Action (TRA) (Han *et al*., 2010); (Hill, 1977); (Ajzen, 1985). There are three main latent variables in the TPB model. First, AT is defined as a psychological tendency towards a particular entity or set of beliefs of favor or disfavor to certain people or objects that will determine how the individual behaves (Hill, 1977). Second, SN is an individual's perception of a particular behavior, which is influenced by the judgment of significant others (e.g., parents, spouse, friends, and teachers) (Amjad and Wood, 2009). Third, PB is an individual's perceived ease or difficulty in performing a particular behavior (Ajzen, 1991). These factors have been proved by Ajzen (1991), which make a significant contribution to the explanation of the behavior model. TPB is considered a framework for apprehending, prophesying, and switching consumer behavior (Nabila and Nurcahyo, 2020). This model has been broadly applied to individual behavioral studies, particularly behavior toward the environment (Han *et al*., 2010); (Chen and Tung, 2014). The factor's impact on the behavior toward bringing the own bags was measured by applying the TPB theory (Nguyen, 2022). Many previous studies have applied TPB to explain the relationship between latent variables and WTP (Kwistianus *et al*., 2020); (Zhang and Fukuda, 2019); (Obeng *et al*., 2019).

The TPB model also accepts addition of new variables as long as these variables can drive a significant relationship to the explanation of the model (Nabila and Nurcahyo, 2020). This model is also known as the extended TPB model. Therefore, this study added the variable involved in environmental knowledge, namely EL. EL is an important factor in the environmental behavior of Asian consumers (Mei *et al*., 2012); (Cheah & Phau, 2011). Kuppusamy and Gharleghi (2015) and Ngoc *et al*. (2019) also showed a strong relationship between environmental knowledge and consumers' behavior in reducing plastic waste.

The Contingent Valuation Method (CVM)

CVM is used to appraise the value of non–market goods or environmental services and has been commonly used since 1996 (Tian and Holst, 2011). By designing hypothetical market scenarios, priceless goods or services can be determined through people's WTP (Nautiyal and Goel, 2021). CVM has various popular approaches to collect data, consisting of open–ended questions, dichotomous choice questions (single–bounded and double–bounded), bidding games, and payment card (PC) techniques (Kerr, 2000).

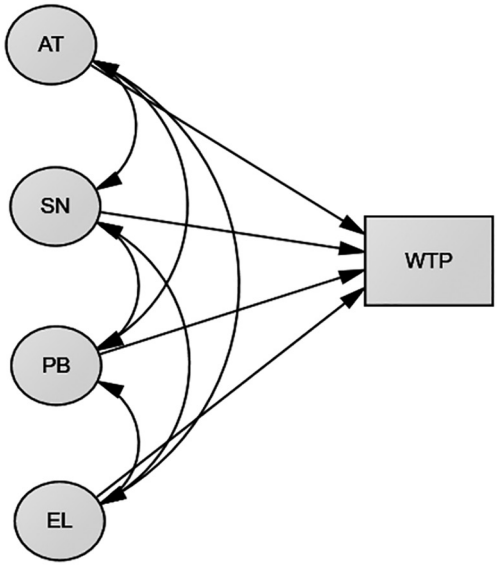

Fig. 1. The research's hypotheses

WTP and Hypotheses

WTP was defined as the maximum amount a consumer is willing to pay for a product or service. According to Ngah (2020), using WTP to predict consumer behavior is better than using behavioral intentions because not all intentions become actual behaviors. In some cases, WTP demonstrates that consumers will accept payment for a good or service even if they have no intention of buying it earlier. Based on the extended TPB model, the research model has four hypotheses:

Hypothesis 1 (H1): Positive AT has the negative impact on WTP. Consumers who have the positive attitude about their own bags will agree to change their habits even if a nominal fee is applied.

Hypothesis 2 (H2): Stronger SN has the negative impact on WTP. Consumers influenced by people around them who regularly talk more about their own bags will agree to change the habits even if a nominal fee is applied.

Hypothesis 3 (H3): Stronger PB has the negative impact on WTP. Consumers who think their self–carring own bag behavior is easy will agree to change their habits even if a nominal fee is applied.

Hypothesis 4 (H4): Positive EL has the negative impact on WTP. Consumers with much more environmental knowledge agree to change their habits even if a nominal fee is applied.

METHODOLOGY

In a bid to measure WTP's values in the extended TPB, the PC technique in CVM was applied. With this technique, people were asked to select only one card

Table 1. Payment cards of plastic bag fees (dong/bag)

0	1 – 100	101 – 200	201 – 300
301 – 500	501 – 700	701 – 1,000	1,001 – 1,200
1,201 – 1,500	1,501 – 1,700	1,701 – 2,000	2,001 – 2,500
2,501 – 3,000	>3,000 (specific)	I don't know	

value that acted on the respondents' maximum WTP level (Venkatachalam, 2004). The method applied was to estimate the maximum WTP fee for plastic bags that made consumers accept giving up their habit. The scenario was explained before the respondents selected the fee level that best reflected their responses. Payment cards designed in this study based on the previous pre–test results.

Latent variables include AT, SN, PB, and EL were determined using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The relationship between WTP and latent variables in the research model was estimated using SEM (Voon *et al*., 2011). It is a statistical method developed to analyze multidimensional relationships between multiple variables in a research model (Haenlein & Kaplan, 2004). These relationships can be represented by various simple and multiple regression equations. In SEM, quantifying latent variables that are difficult to measure could make it easier to estimate the relationships between unobserved variables, thereby solving research problems. The SEM applied in this research was used to test the relationship between WTP and AT, SN, PB, and EL, using IBM SPSS AMOS 26.

Performing reliability and validity tests are necessary because if the factors in the research model do not satisfy validity and reliability, running SEM will cause deviations in the analytical results, and the estimates will not express the significance of the data and reality. It is necessary to test whether this measurement model is good and suitable or not after selecting the eligible factors for analysis. The criteria include CMIN/df (Chi–square/df), comparative fix index (CFI), goodness of fix index (GFI), and root mean square error of approximation (RMSEA) considered. If the model satisfied the acceptable thresholds by Hair *et al*. (2010), it would be a good model.

Definition of variables and descriptive statistics

The definitions of the variables and their descriptive statistics are presented in Table 2.

DATA COLLECTION

Plastic bags are popular commodities used by most consumers throughout the nation every day. Therefore, for a more representative sample, the subjects and study sites considered were people living across all provinces. A pre–test with open questions was implemented to identify the range of consumers' payments for plastic bag fees. The semi–structured questionnaire was then designed for the actual survey. In this study, face–to–face interviews could not be conducted due to the unexpected situation of the pandemic. An online survey was conducted to collect data using a designed questionnaire. Online surveys have long been considered unrepresentative (Szolnoki & Hoffmann, 2013). However, this view has changed in recent decades. Kaplowitz *et al*. (2004) stated that data collected from online or offline surveys do not show considerable variance.

The actual online survey was carried out for four weeks starting from December 22nd, 2020, using Google Forms and circulated through social media at a national scale. Consequently, 208 responses were obtained. Nine invalid respondents were excluded from the study. Thus, 199 usable responses were used for the final data analysis.

RESULTS AND DISCUSSION

The demographic profile of the respondents

The descriptive statistics from the online survey shown in Table 3.

In Vietnam, the majority of plastic bags are consumed in retail stores, in which the traditional market accounts for the most with an average of 22 bags/person/month.

The next positions are supermarkets, grocery stores, and convenience stores with 11, 7, and 6 bags/person/month, respectively. These figures were based on the survey for both urban and rural areas, hence they may vary slightly for consumers in big cities, especially Hanoi and Ho Chi Minh City.

Distribution of the positive WTP

Based on the 15 payment cards, WTP values were calculated for the two cases. First, WTP's values were calculated by taking the average value for cards with values greater than zero. Second, for the zero cards, the values were divided as "real zero" (consumers who already bring or intend to bring their bags when shopping, and do not need a plastic bag fee to change their behavior) and "protest response" (consumers who disagree to pay for a plastic bag fee). The "I don't know" card was also considered as the "protest response". In this case, only "real zero" responses were included when the data were processed.

Thus, among 199 valid samples, 12 "protest responses" were excluded from the data analysis. The main reason for "protest responses" was that consumers do not have sufficient information about the problem of plastic bag waste. Some wanted producers to become payers. Others believed that charging plastic bags is not a good way to solve this problem. The rest answered

Table 2. Definition of variables and descriptive statistics

Var	Definition	Items	Mean	Max	Min	SD
WTP	The maximum fee makes consumers decide to bring their own shopping bags instead of using plastic bags.		1895.3	20,000	0	2915.5
AT	Consumers' attitude towards the self–carrying own bag behavior when shopping.	AT1	1	5	3.9	1.1
		AT2	1	5	3.9	1.1
		AT3	1	5	3.8	1.1
		AT4	1	5	4.3	0.8
		AT5	1	5	4.3	0.8
		AT6	1	5	4.2	0.9
SN	The consumers' perception of the self–carrying own–bag behavior is influenced by family, friends, colleagues, celebrities, local authorities, and social media.	SN1	1	5	3.8	1.0
		SN2	1	5	3.8	0.9
		SN3	1	5	3.6	1.0
		SN4	1	5	3.1	1.1
		SN5	1	5	3.6	1.0
		SN6	1	5	3.5	1.0
PB	The consumers' perception of the self–carrying own–bag behavior is that it is easy or difficult to implement	PB1	1	5	3.6	1.0
		PB2	1	5	3.8	1.0
		PB3	1	5	3.9	1.0
		PB4	1	5	3.7	1.0
		PB5	1	5	3.3	1.1
EL	Consumers' knowledge about the negative effects of plastic bags and the benefits of self–carrying their own bags	EL1	1	5	3.3	1.3
		EL2	1	5	3.4	1.2
		EL3	1	5	4.1	1.0
		EL4	1	5	4.1	1.0
		EL5	1	5	4.2	0.9
		EL6	1	5	4.2	0.9
		EL7	1	5	2.8	1.3
		EL8	1	5	2.1	1.2
		EL9	1	5	2.0	1.2
		EL10	1	5	2.4	1.4

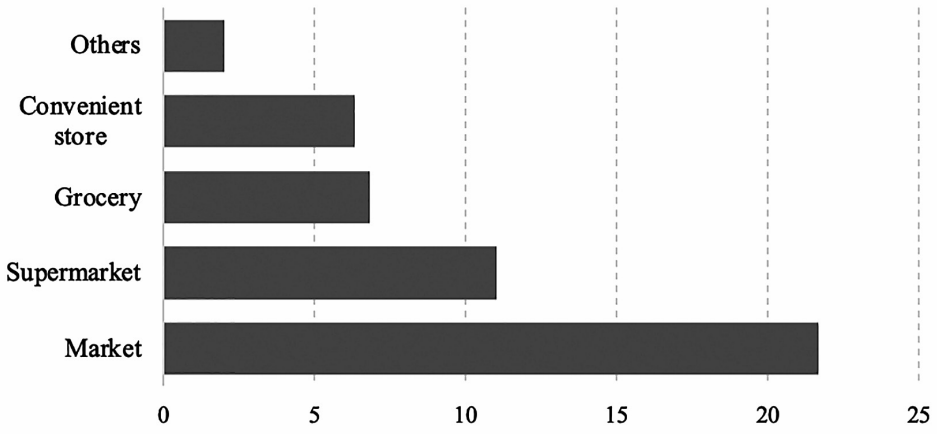

Fig. 2. The number of plastic bags used by retail stores (bag/person/month)

Table 3. The summary of respondents' characteristics

Factors	Category	Valid percent (%)
Gender	Female	82.4
	Male	17.6
Education	Undergraduate	65.2
	Graduate	28.3
	High school	6.1
	Primary school	0.5
Occupation	Office worker	37.9
	Civil servant	25.8
	Student	14.1
	Managerial employee	6.6
	Blue–collar worker	3.0
	Others	12.6
Status	Single	50.3
	Married	47.7
	Others	2.0
Region	Ho Chi Minh	38.2
	Hanoi	29.1
	Others	32.7
	Mean	Std
Age (years old)	29.4	6.9
HH size (people)	3.7	1.6
Personal income (mil VND/month)	9.8	8.3
HH Income (mil VND/month)	22.9	15.4

that they could not afford to pay and some did not agree with the plastic bag fee policy. 94% of the respondents were willing to pay plastic bag fees. This demonstrates that there is potential to encourage consumers to bring their own bags instead of using plastic bags.

According to the positive WTP distribution, the maximum and minimum values were 20,000 and 0, respectively. The median WTP for the plastic bag fee that makes respondents decide to bring their own shopping bags was 850.5 dong/bag (≈ 0.04 USD).

Reliability and Validity tests

There were 5–10 items for each latent variable. To evaluate the reliability of each item, Cronbach's alpha coefficient was calculated. After checking, the corrected item–total correlation was smaller than 0.3 and was not satisfied in the rotated component matrix, and 13 items that were not good removed. The Cronbach's alpha coefficient of the latent variables was higher than 0.7, indicating their reliabilities (Nunnally, 1978).

Table 4. WTP values

WTP	Frequency	%
Positive	164	82.4
Real zero	23	11.6
Protest zero	4	2.0
Undecided	8	4.0

After obtaining good items in the structures, convergent validity and reliability were used to test the differences between latent variables by looking at standardized loading estimates (SLE), composite reliability (CR), and average variance extracted (AVE). According to Hair *et al.* (2010), a model is suitable when SLE > 0.7, CR > 0.7, and AVE > 0.5. These criteria also met the thresholds. It indicates that the four latent variables had a good relationship with the constructs.

The results also show that the Kaiser–Meyer–Olkin coefficient was 0.869 (> 0.5 and <1), and Bartlett's test of sphericity was significant (sig. =0.000 < 0.05). It demonstrates that the observed variables were eligible for analysis and correlated with each other.

Additionally, the testing of discriminant validity between the construct criteria was suggested by Hair *et al.* (2010). The maximum shared variance was smaller than the average variance extracted (AVE), and the square root of AVE (SQRTAVE) was larger than the inter–construct correlation.

Overall, the reliability testing results were consistent and the proposed model was validated. Furthermore, the items loading and cross–loading criterion were both met and the convergent validity and discriminant validity of indicators were validated.

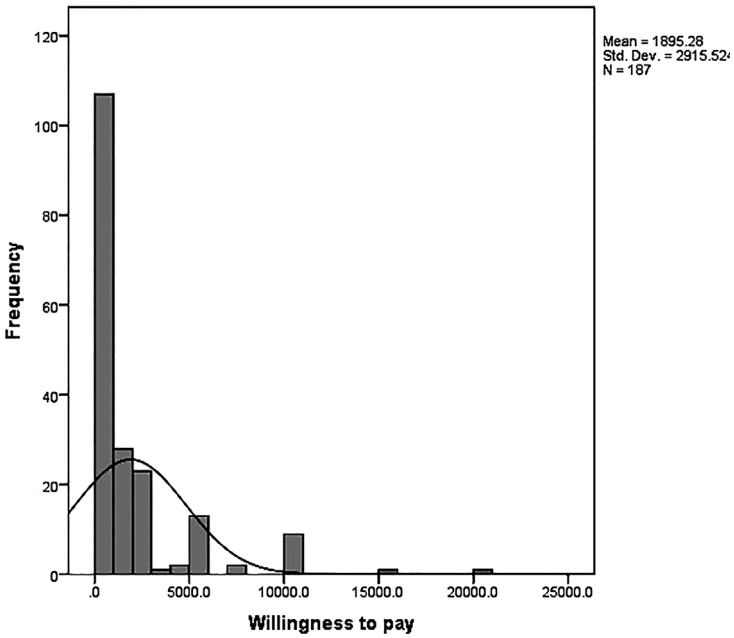

Fig. 3. WTP distribution (dong/bag)

Table 5. Cronbach's alpha coefficient of latent variables

Latent variables	Name of items*	Cronbach's Alpha
AT	AT4, AT5, AT6	0.936
PB	PB1, PB2, PB4, PB5	0.904
SN	SN4, SN5, SN6	0.873
EL	EL3, EL4, EL5, EL6	0.878

*Notes: *the names of items of AT1, AT2, AT3, PB3, SN1, SN2, SN3, EL1, EL2, EL7, EL8, EL9, EL10 were removed because the Corrected Item–Total Correlation <0.3 and not satisfied in Rotated Component Matrix.*

Table 6. Convergent validity and reliability test

Factors	Items	SLE	AVE	CR
Attitude	AT4	0.912	0.836	0.939
	AT5	0.955		
	AT6	0.875		
Subjective norms	SN4	0.732	0.714	0.881
	SN5	0.900		
	SN6	0.892		
Perceived behavior	PB1	0.768	0.707	0.905
	PB2	0.752		
	PB4	0.929		
	PB5	0.900		
Eco–Literacy	EL3	0.813	0.647	0.879
	EL4	0.736		
	EL5	0.928		
	EL6	0.725		

Table 7. Discriminant validity test with MSV, EVA

Latent variables	AVE	MSV
Attitude	0.836	0.537
Subjective norms	0.714	0.110
Perceived behavior	0.707	0.537
Eco–Literacy	0.647	0.376

Structural model evaluation

The goodness of the model fit, the CMIN/df, CFI, GFI, and RMSEA criteria were considered to assess the model results based on the thresholds of Hair *et al.* (2010).

The accepted thresholds of model fit indices by Hair *et al.* (2010) are CMIN/df ≤ 2; CFI, GFI ~ 0.9 or 1; RMSEA ≤ 0.08 (the smaller, the better). The results of the study were acceptable (Chi–square = 130.3; P–value < 0.01, significant; CMIN/df = 1.61; CFI = 0.98; GFI = 0.92; RMSEA = 0.06). Therefore, the structural model was acceptable.

SEM model estimation and hypotheses testing

Kuppusamy and Gharleghi (2015); Ngoc *et al.* (2019); Zhan and Fukuda (2019) proved that EL has a significant relationship with environmental behavior and WTP toward the environment. Based on the results of the model estimation, the standardized effect of the relationship between EL and WTP was –0.281 with a p–value of 0.004, which is smaller than 1%. Therefore, H4 was accepted. This means that with just a small fee for plastic bags, consumers who have more environmental knowledge would agree to bring their own bags instead of paying plastic bag fees.

Simultaneously, the relationships between AT, SN,

Table 8. Discriminant validity test with SQRTAVE, Inter–Construct Correlations

Correlations of Latent Variables	Attitude	Subjective norms	Perceived behavior	Eco–Literacy
Attitude	0.915			
Subjective norms	0.263	0.845		
Perceived behavior	0.733	0.332	0.841	
Eco–Literacy	0.613	0.251	0.543	0.805

Table 9. The result of Model Fit

Chi–square = 130.3 P value = 0.000				
Criteria for fit indexes	CMIN/df	CFI	GFI	RMSEA
Accepted thresholds	≤ 2	≥ 0.95	≥ 0.9	≤ 0.08
Observed values	1.61	0.98	0.92	0.06

Table 10. Paths hypothesized relationship

Hypothesis	Standardized effect	P–value	Conclusion
H1: AT → WTP	0.018	0.887^{ns}	Unsupported
H2: SN → WTP	–0.123	0.128^{ns}	Unsupported
H3: PB → WTP	0.176	0.144^{ns}	Unsupported
H4: EL → WTP	–0.281	0.004**	Supported

*Notes: ** → P–value ≤ 0.01; ^{ns} → P–value > 0.1*

PB, and WTP were insignificant because their p–values were larger than 10% (0.887, 0.127, and 0.143, respectively). Therefore, H1, H2, and H3 are unacceptable. These results contradicted the conclusions of previous studies. Kuppusamy and Gharleghi (2015) and Ngoc *et al*. (2019) revealed that the latent variables of the TPB model, SN, and PB (except AT) had an impact on consumers' behavior toward the environment. Nguyen (2022) concluded that AT had a strong influence on the intention behavior toward bringing the own bags. These differences could be attributed to the variance in research time, location, and personal characteristics. Most Vietnamese consumers' WTP for plastic bag fees is unaffected by family, friends or those around them. Even though they knew that carrying their own shopping bags was necessary and easy to do, they were not willing to change their behavior. Possibly, they did not have enough motivation to do that because the policy of charging plastic bags has not yet set a specific time to apply.

Multigroup analysis

The relationships among the variables in the research model were determined based on direct effects. However, indirect effects could not be estimated. Therefore, for a more adequate and in–depth study result, a multigroup analysis was performed to assess whether the relationship between WTP and EL differed in terms of demographic factors (gender, income, age, and education levels). Therefore, the proposed policy implications would be more specific and effective.

Multigroup analysis helps to evaluate the difference of effects in the SEM model between different values of qualitative variables or, in other words, whether the model is different between different subjects or not (Hair *et al*., 2014). According to the traditional approach of Joreskog (1971), to evaluate whether there is a difference in a model between different objects, we would rely on the difference in the chi–square value in the relationship with *df* between the constraint model and the unconstrained model.

The constraint model is a model of the effect coefficients of a free path. Meanwhile, for the unconstrained model, we fix the impact factor for all paths in the SEM model. After obtaining the chi–square and *df* of the two models, we calculated the P–value (using Chidist formula). If the p–value was larger than 5%, we chose the unconstrained model to explain the model results.

Indicators often used to assess the impacts of the multigroup analysis are sig or p–value and standardized regression weight (SRW) value.

It is obvious that the p–values of the demographic factors calculated were > 5%. Therefore, there was a difference in the Chi–square between the constrained and unconstrained models. Therefore, this study chose unconstrained models to interpret the results because of their higher compatibility.

Looking at the p–value of demographic factors, it

Table 11. Multigroup analysis by demographic factors

Model	Gender		Income		Age		Education	
	Chi–square	df	Chi–square	df	Chi–square	df	Chi–square	df
Constrained	303.176	162	335.632	162	329.076	162	277.451	162
Unconstrained	312.288	166	341.219	166	333.808	166	281.252	166
Difference	9.112	4	5.587	4	4.732	4	3.801	4
P–value	0.058 >5%		0.232 >5%		0.316 >5%		0.434 >5	
Selected model	Unconstrained		Unconstrained		Unconstrained		Unconstrained	

Table 12. Model fit results of the multigroup analysis

	Group	SRW	P–value	CMIN/df	GFI	CFI	RMSEA
Gender	Male	–0.25	0.002***	1.881	0.851	0.93	0.069
	Female	–0.31					
Age	15–24 years old	–0.271	0.022**	2.011	0.832	0.921	0.74
	25–50 years old	–0.19					
Income	Poor and near poor	–0.259	0.013**	2.056	0.848	0.919	0.076
	Fair and rich	–0.236					
Education	Undergraduate and below	–0.274	0.007***	1.694	0.848	0.945	0.061
	Graduate	–0.27					

*Notes: ***P–value ≤ 0.01; **P–value ≤ 0.05*

can be observed that gender, age, income, and education had significant impacts on the relationship between EL and WTP, with a p–value < 5%.

However, the model fit indices of age and income factors did not satisfy the thresholds accepted by Hair *et al*. (2010), Baumgartner and Homburg (1996), and Doll *et al*. (1994). Hence, gender and education factors were thought to affect the relationship between EL and WTP.

Focusing on SRW, it is notable that the value of females was higher than that of males. It means that women, who have much more environmental knowledge, impact WTP more strongly than men. Considering the negligible variation between men and women, this influence was insignificant from the education perspective. Therefore, it can be concluded that different genders with environmental knowledge had different effects on carrying their own bags when shopping. Other factors did not affect or had negligible impacts.

CONCLUSION AND RECOMMENDATIONS

The two locations where plastic bags are consumed the most in Vietnam are traditional markets and supermarkets, with 20 and 11 bags/person/month, respectively. The average fee that could affect consumers' behavior toward reducing plastic bag use is 850.5 Dong/bag (≈ 0.04 USD). This figure provides an indication for the policymakers who can set up a tax rate in the near future. Out of four latent variables, EL had a significant effect on WTP. This means that with a nominal plastic bag fee, consumers who have more environmental knowledge will agree to bring their own bags instead of paying for plastic bags. However, AT, SN, and PB do not have significant impacts on WTP. The reason may be that a policy for plastic bag fees has not yet been issued. According to the results of the multigroup analysis, in the relationship between EL and WTP, environmentally aware women would be more willing to bring their own bags for shopping than men.

To mobilize consumers to bring their own bags, the government should apply a plastic bag fee when shopping at traditional markets and supermarkets as soon as possible. The recommended fee could be at least 850.5 Dong/bag. Applying this fee could reduce the number of plastic bag users by more than 50% in the near future. Pro–environmental campaigns should be implemented weekly, monthly, or yearly to promote consumer habits. The government should also collaborate with schools and relevant associations (especially women's unions, women's cultural houses, etc.) in generating better environmental awareness through programs, events about the negative impacts of plastic bags, and the benefits of reusable bags via social media, newspapers, and television, the most accessible channels by respondents for environmental information.

AUTHOR CONTRIBUTIONS

Linh Thi Ut TRAN designed the study questionnaire, collected and analyzed the data, and drafted the manuscript; Yoshifumi TAKAHASHI and Hisako NOMURA gave the comments and revised the manuscript; Mitsuyasu YABE supervised the research and made critical revisions to the manuscript. All authors read and

approved the final manuscript.

ACKNOWLEDGMENTS

This study was supported by the Project for Human Resource Development Scholarship by Japanese Grant Aid. Big thanks go to labmates and lecturers in the Faculty of Agriculture, Kyushu University.

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