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# Shopping bags: own or plastic? Theoretical explanation of pro-environment consumer behavior in Vietnam

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## Abstract

Shopping bags have posed significant environmental burdens. The integrated model of theory of planned behavior (TPB) and norm activation model (NAM) was proposed to predict individuals' choice of shopping bags. Data from a cross-sectional study with a total of 536 respondents in Vietnam was used to test the proposed models and hypotheses. Results from linear regressions indicated that socioeconomic factors possibly were confounding factors for the main associations. Results from structural equation modeling showed that revised TPB, revised NAM and integrated model of TPB and NAM were good fit. Controlling for socioeconomic factors, mediation analyses showed that personal norms mediated the relationship between. The results of this research contribute to theory development in the area of pro-environmental purchase behavior.

**Keywords:** theory of planned behavior, norm activation model, shopping bags, integrated model.

## Introduction

Utilization of own shopping bags is pro-environment behavior. This is because littering of the shopping bags resulted in ecological hazard (Barbale, et al., 2021). A penalty tax was recommended as an effective tool in motivating shoppers to bring reusable bags (Muralidharan & Sheehan, 2016). As a result, local governments in the USA increasingly adopted a variety of measures to reduce single-use plastic shopping bags (Wagner, 2017). But, a study in South Africa concludes that retailer self-regulation of plastic bag litter take little effects (Muposhi & Shanhuyenzva, 2021). Therefore, most individuals were expected to use own shopping bags instead of when buying in supermarket. From this perspective, identifying psychological factors that influence choice of shopping bags is becoming increasingly important in the fields of pro-environment behavior research.

The intensive use of plastic shopping bags continues to pose significant environmental challenges (Misgana & Tucho, 2022). A study in Hong Kong indicated that the majority of consumers prefer paper shopping bags rather than plastic shopping bags (Prendergast, et al., 2001). Regarding the eco-functional properties, plastic bags outscore paper bags in

the single use category (Muthu, et al., 2013). Meanwhile, consumers' perceptions and usage behaviors could be highly decisive in reducing the eco-impact of shopping bags (Muthu, et al., 2012). A panel study demonstrate that bringing one's own bags increases purchases of foods (Karmarkar & Bollinger, 2015). A study in Taiwan showed that individual and situational factors determined choice of shopping bags (Lam & Chen, 2006). A Vietnamese investigation shows that intention towards "bringing your own shopping bags" (BYOB) has a positive effect on consumers' behavior towards BYOB (Nguyen, et al., 2022).

Currently, theory of planned behavior (TPB) has been extensively used to analyze purchase behaviors. A study confirmed that purchase intention towards eco-friendly packaging is significantly influenced by personal norms, attitude, environmental concern and willingness to pay (Prakash & Pathak, 2017). Simultaneously, TPB was used to design an instrument assessing attitudinal, subjective normative, and perceived control beliefs toward consuming milk (Park & Ureda, 1999).

Additionally, a study indicated that perceived behavioral control is found as an important independent factor compelling Indian consumers towards green buying behavior (Kumar, 2021). Nguyen (2022) show that attitude and personal norm (PN) s have a stronger impact on intention toward "bringing your own shopping bags" (BYOB) than other factors, and the study also reveals the moderate relationship between intention with actual behavior toward BYOB in Vietnamese consumers.

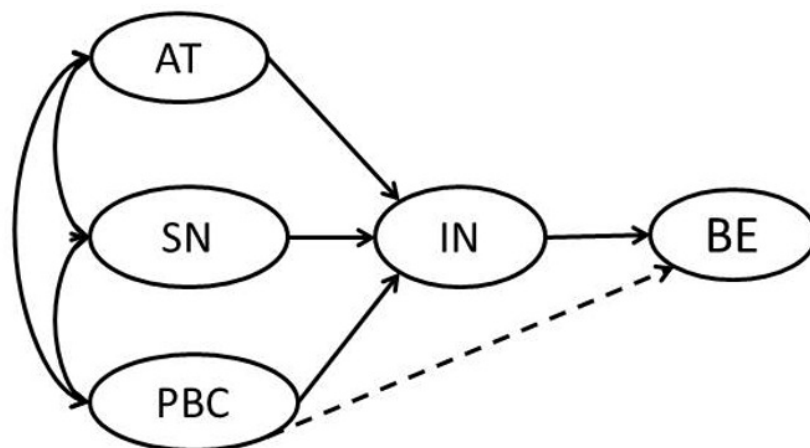
What are the important reasons for consumers to choose shopping bags? There are no published studies relating to choice of shopping bags, therefore, this exploratory study aims to provide an initial insight toward consumer perceptions of shopping bags. Therefore, this study aims to investigate consumers' choice of shopping bags by integrating TPB and TAM and to examine the overall mechanism through the structural equation model (SEM). The findings will bridge the knowledge gap of factors associated with consumers' choice of shopping bags and provide references for expanding the implementation of green buying behavior.

## Theoretical model and hypotheses

### Theory of planned behavior

The Theory of Planned Behavior (TPB) developed by Ajzen (1985, 1991) was often used to explore factors associating with behavior. The central factors in TPB are Attitude (AT), Subject norms (SN), Perceived behavioral control (PBC), Intention (IN), and Behavior (BE). In Figure 1, a structural diagram depicts the theory. Moreover, it has been extensively replicated in purchase behavior studies (Yadav & Pathak, 2016, 2017; Cheng & Huang, 2013; Hansen, et al. 2004; Sun, et al., 2007). A plethora of studies developed an intention to purchase model based on the TPB and estimated using survey data (Gracia & Maza, 2015). Empirically, there are significant relationships between attitudes, subjective norms, and perceived behaviour control (Krishnadas & Renganathan, 2021). Meanwhile, a study using a revised TPB identified the relationships of 'attitudes' and 'personal norms' → the formation of pro-reusable shopping bags use intentions → actual

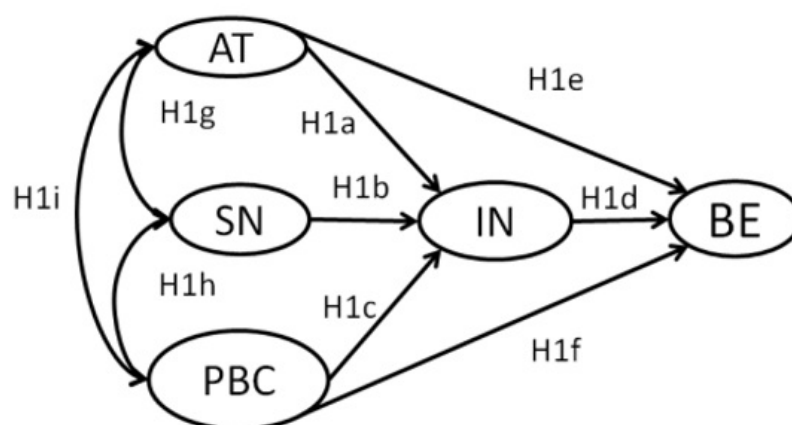
behaviour (Muposhi, et al., 2021).



**Figure 1.** Theory of planned behavior by Ajzen (1991)

**Legend:** AT= Attitude, SN= Subject norms, PBC= Perceived behavioral control, IN= Intention, and BE= Behavior

The TPB model has been confirmed to have better prediction power than Relationship Quality Model (Cannière, et al., 2009) and Model of Goal-directed Behavior (Han & Yoon). In the framework of TPB, several studies confirmed the relationships of AT→IN, PBC→IN, and AT→IN (Wera, et al., 2016), AT→IN (O'Fallon, et al., 2007), AT→IN →BE (Menozzi, et al., 2015), AT, social norms and PBC→IN (Litvine & Wüstenhagen, 2011), AT →IN (Costa, et al., 2021), and AT→ IN, PBC → IN, IN →BE and PBC → BE (Mainardes, et al., 2020). Another study indicated AT &SN → IN was confirmed (Zerbini, et al., 2017). Based on the original framework, revised TPB model was designed in Figure 2 and research hypotheses were proposed.



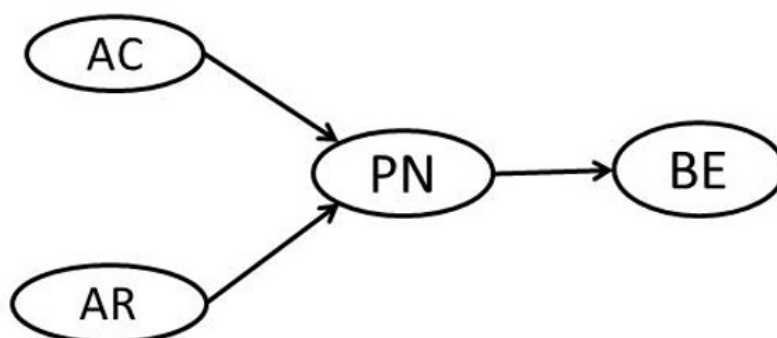
**Figure 2.** Revised TPB model with research hypotheses.

**Legend:** AT= Attitude, SN= Subject norms, PBC= Perceived behavioral control, IN= Intention, and BE= Behavior

- Hypothesis 1a (H1a): Attitude (AT) is positively related to the intention to use shopping bag (IN).
- Hypothesis 1b (H1b): Subject norms (SN) is positively related to the intention to use shopping bag (IN).
- Hypothesis 1c (H1c): Perceived behavioral control (PBC) is positively related to the intention to use shopping bag (IN).
- Hypothesis 1d (H1d): Intention to use fabric bag (IN) is positively related to choice of shopping bag (BE).
- Hypothesis 1e (H1e): Attitude (AT) relates is positively related to the intention to choice of shopping bag (BE).
- Hypothesis 1f (H1f): Perceived behavioral control (PBC) is positively related to choice of shopping bag (BE).
- Hypothesis 1d (H1g): Attitude (AT) is positively correlated with Subject norms (SN).
- Hypothesis 1e (H1h): Subject norms (SN) is positively correlated with Perceived behavioral control (PBC).
- Hypothesis 1f (H1i): Attitude (AT) is positively correlated with Perceived behavioral control (PBC).

### Norm Activation model

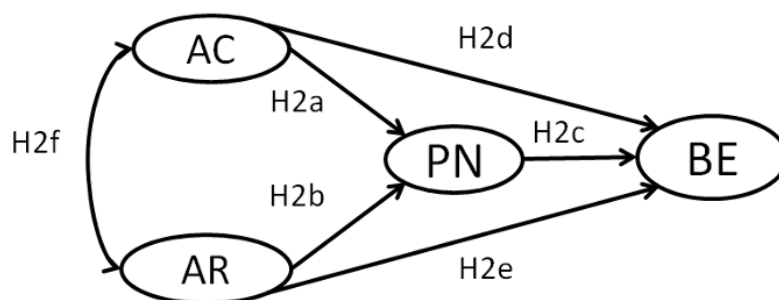
Since NAM developed by Schwartz (1973) in Figure 3, a number of NAM model interpretations are found in the literature. NAM scales consisted of awareness of consequences(AC), ascription of responsibility(AR), and personal norm(PN), and Behavior (BE).NAM model is employed explain nuclear energy utilization (De Groot and Steg, 2010) and consumer intentions to buy bio-based products (Wensing, et al., 2021).



**Figure 3.** The Norm Activation model

**Note:** AC, awareness of consequence; AR, ascription of responsibility; PN, personal norm; BE, choice of shopping bag.

With NAM model, a study confirmed the relationships of  $AR \rightarrow PN$  and  $AC$ , social norm, and  $PN \rightarrow BE$  (Munerah, et al., 2021). Based on the original framework, revised NAM model was designed in Figure 4 and research hypotheses were proposed.



**Figure 4.** Revised NAM with research hypotheses.

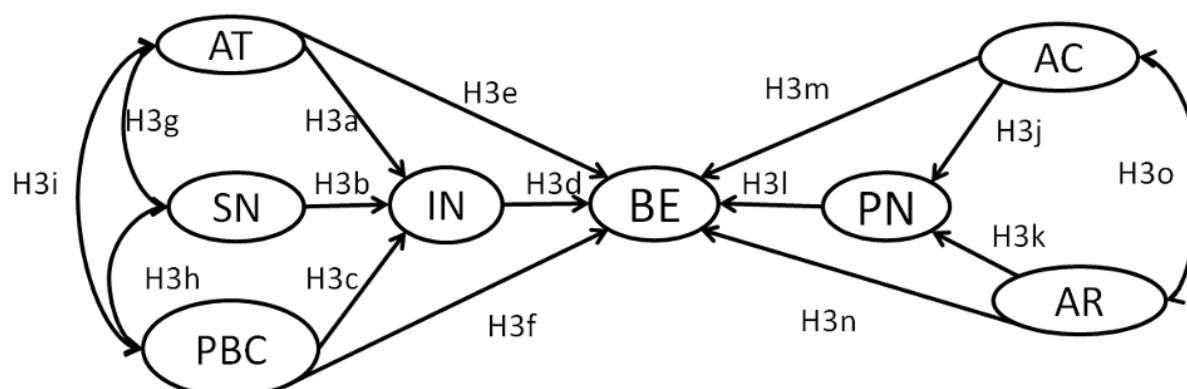
**Note:** AC, awareness of consequence; AR, ascription of responsibility; PN, personal norm; BE, choice of shopping

- Hypothesis 2a (H2a): Awareness of consequences (AC) is positively related to Personal norm (PN).
- Hypothesis 2b (H2b): Ascription of responsibility (AR) is positively related to Personal norm (PN).
- Hypothesis 2c (H2c): Personal norm (PN) is positively related to choice of shopping bag (BE).
- Hypothesis 2d (H2d): Awareness of consequences (AC) is positively related to choice of shopping bag (BE).
- Hypothesis 2e (H2e): Ascription of responsibility (AR) is positively related to the intention to choice of shopping bag (BE).
- Hypothesis 2f (H2f): Awareness of consequences (AC) is positively correlated with Ascription of responsibility (AR).

### Theoretical framework of extended TPB and TAM

TPB was integrated by the value-belief-norm theory (Becker-Leifhold, 2018), TAM (Thøgersen & Ebsen, 2019), Health Belief Model (Xinying Sun, et al., 2006), and Theory of Reasoned Action (Bangia & Palmer-Keenan, 2014) to explain consumers' intention to engage in consumption.

To comprehensively investigate the mechanism on the utilization of shopping bags from the level of individual, the theoretical model of this study was inspired by the integration of the TPB and NAM (Chunan Zhao, et al., 2019). The integrated theoretical model is presented in Figure5, and the corresponding hypotheses are as follows:



**Figure 5.** Integrated model of TPB and NAM with research hypotheses

- Hypothesis 3a (H3a): Attitude (AT) is positively related to the intention to use shopping bag (IN).
- Hypothesis 3b (H3b): Subject norms (SN) is positively related to the intention to use shopping bag (IN).
- Hypothesis 3c (H3c): Perceived behavioral control (PBC) is positively related to the intention to use shopping bag (IN).
- Hypothesis 3d (H3d): Intention to use fabric bag (IN) is positively related to choice of shopping bag (BE).
- Hypothesis 3e (H3e): Attitude (AT) is positively related to the intention to choice of shopping bag (BE).
- Hypothesis 3f (H3f): Perceived behavioral control (PBC) is positively related to choice of shopping bag (BE).
- Hypothesis 3g (H3g): Attitude (AT) is positively correlated with Subject norms (SN).
- Hypothesis 3h (H3h): Subject norms (SN) is positively correlated with Perceived behavioral control (PBC).
- Hypothesis 3i (H3i): Attitude (AT) is positively correlated with Perceived behavioral control (PBC).
- Hypothesis 3j (H3j): Awareness of consequences (AC) is positively related to Personal norm (PN).
- Hypothesis 3k (H3k): Ascription of responsibility (AR) is positively related to Personal norm (PN).
- Hypothesis 3l (H3l): Personal norm (PN) is positively related to choice of shopping bag (BE).
- Hypothesis 3m (H3m): Awareness of consequences (AC) is positively related to choice of shopping bag (BE).
- Hypothesis 3n (H3n): Ascription of responsibility (AR) is positively related to the intention to choice of shopping bag (BE).
- Hypothesis 3o (H3o): Awareness of consequences (AC) is positively correlated with Ascription of responsibility (AR).

## Confounding effects

Socioeconomic factors play a vital role in consumer behavior. Considering sustainable shopping, it is demonstrated there are differences between socioeconomic status regarding shoppers' buying new bags (van der Wal, et al., 2016). Socio-demographic factors including family size and level of education are correlated to attitude with low correlations (Okonta & Mohlalifi, 2020). Similarly, socioeconomic factors influence the relationship of consumption intention → behaviors (Zhu, et al., 2013). Sustained municipal education may lead to durable public buy-in (Ladele, et al., 2021). Thus, socioeconomic factors possibly perform as confounding factors in the integrated model of TPB and NAM.

## Method

### Data source

The questionnaires were sent through direct distribution at top 10 supermarkets in two big cities, Hanoi and Ho Chi Minh and online survey via Google Docs tool in Vietnam in November 2020. The field survey is conducted at 9 am, 10 am every weekend at the exit of the supermarkets. The online survey is conducted through selected 50 enterprises that publish their employees' email addresses on the company's official website. Part of survey participants randomly received a supermarket shopping voucher. The valid questionnaire is characterized by all questions answered. Consequently, 536

valid questionnaires were collected to study factors influencing consumer behavior towards bringing own shopping bags instead of using plastic bags in Vietnam. Surveys at obtained 211 valid questionnaires (response rate: 89.8%), while online surveys obtained 325 valid questionnaires (response rate: 54.2%).

The designed survey included socioeconomic factors and main scales of theory of planned behavior and norm activation model. Socioeconomic factors included gender (male, female), age (under 20, from 20 to 29, from 30 to 39, from 40 to 49, from 50 to 59, over 60), educational qualification (high school graduation, college/university graduation, master/phd graduation, others), job (student, business staff, state employee, housewife, freelancer), marital status (single, married, divorce, other), number of family members (1, 2-4, >4), and income (<6 million VND, 6-10 million VND, 10-20 million VND, 20-30 million VND, 30-40 million VND, >40 million VND).

## Main measures

In Supplementary Table 1, main scales of TPB and NAM are consisted of the remaining 25 items, which are assessed on a 5-point Likert scale (1: Strongly disagree; 2: Disagree; 3: Neutral; 4: Agree; 5: Strongly agree). In order to compare group differences regarding shopping bags, BE1, BE2, and BE3 are renamed as free bags, discounted use, and own bags, respectively. Then, they are dichotomized into binary variables with the response options no (=0, strongly disagree; disagree; neutral) and yes (=1, agree; strongly agree). Similarly, PN1, PN2, and PN3 are dichotomized into binary variables and renamed as obliged norm, complied norm, responsible norm, respectively. IN1, IN2, and IN3 are dichotomized into binary variables and renamed as will, plan, recommend, respectively.

**Supplementary Table 1.** Main scales of TPB and NAM.

	<b>Behavior (BE) (Cronbach's Alpha = 0.916)</b>
<b>BE1</b>	If plastic bags given at cash registers were not free, I would use fewer plastic bags.
<b>BE2</b>	If supermarkets offered discounts to shoppers who brought their own cloth bags, I would use fewer plastic bags.
<b>BE3</b>	I usually bring my own bags when shopping.
	<b>Intention (IN) (Cronbach's Alpha = 0.841)</b>
<b>IN1</b>	I will buy fabric bag products to use when shopping.
<b>IN2</b>	I plan to continue with the choice of buying fabric bag products for future shopping.
<b>IN3</b>	I will recommend for everyone to use the eco-friendly fabric bag.
	<b>Attitude (AT) (Cronbach's Alpha = 0.797)</b>
<b>AT1</b>	I like to take advantage of shopping situations to get free plastic bags.
<b>AT2</b>	It is worthwhile to bring my own bag(s) to shopping.
<b>AT3</b>	It is stupid for me to hold shopping items with my bare hands.
	<b>Subject norms (SN) (Cronbach's Alpha = 0.858)</b>
<b>SN1</b>	The people who influence my behavior think that I should bring a cloth bag when I go shopping.
<b>SN2</b>	My close friends think that I should use cloth bags when shopping.
<b>SN3</b>	Most of the people important to me think that I should bring cloth bags when shopping.
	<b>Perceived behavioral control (PBC) (Cronbach's Alpha = 0.821)</b>
<b>PBC1</b>	I will use cloth bag when I go shopping although friends advise me not to use it due to inconvenience.
<b>PBC2</b>	I have complete control over the use of cloth bags when shopping.
<b>PBC3</b>	I can afford to buy fabric bag products to use when shopping.
	<b>Awareness of consequences (AC) (Cronbach's Alpha = 0.952)</b>
<b>AC1</b>	Plastic bags damage the environment.
<b>AC2</b>	Plastic bags increase the risk of cancer.
<b>AC3</b>	Plastic bags harm living beings (animals) on land.
<b>AC4</b>	Plastic bag wastes emit toxic gases into the air.
	<b>Ascription of responsibility (AR) (Cronbach's Alpha = 0.880)</b>
<b>AR1</b>	I have an obligation to bring cloth bags when shopping morally.
<b>AR2</b>	Carrying a cloth bag with you when shopping is ethical.
<b>AR3</b>	Walking behavior when I carry cloth bags is ethically correct.
	<b>Personal norm (PN) (Cronbach's Alpha = 0.908)</b>
<b>PN1</b>	Every citizen has the obligation to avoid using plastic bags.
<b>PN2</b>	I feel obliged to comply with the government's plastic bag restriction.
<b>PN3</b>	Unless many people comply with the restriction, I do not have the responsibility to comply.

## Statistical strategies

This study includes three stages. In the first stage, the respondents are depicted statistically. For convenience, socioeconomic factors (age, gender, educational qualification, marital status, job, number of family members and income) are dichotomized into binary variables. In the second stage, the associations between socioeconomic factors and shopping bags use are explored with logistic regressions. In the third stage, revised TPB, revised NAM and integrated



model of TPB and NAM are explored by structural equation modelling. Controlling socioeconomic factors, mediation analyses using structural equation modelling were performed to report the mediating effects of IN and PN.

## Results

### Descriptive analyses

In table 1, the majority of the sample was aged less than 40 years old, females, higher educated, unemployed, single, and had  $\leq 4$  family members. There were significant differences between income ( $< 6$  million) and income ( $\geq 6$  million) with respect to age group, gender, employment status, and marital status.

**Table 1.** Respondents' characteristics stratified by income among the 536 respondents (%).

Variables	Total	<6 million	≥6 million	Chi-square	P-value
<b>Age group (years)</b>				35.4899	0.000***
<40	96.08	76.31	19.78		
≥40	3.92	0.93	2.99		
<b>Gender</b>				3.8462	0.050**
Female	71.78	57.01	14.77		
Male	28.22	20.19	8.04		
<b>Educational level</b>				0.8910	0.345
basic	15.86	12.87	2.99		
higher	84.14	64.37	19.78		
<b>Employment status</b>				103.0351	0.000***
Unemployed	90.30	75.19	15.11		
Employed	9.70	2.05	7.65		
<b>Marital status</b>				157.7599	0.000***
Single	84.51	73.51	11.01		
other	15.49	3.73	11.75		
<b>Number of family members</b>				0.6325	0.426
≤4	64.18	48.88	15.30		
>4	35.82	28.36	7.46		

Note: \*\*\*, \*\* and \* indicates 1%, 5% and 10% significance level, respectively.

### Association between socioeconomic factors and choices of shopping bag

In Tables 2 to 5, consumers aged ≥40 years were less likely to use free bags (aOR=0.145, 95% CI: 0.025-0.845), discounted bags (aOR=0.189, 95% CI: 0.029-1.226), and own bags (aOR=0.172, 95% CI: 0.032-0.936) compared to consumers aged <40 years. Simultaneously, male consumers were less likely to use free bags (aOR=0.155, 95% CI: 0.095-0.252), discounted bags (aOR=0.109, 95% CI: 0.056-0.214), and own bags (aOR=0.071, 95% CI: 0.038-0.131) compared to female consumers. Likewise, consumers with higher education were more likely to use free bags

(aOR=1.890, 95% CI: 1.687-2.118), discounted bags (aOR=2.505, 95% CI: 2.119-2.961), and own bags (aOR=2.353, 95% CI: 2.013-2.751) compared to consumers with basic education level. Additionally, consumers with other marital status were more likely to use free bags (aOR=2.784, 95% CI: 1.138-6.808), discounted bags (aOR=5.012, 95% CI: 1.363-18.435), and own bags (aOR=3.825, 95% CI: 1.323-11.058) compared to consumers with single marital status. Finally, consumers with >4 family members were less likely to use discounted bags (aOR=0.484, 95% CI: 0.279-0.839) and own bags (aOR=0.453, 95% CI: 0.277-0.741) compared to consumers with  $\leq 4$  family members.

Logistic regressions on the associations of domains of modified NAM with choice of shopping bags, the associations of domains of modified TPB with choice of shopping bags, and the associations of domains of integrated model of TPB and NAM with choice of shopping bags can be seen in Supplementary Table 2, Supplementary Table 3, and Supplementary Table 4.

**Table 2.** Logistic regressions on the associations of socioeconomic factors with choice of shopping bags.

Variables	Free bags		Discounted bags		Own bags	
	OR	95% CI	OR	95% CI	OR	95% CI
<b>Age group (years)</b>						
<40	1[Reference]		1[Reference]		1[Reference]	
$\geq 40$	0.145**	0.025-0.845	0.189*	0.029-1.226	0.172**	0.032-0.936
<b>Gender</b>						
Female	1[Reference]		1[Reference]		1[Reference]	
Male	0.155***	0.095-0.252	0.109***	0.056-0.214	0.071***	0.038-0.131
<b>Educational level</b>						
basic	1[Reference]		1[Reference]		1[Reference]	
higher	1.890***	1.687-2.118	2.505***	2.119-2.961	2.353***	2.013-2.751
<b>Employment</b>						
Unemployed	1[Reference]		1[Reference]		1[Reference]	
Employed	2.499	0.650-9.611	0.495	0.112-2.190	1.167	0.270-5.040
<b>Marital status</b>						
Single	1[Reference]		1[Reference]		1[Reference]	
Other	2.784**	1.138-6.808	5.012**	1.363-18.435	3.825**	1.323-11.058
<b>Income</b>						
<6 million	1[Reference]		1[Reference]		1[Reference]	
$\geq 6$ million	0.942	0.474-1.874	1.259	0.510-3.112	0.721	0.354-1.468
<b>Number of family members</b>						
$\leq 4$	1[Reference]		1[Reference]		1[Reference]	
>4	0.712	0.460-1.102	0.484**	0.279-0.839	0.453***	0.277-0.741
Number	535		535		535	

Note: \*\*\*, \*\* and \* indicates 1%, 5% and 10% significance level, respectively.

## Tests of model and hypotheses

### Structural equation models of revised TPB

Statistical outcomes of norm activation model could be seen in Figure 6. Fit statistic was  $\chi^2(81) = 1.669$ ,  $p > \chi^2 = 0.000$ , RMSEA = 0.035, 90% CI: 0.024-0.046,  $pclose = 0.992$ , AIC = 16938.000, BIC = 17169.343, CFI = 0.987, TLI = 0.983, SRMR = 0.030, and CD = 0.998. In the measurement model, all the coefficients were significant ( $p < 0.001$ ). Regarding  $AT \rightarrow BE$  via IN, about 307 % of the effect of AT on BE is mediated by IN. The mediated effect is about 1.5 times as large as the direct effect of AT on BE. Regarding  $SN \rightarrow BE$  via IN, Delta, Sobel, and Monte Carlo standardised estimates of Indirect effect were 0.057 (standard error = 0.027, confidence interval: 0.004, 0.111). Regarding  $PBC \rightarrow BE$  via IN, about 458 % of the effect of PBC on BE is mediated by IN. The mediated effect is about 1.3 times as large as the direct effect of PBC on BE.

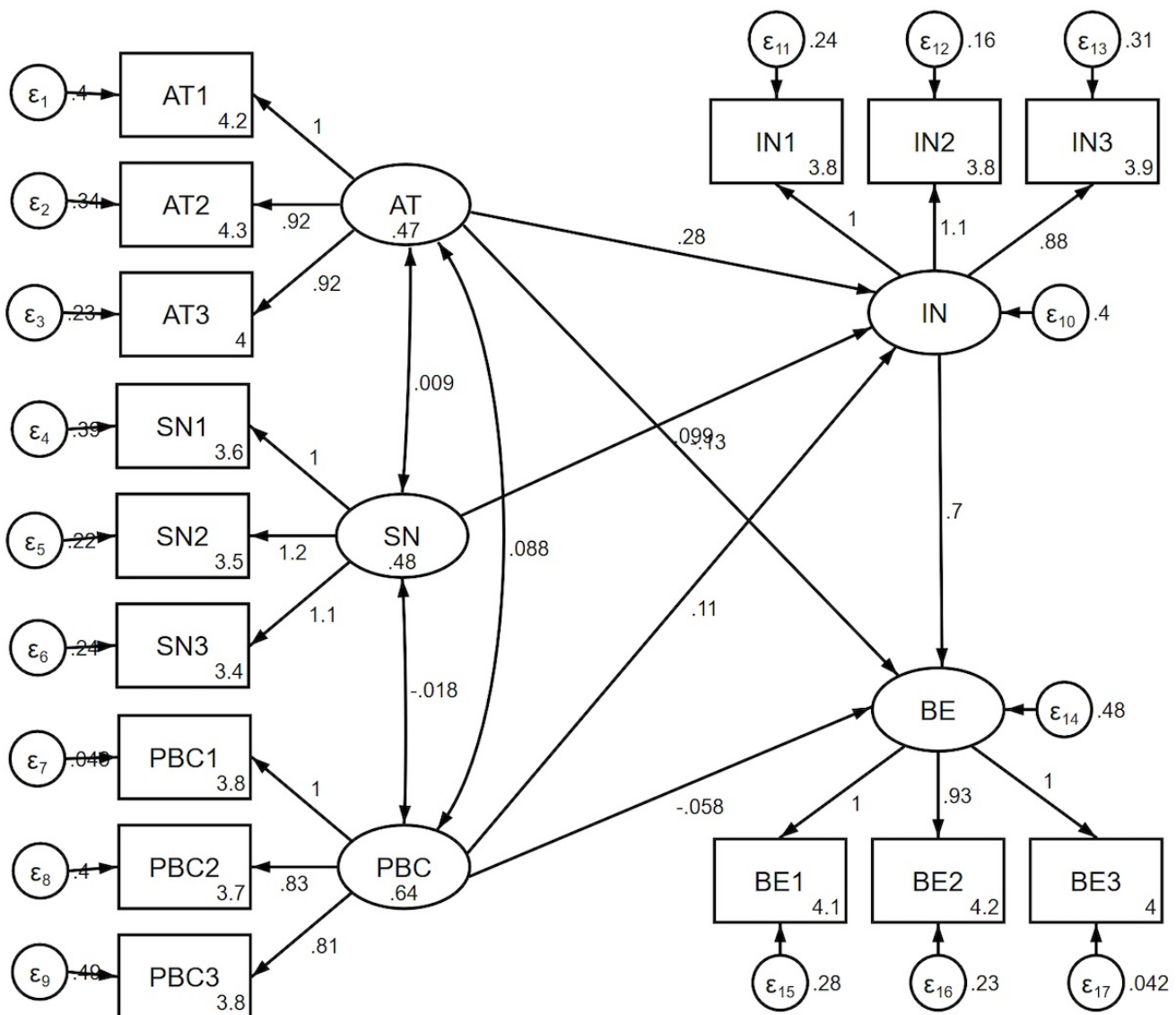
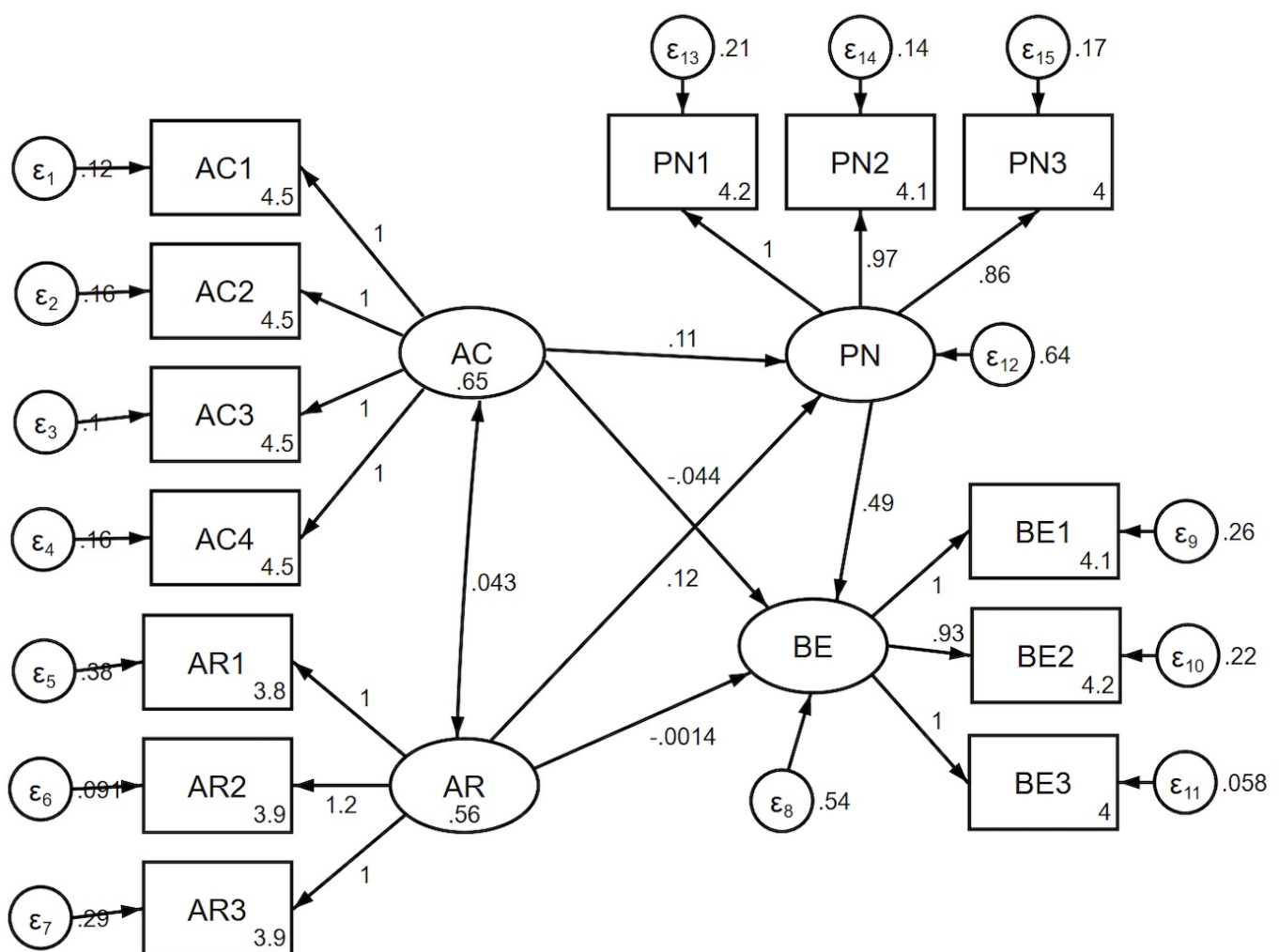


Figure 6. Statistical outcomes of revised TPB

**Legend:** AT= Attitude, SN= Subject norms, PBC= Perceived behavioral control, IN= Intention, and BE= Behavior

### Structural equation models of revised NAM

Statistical outcomes of norm activation model could be seen in Figure 7. Fit statistic was  $\chi^2(59)=1.957$ ,  $p > \chi^2=0.000$ , RMSEA=0.042, 90% CI: 0.031-0.054,  $pclose=0.863$ , AIC =12954.634, BIC=13147.420, CFI =0.990, TLI =0.987, SRMR=0.024, and CD=0.997. In the measurement model, all the coefficients were significant ( $p<0.001$ ). Regarding  $AC \rightarrow BE$  via PN, about 483 % of the effect of AC on BE is mediated by PN. Moreover, the mediated effect is about 1.3 times as large as the direct effect of AC on BE. Regarding  $AR \rightarrow BE$  via PN, about 102 % of the effect of AR on BE is mediated by PN. Moreover, the mediated effect is about 43.1 times as large as the direct effect of AR on BE.



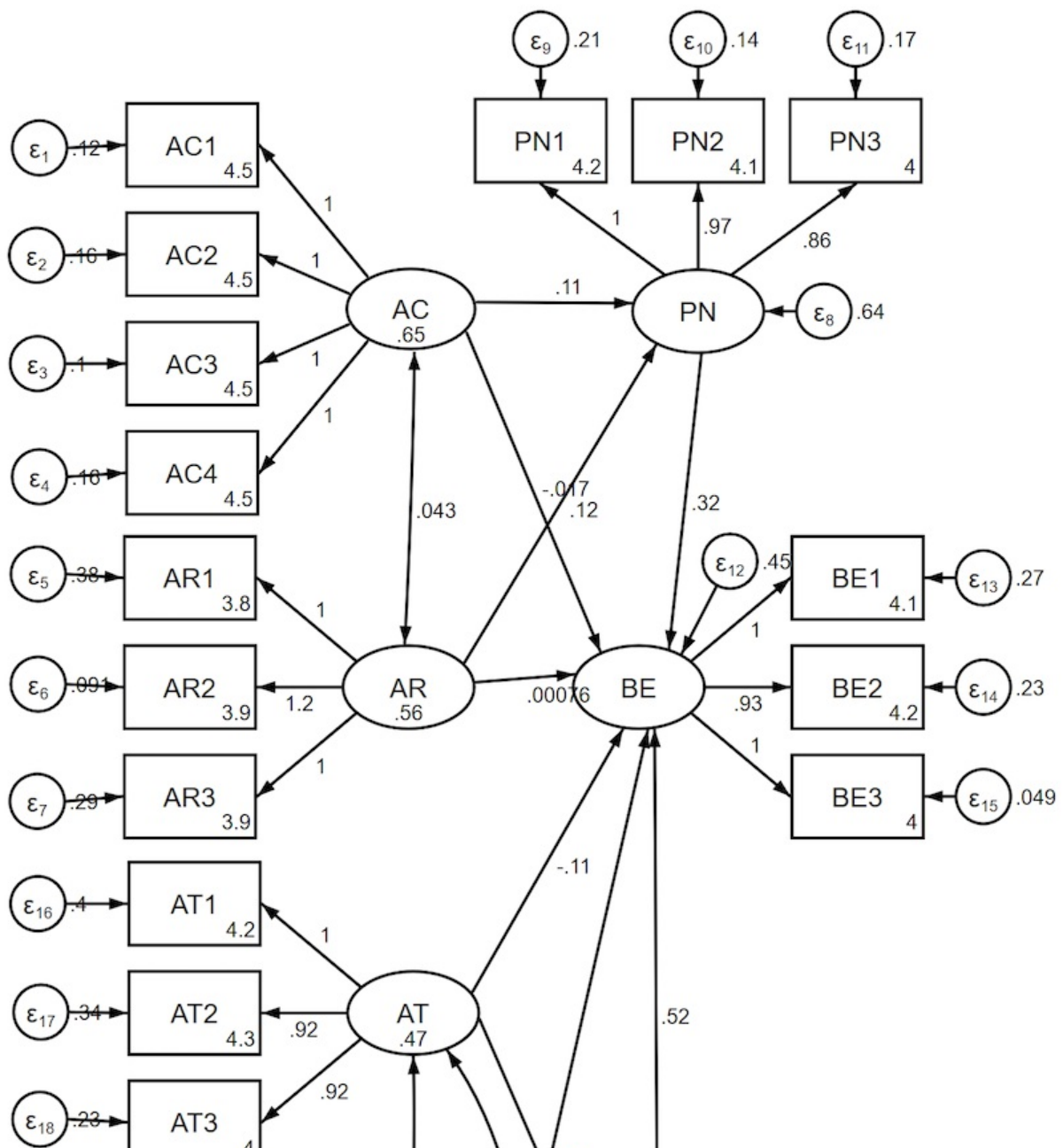
**Figure 7.** Statistical outcomes of revised NAM

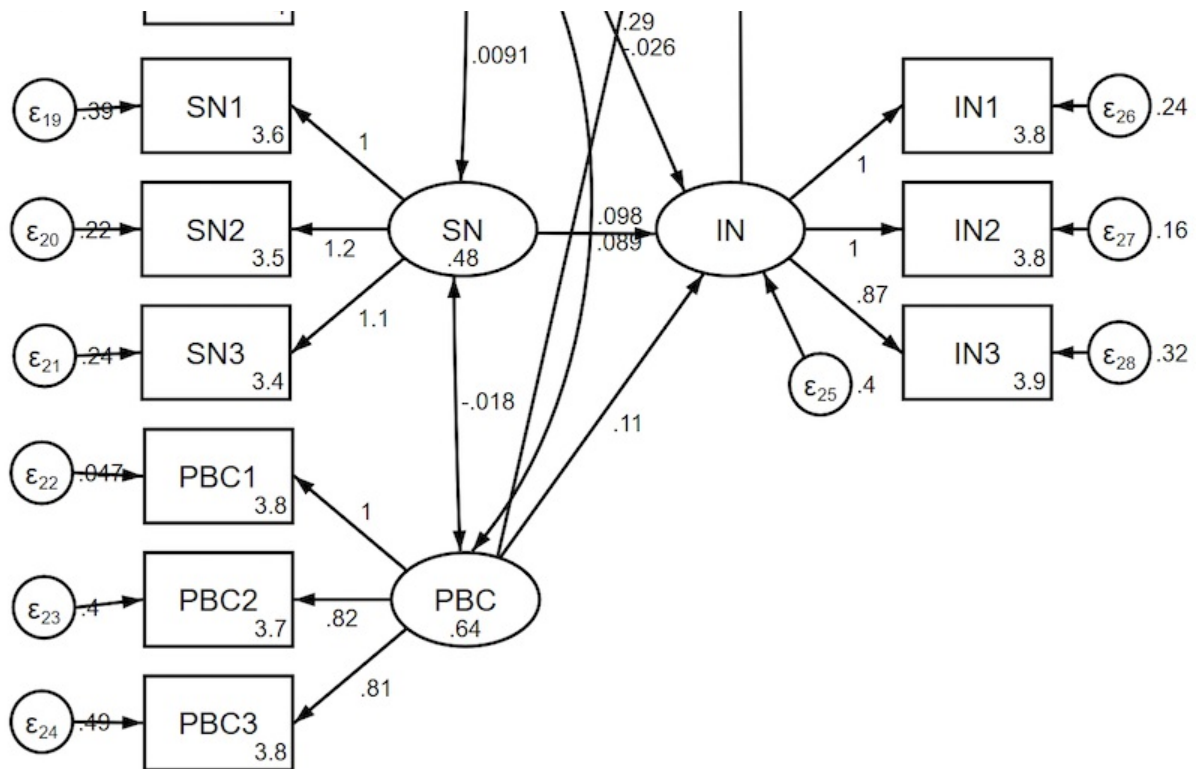
**Legend:** AC= Awareness of consequences, AR= Ascription of responsibility, PN= Personal norm

### Integrated model of TPB and NAM

Statistical outcomes of integrated model of TPB and NAM could be seen in Figure 8. Coefficients of the integrated model

of TPB and NAM can be found Table 3. With respect to integrated model of TPB and NAM, Fit statistic was  $\chi^2(260)=2.035$ ,  $p > \chi^2=0.000$ , RMSEA=0.044, 90% CI: 0.039-0.049,  $p_{close}=0.969$ , AIC=26868.831, BIC=27254.403, CFI=0.968, TLI=0.964, SRMR=0.080, and CD=1.000. In the measurement model, all the coefficients were significant ( $p < 0.001$ ). Regarding  $AT \rightarrow BE$  via IN, about 414 % of the effect of AT on BE is mediated by IN. Moreover, the mediated effect is about 1.3 times as large as the direct effect of AT on BE. The mediating effect of IN on the relationship between SN and BE was not calculated. Regarding  $PBC \rightarrow BE$  via IN, about 192 % of the effect of PBC on BE is mediated by IN. Moreover, the mediated effect is about 2.1 times as large as the direct effect of PBC on BE. Regarding  $AC \rightarrow BE$  via PN, about 187 % of the effect of AC on BE is mediated by PN. Moreover, the mediated effect is about 2.1 times as large as the direct effect of AC on BE. Regarding  $AR \rightarrow BE$  via PN, about 98 % of the effect of AR on BE is mediated by PN. Moreover, the mediated effect is about 49.7 times as large as the direct effect of AR on BE.





**Figure 8.** Statistical outcomes of integrated model of TPB and NAM.

**Notes:** AC = Awareness of consequence; AR = Ascription of responsibility; PN= Personal norm; SN = Subjective norm; PBC = Perceived behavioral control.

**Table 3.** Path coefficients of revised TPB, revised NAM, and integrated model of TPB and NAM.

Path	Coefficient	standardized error	p values	Hypotheses	Results
revised TPB					
AT→IN	0.285***	0.053	0.000	H1a	Supported
SN→ IN	0.099**	0.047	0.035	H1b	Supported
PBC→IN	0.106***	0.041	0.009	H1c	Supported
IN→BE	0.696***	0.063	0.000	H1d	Supported
AT→BE	-0.134**	0.057	0.020	H1e	Supported
PBC→BE	-0.058	0.043	0.182	H1f	Rejected
AT↔SN	0.009	0.024	0.713	H1g	Rejected
SN↔PBC	-0.018	0.026	0.489	H1h	Rejected
AT↔PBC	0.088***	0.028	0.002	H1i	Supported
revised NAM					
AC→PN	0.113**	0.046	0.015	H2a	Supported
AR→PN	0.118**	0.051	0.020	H2b	Supported
PN→BE	0.493***	0.047	0.000	H2c	Supported
AC→BE	-0.044	0.043	0.299	H2d	Rejected
AR→BE	-0.001	0.047	0.977	H2e	Rejected
AC↔AR	0.043	0.028	0.128	H2f	Rejected
Integratedmodel of TPB and NAM					
AC→PN	0.113**	0.046	0.014	H3a	Supported
AR→PN	0.118**	0.051	0.019	H3b	Supported
PN→BE	0.318***	0.047	0.000	H3c	Supported
IN→BE	0.520***	0.063	0.000	H3d	Supported
AC→BE	-0.017	0.041	0.680	H3e	Rejected
AR→BE	0.001	0.043	0.986	H3f	Rejected
AT→BE	-0.113**	0.057	0.048	H3g	Supported
PBC→BE	-0.026	0.041	0.523	H3h	Rejected
AT→IN	0.285***	0.054	0.000	H3i	Supported
SN→IN	0.098**	0.047	0.038	H3j	Supported
PBC→IN	0.106**	0.041	0.010	H3k	Supported
AT↔SN	0.009	0.024	0.715	H3l	Supported
SN↔PBC	-0.018	0.026	0.486	H3m	Supported
AT↔PBC	0.088***	0.028	0.002	H3n	Rejected
AC↔AR	0.043	0.028	0.128	H3o	Supported

Note: \*\*\*, \*\* and \* indicates 1%, 5% and 10% significance level, respectively.

In summary, the results indicated that structural models were good fit, suggesting that revised TPB model, revised NAM, and integrated model of TPB and NAM were confirmed. Among the SEM models, some relationships between latent variables were not significant. This may be because the survey data did not support the relationships. All in all, an



integrated model of TPB and NAM about choice of shopping bag was supported by the survey data.

## Discussion

### Summary of the main findings

This study revealed that integrated model of TPB and NAM could explain consumers' utilization behavior of shopping bags. Our study provides evidence toward the utility for consumers to choose shopping bags using TPB-NAM. Our findings suggest that AC, AR, and PBC could not lead to BE. When considering the control variables, SEM approach was performed to simultaneously investigate the influencing factors of utilization behavior of shopping bags. By corroborating the salience of the integrated model of TPB and NAM, this study enriches and expands pro-environment behavior research. The design and outcomes in this study is not in line with Savari's, et al. (2023).

### Key explanations

To the best of the authors' knowledge, this study represents for the first time the application of an integrated model of TPB and NAM to learn about the choice of shopping bags. Psychological determinants derived from TPB and NAM show a high correlation between the electric car purchase and use stages (Klößner, et al., 2013). A similar study starting from TPB and NAM basic assumptions reported the relationships of "attitude & personal norms → purchase intention" and "awareness of consequences → personal norms → attitude towards the product" (Zerbini, et al., 2019).

Path coefficients reflect influential strength of the main psychological determinants. Another study had the similar findings that attitude was found to be most dominant in predicting behavioural intention, followed by subjective norms and perceived behavioural control in the extended TPB model (Sadiq, et al., 2021). A study revealed that consumers' intention to buy were primarily influenced by attitudes, while social norms and perceived abilities played a minor role (Tønnesen & Grunert, 2021). A study revealed confirm the major role played by individual attitude in shaping buying intention, followed by subjective norms and perceived behavioral control (Scalco, et al., 2017). A study revealed Attitudes towards the electric car was identified as one the biggest predictors of Intention to Use (Oliveira, et al., 2022). A German study with TPB and suggest that attitudes and subjective norms were main drivers of stockpiling behavior (Lehberger, et al., 2021). Regarding drivers of intention, there are role differences of attitude, subjective norm and PBC between TPB-extended minced beef model and TPB-extended beef steak model (Spence, et al., 2018).

Significant relationships between scales in TPB were confirmed. For example, subjective norms have a stronger influence on intention to purchase than other social-psychological factors (Huibin Du, et al., 2018). A current study examined the role psychological determinants (attitudes, perceived behavioral control, and norms) play in organic consumerism (Johe & Bhullar, 2016). A study showed that attitude, subjective norm, and perceived behavioral control ↔ intention (Borges, et al.). Several studies indicate the important roles of attitudes, norms, and perceived behavioral control in buying behavior (Truong, et al. 2020; Buaphiban & Truong, 2017; Hoeksma, et al., 2017; Jianhua Wang, et al., 2020; Yeh, et al., 2021). But,

a study indicated that attitudes, subjective norms, and perceived price were not significant predictors of the intention to buy organic fish (Budhathoki, et al.,2022).

Some studies have the same findings with the statistical outcomes in this study. A study revealed attitudes and subjective norms → intention (Bezirgani & Lachapelle, 2021). Attitudes have the strongest effect on the intention to buy, while the intention is the strongest predictor of regular purchase (Maksan, et al., 2019). Similarly, the influence of subjective norm → intention was not supported (Ghazali, et al., 2017). A study revealed that SN and AT → consumers' green purchase intention (Joshi, et al.,2021). Attitudes rather than subjective norms and perceived behavioural control had a significant positive influence on reported behaviour (Meijer, et al., 2015). Meanwhile, the relationship of beliefs, and attitudes → intention to purchase sustainably produced foods is confirmed (Robinson & Smith, 2002). A study shows that subjective norm and perceived behavioral control are positively related to the intention (Simsekoglu & Nayum, 2019).

## Limitations

This empirical study has several limitations. According to the research, a further inclusive analysis can be conducted in the future to evaluate the purchase intention of green beauty products among non-green consumers and existing consumers on the foundation of norm activation theory. Based on the data set, further studies can study the relationship between factors in the TPB-NAM integration model or separate each theory to find factors influencing consumer intention and behavior towards bringing own shopping bags instead of using plastic bags in Vietnam.

## Conclusion

In this research, we propose an integrated model based on the Norm Activation Model and the Theory of Planned Behavior with confounding factors to predict choice of shopping bags. The results of this research confirmed the proposed hypotheses.

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