



Article Internal Motivations, External Contexts, and Sustainable Consumption Behavior in China—Based on the TPB-ABC Integration Model

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Abstract: Population expansion and the depletion of the planet's natural resources make it necessary to look at human consumption behavior in sustainable development. The purpose of this study is to investigate the influence factors, the influence paths, and the decision-making mechanisms of Chinese consumers' sustainable consumption behavior through the TPB–ABC integration theory. Based on survey data from 534 consumers in Dongying, China, this study used the partial least squares structural equation model (PLS-SEM) to analyze the main factors that influence the three sections of sustainable consumption behaviors, which are green purchase behavior, green transportation behavior, and recycling and resource conservation behavior. Decision-making mechanisms are discussed concerning impact pathways. The results prove that three internal motivations and two external contexts are intimately linked to customers' behavioral decisions, with external contexts indirectly shaping individual attitudes. Furthermore, the factors that influence various types of sustainable consumption practices differ. Specifically, green purchase behavior and green transportation behavior are mainly influenced by attitude variables, and negative contexts mainly influence recycling and resource conservation behavior are sustainable corresponding policy recommendations to promote sustainable consumption.

Keywords: sustainable consumption behavior (SCB); internal motivations; external contexts; the TPB-ABC integration model; partial least squares structural equation model (PLS-SEM)

1. Introduction

Environmental degradation caused by inappropriate consumption patterns of human beings is one of the most severe problems facing people today [1–3]. The search for sustainable consumption patterns has become a topic of widespread concern in countries worldwide [4,5]. In 2015, the United Nations Sustainable Development Summit officially adopted 17 Sustainable Development Goals (SDGs) [6], the blueprint for achieving a better and more sustainable future. Those are envisioned as universal goals relevant to developed and developing countries [7]. Among them, SDG 12 ensures sustainable consumption and production (SCP) patterns. This makes sustainable consumption a more important topic to be studied to help achieve the SDGs. Therefore, how to effectively promote sustainable consumption and harness the power of consumers to contribute to sustainable economic, social and environmental transformation are also issues worth studying.

Sustainable consumption is not about consuming less but consuming differently [8]. SCP is the integration of production, consumption, disposal and recycling processes [9] rather than focusing only on the quantity consumed. Especially in developing countries, sustainable consumption patterns should avoid reducing growth and undermining economic and social demand but rather increase social and economic prosperity by creating new markets and adopting appropriate policies and incentive structures, as well as stimulating better use of technology [10].



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Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https:// creativecommons.org/licenses/by/ 4.0/). China has become the second-largest economy, with GDP per capita exceeding \$10,000 for two consecutive years in 2019 and 2020 [11]. The booming service sector, driven by continued consumption upgrades, reflects Chinese consumers' increased demand for high-quality consumption [12]. The sustainable consumption market in China has unleashed vast consumer potential. More and more Chinese consumers are waking up to sustainability awareness and are actively practicing sustainable lifestyles [13]. Therefore, it is essential to research sustainable consumption behavior in emerging markets in China. Dongying, a prefecture-level city in Shandong Province, joined the UNEP Partnership for Action on Green Economy (PAGE) program in 2016. As the first city in China to be selected for PAGE, Dongying actively summarizes, introduces, and disseminates the city's sustainable development practices to the international community through the UN platform, providing developing countries with experiences and examples to follow [14].

Current research on sustainable consumption behavior has concentrated on two theoretical approaches: environmental psychology and environmental sociology [15]. The former approach mainly considers the influence of internal subjective factors on individual behavior. For example, ecological attitudes, behavioral perceptions, self-efficacy, and other internal factors can form the consumer's self-motivation, promoting sustainable consumption behavior [16]. The latter considers the interactions between micro individuals and external context systems and argues that individuals' ideas and behavioral choices depend on the level of social and technological development [17]. Undeniably, the existing studies provide strong explanatory power for the reasons for implementing consumers' sustainable consumption.

However, a review of the previous literature reveals that existing studies have mainly analyzed the influencing factors of sustainable consumption behavior from a single perspective of internal motivation [18] or external contexts [19], lacking a systematic exploration of the decision-making mechanism of sustainable consumption behavior from a multidimensional perspective. In addition, some studies measured different types of sustainable consumption behaviors and aggregated them into one variable [20,21], the measurement that assumed different types of sustainable consumption behaviors occurred simultaneously and synchronously. In fact, different behaviors have very different requirements in terms of cost, capacity, and convenience [20], which may result in the same individual having different attitudes and behaviors toward different types of sustainable consumption.

Accordingly, based on the Theory of Planned Behavior (TPB) [22] and Attitude-Behavior-Context (ABC) theory [19], the study attempts to construct a theoretical framework (Figure 1) that includes internal motivations and external contexts to explore the influencing factors and the decision-making mechanism of sustainable consumption behaviors and analyze the heterogeneity among different types of sustainable consumption behaviors [23,24]. This will further provide a multidimensional approach to promoting consumption behavior's sustainable transformation. It may help inform policies for a sustainable transformation of consumer behavior in developing countries.



Figure 1. The theoretical framework of the TPB-ABC integration model; Source: authors.

2. Literature Review and Hypothesis Development

2.1. The TPB–ABC Integration Model

The Theory of Planned Behavior (TPB) proposed by Ajzen et al. in 1991 is a wellestablished theory of the "attitude–behavior" relationship [22]. It has good explanatory and predictive power for the mental decision-making process of goal-oriented behavior. According to TPB, an individual's volitionally controllable behavior results from three internal motivational factors: attitude, subjective norm, and perceived behavioral control [25].

With the development of related research, TPB is considered insufficient to fully explain the complete mechanism of behavior implementation [26]. Since people face various external constraints and limitations when making behavioral decisions, internal motivations are not the only consideration. To improve the research, external contexts have been gradually incorporated into the study of sustainable consumption behavior [27]. The Attitude-Behavior-Context (ABC) theory is the leading theory used to examine the influence of external contexts on sustainable consumption behavior, which states that behavior (Behavior, B) is the result of the joint action of attitude variables (Attitude, A) and contextual factors (Context, C), and considers contextual factors as a crucial factor in determining whether an individual performs the behavior [19]. Many studies confirmed that adding contextual factors can make the model of consumer behavior explanation more complete [28–30].

A growing number of scholars attribute consumer behavior to the combined influence of internal motivations and external contexts, and the TPB–ABC integration model has emerged [31,32]. Wang et al. [33] explored the positive effects of policy instruments, as external contexts, on attitudes and environmental behavior by analyzing the results of a questionnaire survey of 1145 residents in Shanghai. Integrating TPB and ABC theories, Feng and Hua [34] demonstrated that internal motivations and external contexts are essential variables in predicting recycling behavior.

2.2. Sustainable Consumption Behavior (SCB)

Sustainable consumption refers to a natural, environmentally friendly, frugal, and healthy lifestyle that consumers fulfill under a more ecological and social development premise [35]. From the perspective of behavior, sustainable consumption behavior (SCB) is about the purchase of green products and the choice of green services and includes the use and recycling of products, with the fundamental purpose of protecting resources and the environment [36]. Therefore, SCB can also be seen as a category of personal environmental

behavior [37]. In summary, this study defines sustainable consumption behavior as having three sections: green purchase behavior, green transportation behavior and recycling and resource conservation behavior, which correspond to the acquisition, use and disposal of commodities, services, public goods and other means of subsistence by consumers.

2.3. Internal Motivations

SCB is both a consumption choice and an expression of internal motivations in individual behavior [38], consisting of attitudes (AT), subjective norms (SN) and perceived behavior control (PBC) [18]. Internal motivations influence people's behavioral decisions when they are faced with multiple available choices. It is also the most profound and fundamental psychological source that determines an individual's behavior [39]. Therefore, how individuals practice SCB is closely related to their internal motivations [40].

2.3.1. Attitude (AT)

Attitude is an essential internal motivational variable for SCB [41]. The sustainable consumption attitude refers to consumers' general and stable feeling or position toward SCB. The results of most empirical studies prove that a positive attitude has a facilitating effect on green product purchases [42], household recycling behavior [43], green transportation [44] and other SCB [45]. Based on the above discussion, the following hypotheses have been postulated:

H1a. AT is positively related to green purchase behavior (PUR).

H1b. AT is positively related to green transportation behavior (TRAN).

H1c. AT is positively related to recycling and resource conservation behavior (REC).

2.3.2. Subjective Norm (SN)

The TPB model's second determinant of behavior is SN [22]. It is defined as the perceived social pressure to perform or not to perform the behavior [46]. The purpose of this factor is to analyze the role of social pressure on an individual's decision to behave in a particular way, including the subject's specific perception of this passively imposed public opinion pressure and the subjective willingness to conform to this public opinion expectation [47,48]. Norm activation theory (NAT) has been applied to explain SCB, arguing that the direct antecedent of individuals' implementation of SCB is subjective norms [49–51]. A series of studies by social psychologists such as Schultz [52], Nolan [53] and Goldstein [54] have shown that individuals engage in SCB significantly more often when they are told that the vast majority of people or their surrounding neighbors are engaging in similar behaviors than when the benefits of environmental protection are simply promoted. Based on the above discussion, the following hypotheses have been postulated:

H2a. *SN* is positively related to green purchase behavior (PUR).

H2b. *SN* is positively related to green transportation behavior (TRAN).

H2c. *SN* is positively related to recycling and resource conservation behavior (REC).

2.3.3. Perceived Behavioral Control (PBC)

PBC reflects the role of past experiences and expected hindrances in influencing individuals' specific behavioral decisions [22]. Hines et al. [41] used meta-analysis to synthesize previous research on SCB and indicated that consumers who have PBC believe that they can influence the environment and are more inclined to adopt SCB.

PBC can be divided into two components: self-efficacy [55] and perceived controllability [56]. The former refers to the conviction that one could successfully perform a specific behavior based on the consumer's perceived effectiveness and knowledge of SCB. The latter is the individual's assessment of the impact of these factors in facilitating or hindering specific behaviors [22]. Higher perceived behavioral controllability promotes SCB based on a survey of 626 consumers [57]. The findings of Kim et al. using structural model equations suggest that the higher the perceived behavioral controllability of consumers, the higher the likelihood of actually engaging in SCB [58]. Based on the above discussion, the following hypotheses have been postulated:

H3a. PBC is positively related to green purchase behavior (PUR).

H3b. *PBC* is positively related to green transportation behavior (TRAN).

H3c. PBC is positively related to recycling and resource conservation behavior (REC).

2.4. External Contexts

External contexts refer to individuals' objective factors when adopting a particular behavior [59]. Specifically, external contexts include advertising, government regulations, legal and institutional factors, material incentives and costs, technological constraints and the availability of infrastructure to support the behavior [60,61]. The external contexts, as the external environment faced by individual psychological factors, can create opportunities and generate constraints for forming personal attitudes and behaviors [19]. Many scholars found in their practical studies that external contexts play a significant role in promoting or hindering the implementation of SCB [19,62]. According to the promotion and inhibition of external contexts on individual behavior, this study divided the external contexts into positive contexts and negative contexts [21].

2.4.1. Positive Contexts (PC)

External contexts can positively influence the likelihood of individuals engaging in SCB [61]. According to Nudge Theory, policies can effectively drive individuals to make decisions in the direction that the government expects to be beneficial for the welfare of the whole society [63]. Policy regulations and measures positively influence people's SCB [64–66]. Financial incentives can also positively impact the SCB of the population. It was found that households that received financial incentives saved more on household electricity than those in the control group [67]. Cameron showed that if the government subsidy was equivalent to a 15% cost reduction, it could lead to 3% of households engaging in conservation and recycling behavior [68].

Since financial incentives are insufficient to positively guide SCB in the long term [69], guidance-based external contexts that intervene in SCB, such as advertising and communication education, are receiving increasing attention. Through humanistic communication, persuasion and presentation, advertising and education can improve consumers' awareness and understanding of SCB, facilitating its implementation of SCB. Publicly oriented advertising and education significantly impact SCB [70,71]. Based on the above discussion, the following hypotheses have been postulated:

H4a. PC is positively related to green purchase behavior (PUR).

H4b. *PC* is positively related to green transportation behavior (TRAN).

H4c. PC is positively related to recycling and resource conservation behavior (REC).

2.4.2. Negative Contexts (NC)

According to the ABC model, negative contextual factors increase if individuals perceive that performing a behavior is time-consuming, costly, or requires overcoming many difficulties [19]. Gifford [72] suggested that negative contextual factors such as the effort, monetary costs, facility availability, etc., required to engage in SCB may prevent such behaviors from occurring or turn them into impossible tasks. Miao and Wei [73] further confirmed the constraints of time and effort required to engage in SCB by excluding

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motivation and awareness. Negative contexts can be considered an important influence on SCB [74]. Based on the above discussion, the following hypotheses have been postulated:

H5a. *NC* is negatively related to green purchase behavior (PUR).

H5b. *NC* is negatively related to green transportation behavior (TRAN).

H5c. NC is negatively related to recycling and resource conservation behavior (REC).

2.5. Internal Motivations as Mediators

Although internal motivations can predict SCB to some extent, such as green food purchase [75], energy conservation [76] and commodity recycling [77], many studies also confirmed the existence of inconsistencies between internal motivations and SCB [78,79]. Thus, other conditions may inhibit the transformation from internal motivations to behavior, resulting in an internal factors-behavior gap in SCB. Several studies confirmed from different perspectives that external contexts might influence the relationship between internal motivations and behavior. In other words, the effect of internal motivations on specific behaviors may depend on the strength of the external contexts [80], especially the constraints such as the effort, cost, or time required to adopt the behavior [19,81]. Based on the above discussion, the following hypotheses have been postulated:

H6. *PC* is positively related to AT.

H7. NC is negatively related to AT.

H8a. AT mediates the relationship between PC and PUR.

H8b. AT mediates the relationship between PC and TRAN.

H8c. *AT mediates the relationship between PC and REC.*

H9a. AT mediates the relationship between NC and PUR.

H9b. *AT mediates the relationship between NC and TRAN.*

H9c. AT mediates the relationship between NC and REC.

In summary, this study constructs a hypothesis model of consumer sustainable consumption behavior influence paths based on the TPB–ABC integration theory and sustainable consumption practices in Dongying, China, as shown in Figure 2.



Figure 2. The hypothesis model of consumer sustainable consumption behavior influences paths.

3. Material and Method

3.1. Questionnaire Design

Based on the hypothesis model, a questionnaire on the factors influencing sustainable consumption behavior was designed using focus group discussions, on-site collection, expert evaluation and representative interviews. The pre-survey was first conducted in a street (subdistrict) in Dongying and a university in Beijing. The questionnaire was adjusted and improved for the formal survey regarding the pre-survey results to accurately and fully reflect the subjective views and practices of the respondents. The formal questionnaire contains eight latent variables, including positive context (PC), negative context (NC), attitude (AT), subjective norm (SN), perceived behavioral control (PBC), green purchase behavior (PUR), green transportation behavior (TRAN) and recycling and resource conservation behavior (REC), with each latent variable consisting of three measurement items. The measurement items were adapted from existing literature to ensure the scale's content validity. The specific items and their sources are shown in Table 1. All items were measured using a three-level scale (1 = disagree, 2 = neither agree nor disagree, 3 = agree). In addition to the 24 items above, individual characteristics such as gender, age, education level and monthly income were also included in the questionnaire, which consisted of a total of 32 items.

Table 1. Measurement item design of latent variables and observed variables.

Latent Variables	Measurement Items (Observed Variables)	Source	
	Advertising and communication education makes me tend toward sustainable consumption. (PC1)	[70]	
Positive context (PC)	Government regulations make me tend toward sustainable consumption. (PC2)	[82]	
	Financial incentives make me tend toward sustainable consumption. (PC3)	[66]	
	The high cost prevents me from implementing sustainable consumption. (NC1)	[83]	
Negative context (NC)	Time-consuming prevents me from implementing sustainable consumption. (NC2)	[84]	
	Lacking convenient infrastructure facilities prevents me from implementing sustainable consumption. (NC3)	[83]	
	I think sustainable consumption is beneficial. (AT1)	[85]	
Attitude (AT)	I think sustainable consumption is sensible. (AT2)	[84]	
	I am willing to adopt sustainable consumption practices. (AT3)	[86]	
	My family and most people important to me believe that sustainable consumption is the right thing to do. (SN1)	[85,87]	
Subjective norm (SN)	My neighbors are active in sustainable consumption. (SN2)	[87]	
	I agree that most celebrities I respect and admire are active in sustainable consumption. (SN3)	[88]	
	I can make my own decisions about sustainable consumption. (PBC1)	[89]	
Perceived behavioral control (PBC)	I can afford to take sustainable consumption. (PBC2)	[89]	
	I have the knowledge and information for sustainable consumption. (PBC3)	[88]	
	I tend to buy second-hand items. (PUR1)	[70]	
Green purchase behavior (PUR)	I tend to buy energy-efficient appliances. (PUR2)	[70]	
	I tend to buy green and organic food. (PUR3)	[70]	
Green transportation	I prefer public transportation. (TRAN1)	[90]	
behavior (TRAN)	I prefer to walk for short distances. (TRAN2)	[90]	
	I prefer to adopt new energy vehicle. (TKAN3)	[90]	
Recycling and resource	I am willing to implement waste separation. (REC1)	[91]	
conservation behavior (REC)	I am willing to recycle used appliances. (REC2)		
	I am Willing to recycle used clothes. (KEC3)	[91]	

3.2. Data Collection

Dongying has a good policy environment and facility base for sustainable consumption and has committed to actively practicing sustainable development since joining the PAGE program of the UN in 2016. As a result, it was selected as a study area. In January 2018, our research team conducted a formal field survey among permanent residents in Dongying. The data was collected through a questionnaire survey. The formal survey adopted the Probability Proportionate to Size (PPS) Sampling method to select the sample. The specific sampling process was as follows. PPS was used to identify each district (two districts based on each district's share of the city's population), street (three per sample district, based on each street's share of each district's population) and community (two per sample street, based on each community's share of each street's population) drawn from the city. Communities were drawn using a random number table, resulting in the selection of 12 communities in the city. At the community level, systematic sampling was used to select household samples (sample size of no more than 45 per community, but calculated with a sample size of 55 in the systematic sampling process in case of blanking) and selected the members in the selected households whose birthday were closest to June 30th to answer the questionnaire face-to-face. A total of 586 questionnaires were collected, of which 552 were valid, with a return rate of 94.36%. After removing the missing values, a new database comprising 534 samples was obtained. The measurement software used in the data collation process for this study was R (version 4.2.0).

Four demographic variables commonly used in behavioral research-gender, age, education level and monthly income-were selected as sample characteristics (Table 2). The ratio of male to female respondents in the sample was approximately 4 to 6 (216:318). The age structure of the respondents shows a slightly aging trend, with 28.46% of the sample aged 55 and above, including 14.79% aged 65 and above, with most of the sample concentrated between 35 and 54 years old, with 28.84% aged 35 to 44 and 24.16% aged 45 to 54. 18.54% of the sample was under 34 years old. The age distribution of the sample is generally consistent with the distribution in Dongying. 17.23% of respondents had middle-high education or below (20%), more than one-third (38.58%) attended high school education, and 4 out of 10 respondents held college-level (21%) or university-level education (20%). A total of 0.94 percent attended post-graduate education or higher. In terms of monthly income, nearly three-quarters (74.16%) of the respondents had a monthly income between RMB 3000-8000, with only 2.43% of respondents earning more than RMB 10,000 per month. The overall distribution of education and monthly income is generally consistent with the actual situation of Dongying residents.

Variable	Туре	Frequency	Proportion (%)
	Male	318	59.55
Gender	Female	216	40.45
	18–24	10	1.87
	25–34	89	16.67
4 70	35–44	154	28.84
Age	45-54	129	24.16
	55-64	73	13.67
	>65	79	14.79
	Middle high or lower	92	17.23
	High school	206	38.58
Education	Čollege	126	23.60
	University	105	19.66
	Post-graduate or higher	5	0.94
	<3000	40	7.49
NG 111 -	3000-5000	223	41.76
Monthly income	5000-8000	173	32.40
(KIVIB)	8000-10,000	85	15.92
	>10,000	13	2.43

Table 2. Description of sample structure characteristic.

3.3. Methodology

Partial Least Squares Structural Equation Modeling (PLS-SEM) [93–95] was adopted in this study, which does not require the data to obey a multivariate normal distribution and has significant advantages in dealing with complex models with a large number of explanatory variables and multiple correlations between variables [93]. Compared to covariance-based structural equations modeling (CB-SEM), PLS-SEM offers considerable convenience and flexibility in forecasting and is more useful in practical fields where application and practical forecasting control are valued. Since the sample data obtained from this investigation does not strictly obey a normal distribution and many variables in the study model and the relative complexity of the relationships involved, this study uses PLS-SEM for an exploratory study.

4. Findings

The data analysis procedures were modeled on the two-step reporting method suggested by Anderson and Gerbing [96], where the measurement model (relationship between each latent variable and related observed variables) was first evaluated. Then the structural model (association between latent variables) was assessed and analyzed. The software used for the data analysis was SmartPLS (version 3.3.9), developed by Ringle et al. in 2015 [97].

4.1. Measurement Model

In the PLS-SEM measurement model analysis, the main focus is on testing its reliability and validity. Reliability is the trustworthiness or stability of the values obtained from a test and is an indicator of the consistency of the measurement. The reliability tests were measured using three indicators: Cronbach's alpha, Composite reliability and Eigenvalues (Eig). The Cronbach's alpha indicator was introduced by Cronbach [98] in 1951 to respond to the internal consistency between measurement questions. According to the criteria proposed by Nunnally [99], a value of 0.7 or above for Cronbach's alpha is considered to be of high reliability in general exploratory studies. Composite reliability is another metric to assess the reliability of each measurement model. Composite reliability greater than 0.7 [100] is generally acceptable. As shown in Table 3, the Cronbach's alpha values for the measurement model range from 0.702 to 0.886, and the composite reliability values range from 0.835 to 0.930, all of which are above 0.7, which indicates that the internal consistency reliability of the scale indicators of the measurement model is acceptable. The eigenvalues (Eig) of the correlation matrix are another criterion indicating the appropriateness of the measured variable in reflecting the corresponding latent variable [95,101]. According to Sanchez [95], if the first eigenvalue in the correlation matrix is higher than 1 and the second eigenvalue is lower than 1, each group of indicators is in a unidimensional space. The measured variables in the measurement model all reflect the latent variables well. According to the results in Table 3, the first eigenvalues of the measurement models ranged from 1.886 to 2.448, and the second eigenvalues ranged from 0.419 to 0.686, indicating that the measured variables in all eight measurement models were a good reflection of these relevant latent variables.

Validity assessments focus on the measurement model's convergent validity and discriminant validity. As suggested by Anderson and Gerbing [96], convergent validity can be tested with validating factor analysis to determine whether each question item converges to the variable to be measured. According to Rumanti et al. [102], a measured variable is considered to have considerable explanatory power for a latent variable if the standardized factor loadings of the measured variable all exceed 0.7 or more. Furthermore, according to Ringle et al. [103] and Sanchez [95], the average variance extracted (AVE) value for all constructs needs to be above a threshold of 0.5 to satisfy the criterion of convergent validity of the latent variable. As shown in Table 3, the loadings for all measured variables ranged from 0.745 to 0.946, indicating a high degree of correlation between all measured variables and their associated latent variables; the average variance extracted for all constructs ranged from 0.628 to 0.816. For example, the AVE value for AT is 0.816, which means that AT1,

AT2 and AT3 explain 81.6% of the variance in the AT variable. Therefore, the convergent validity of this measurement model is acceptable.

Construct Identifier	Items	Outerloadings	Cronbach's Alpha	Composite Reliability	Eig 1st	Eig 2nd	AVE
	PC1	0.849					
PC	PC2	0.782	0.729	0.847	1.948	0.600	0.649
	PC3	0.785					
	NC1	0.855					
NC	NC2	0.822	0.820	0.891	2.212	0.530	0.731
	NC3	0.887					
	AT1	0.933					
AT	AT2	0.946	0.886	0.930	2.448	0.419	0.816
	AT3	0.826					
	SN1	0.824					
SN	SN2	0.847	0.746	0.854	1.991	0.541	0.662
	SN3	0.768					
	PBC1	0.862					
PBC	PBC2	0.895	0.843	0.905	2.286	0.448	0.761
	PBC3	0.859					
	PUR1	0.824					
PUR	PUR2	0.822	0.721	0.843	1.929	0.634	0.642
	PUR3	0.757					
TRAN	TRAN1	0.855					
	TRAN2	0.774	0.702	0.835	1.886	0.686	0.628
	TRAN3	0.745					
REC	REC1	0.784					
	REC2	0.869	0.774	0.868	2.070	0.574	0.687
	REC3	0.832					

Table 3. Reliability and convergent validity test of the measurement model.

As suggested by Hair et al. [93], discriminant validity was mainly assessed through cross-loadings and the Fornell-Larcker criterion. Cross-loadings refer to the contribution of a question item to other latent variables, and discriminant validity is considered acceptable when the indicator's loadings on the relevant constructs are more significant than all its loadings on the other constructs. As shown in Table 4, using the PC to construct an example, the loading values of PC1, PC2 and PC3 with the latent variable positive context (CC) were 0.849, 0.782 and 0.785, which were all greater than 0.5 and significantly exceeded the cross-loadings values with other latent variables such as negative context (NC) and perceived behavioral control (PBC). This indicates that the model has good discriminant validity among the latent variables. Meanwhile, according to the Fornell–Larcker criterion [104], when the square root of the AVE of each construct is greater than the correlation coefficient between the latent variable and the other variables, the discriminant validity of the measurement model distinction is acceptable. In this model, the square root of AVE on the main diagonal of Table 5 is much higher than the non-diagonal values. Therefore, the discriminant validity between the latent variables in this model is good.

	AT	NC	РВС	РС	PUR	REC	SN	TRAN
AT1	0.933	-0.221	0.252	0.238	0.408	0.258	0.163	0.317
AT2	0.946	-0.224	0.237	0.244	0.430	0.261	0.156	0.335
AT3	0.826	-0.225	0.174	0.217	0.287	0.225	0.088	0.259
NC1	-0.254	0.855	-0.304	-0.156	-0.236	-0.341	-0.142	-0.085
NC2	-0.164	0.822	-0.406	-0.160	-0.167	-0.213	-0.086	-0.087
NC3	-0.195	0.887	-0.424	-0.072	-0.164	-0.264	-0.074	-0.115
PBC1	0.203	-0.256	0.862	0.201	0.271	0.179	0.070	0.290
PBC2	0.243	-0.397	0.895	0.131	0.196	0.217	-0.012	0.216
PBC3	0.204	-0.484	0.859	0.122	0.291	0.228	-0.034	0.205
PC1	0.224	-0.122	0.166	0.849	0.250	0.236	0.151	0.147
PC2	0.213	-0.174	0.156	0.782	0.203	0.212	0.207	0.166
PC3	0.185	-0.070	0.098	0.785	0.273	0.141	0.179	0.143
PUR1	0.361	-0.169	0.276	0.263	0.824	0.292	0.114	0.236
PUR2	0.297	-0.215	0.243	0.204	0.822	0.256	0.184	0.176
PUR3	0.349	-0.163	0.184	0.249	0.757	0.252	0.153	0.126
REC1	0.172	-0.230	0.205	0.154	0.227	0.784	0.036	0.034
REC2	0.241	-0.271	0.205	0.191	0.243	0.869	0.055	0.113
REC3	0.260	-0.306	0.186	0.252	0.345	0.832	0.094	0.085
SN1	0.157	-0.135	-0.012	0.211	0.155	0.061	0.824	0.182
SN2	0.103	-0.097	0.014	0.161	0.178	0.093	0.847	0.162
SN3	0.115	-0.059	0.029	0.167	0.112	0.029	0.768	0.158
TRAN1	0.308	-0.130	0.222	0.153	0.197	0.092	0.165	0.855
TRAN2	0.248	-0.026	0.224	0.205	0.185	0.077	0.167	0.774
TRAN3	0.247	-0.111	0.204	0.080	0.152	0.059	0.156	0.745

Table 4. Cross-loadings values for each block of indicators.

Table 5. Discriminant validity matrix (Fornell-Larcker criterion).

	AT	NC	PBC	PC	PUR	REC	SN	TRAN
AT	0.903							
NC	-0.246	0.855						
PBC	0.247	-0.433	0.872					
PC	0.258	-0.152	0.175	0.806				
PUR	0.421	-0.227	0.294	0.300	0.802			
REC	0.275	-0.329	0.238	0.246	0.334	0.829		
SN	0.153	-0.122	0.011	0.221	0.185	0.078	0.814	
TRAN	0.339	-0.111	0.274	0.188	0.226	0.097	0.205	0.792

Note: Values (bold) on the diagonal represent the square root of the AVE while the off-diagonals are correlations.

4.2. Structural Model

In the structural model analysis section, first, the validity of the structural model was assessed using R^2 (predicted effect value) and Q^2 (predicted correlation) [96]. In terms of the overall model fit, the R^2 of the general model was 0.731, indicating that the latent variables explained 73.1% of consumers' sustainable consumption behavior, which was greater than 50%, proving that the model assumptions were reasonable and the model fit was good. The Q^2 values for the four endogenous latent variables ranged from 0.084 to 0.157, which met the criterion of >0, indicating that the structural model was valid.

Furthermore, according to the Goodness of Fit (GoF) formula ($GoF = \sqrt{communality \times R^2}$) proposed by Tenenhaus et al. [105], this metric is used to indicate the degree of fit between the simulation results and the actual measurements. Studies have shown that GoF values above 0.26 are considered to have good applicability in areas such as social and behavioral sciences [106]. The GoF value for this model was calculated to be 0.356, indicating a good model fit.

In order to assess the coefficients and significance of each path proposed in the research model, the paths were recalculated after 5000 replicate samples were taken based on the Bootstrapping method. The model validation results are shown in Table 6 and parameter paths of the hypotheses in the model are shown in Figure 3. Overall, 12 of the 17 hypotheses for direct effects were supported. There was a significant positive effect of AT on PUR ($\beta = 0.312$, p < 0.000), TRAN ($\beta = 0.262$, p < 0.000) and REC ($\beta = 0.312$, p < 0.001). Hypotheses H1a, H1b and H1c were all supported. SN has a significant positive effect on both PUR ($\beta = 0.095$, p < 0.017) and TRAN ($\beta = 0.160$, p < 0.000) but not on REC ($\beta = -0.012$, p < 0.793). Hypotheses H2a and H2b were supported, but H2c was not supported. PBC also had a significant positive effect on both PUR ($\beta = 0.170$, p < 0.001) and TRAN ($\beta = 0.233$, p < 0.000) and no significant effect on REC ($\beta = 0.068$, p < 0.157). Hypotheses H3a and H3b were supported but H3c was not. PC had a significant positive effect on PUR ($\beta = 0.162$, p < 0.001), REC ($\beta = 0.159$, p < 0.001) and AT ($\beta = 0.226$, p < 0.000), but no significant effect on TRAN ($\beta = 0.057$, p < 0.268). NC had a significant positive effect on REC ($\beta = -0.237$, p < 0.000) and AT ($\beta = -0.212$, p < 0.000) had a significant negative effect, but no significant effect on PUR ($\beta = -0.237$, p < 0.000) and AT ($\beta = -0.212$, p < 0.000) had a significant negative effect, but no significant effect on PUR ($\beta = -0.237$, p < 0.000) and AT ($\beta = -0.212$, p < 0.000) had a significant negative effect, but no significant effect on PUR ($\beta = -0.237$, p < 0.000) and AT ($\beta = -0.212$, p < 0.000) had a significant negative effect, but no significant effect on PUR ($\beta = -0.237$, p < 0.000) and AT ($\beta = -0.212$, p < 0.000) had a significant negative effect, but no significant effect on PUR ($\beta = -0.237$, p < 0.000) had a significant negative effect, but no significant effect on PUR ($\beta = -0.040$, p < 0.347) and TRAN ($\beta = 0.083$, p < 0.095). Therefore, H4a, H4c, H5c, H6 and H7 were all supported and H4b, H5a and H5b were not supported.

Table 6. Hypothesis testing of the structural model.

Hypotheses	Path	Estimate	Standard Error	T-Value	p Value	95%CI	Results
H1a	$\text{AT} \rightarrow \text{PUR}$	0.312	0.053	5.886	0.000	[0.206, 0.412]	Supported
H1b	$AT \rightarrow TRAN$	0.262	0.043	6.129	0.000	[0.182, 0.350]	Supported
H1c	$AT \rightarrow REC$	0.161	0.050	3.235	0.001	[0.061, 0.256]	Supported
H2a	$\mathrm{SN} ightarrow \mathrm{PUR}$	0.095	0.040	2.388	0.017	[0.020, 0.176]	Supported
H2b	$SN \rightarrow TRAN$	0.160	0.044	3.642	0.000	[0.078, 0.248]	Supported
H2c	$SN \rightarrow REC$	-0.012	0.044	0.262	0.793	[-0.097, 0.075]	Not Supported
H3a	$PBC \rightarrow PUR$	0.170	0.052	3.275	0.001	[0.068, 0.273]	Supported
H3b	$PBC \rightarrow TRAN$	0.233	0.048	4.824	0.000	[0.139, 0.329]	Supported
H3c	$PBC \rightarrow REC$	0.068	0.048	1.415	0.157	[-0.025, 0.162]	Not Supported
H4a	$PC \rightarrow PUR$	0.162	0.050	3.237	0.001	[0.066, 0.261]	Supported
H4b	$PC \rightarrow TRAN$	0.057	0.052	1.108	0.268	[-0.043, 0.157]	Not Supported
H4c	$PC \rightarrow REC$	0.159	0.046	3.475	0.001	[0.070, 0.250]	Supported
H5a	$NC \rightarrow PUR$	-0.040	0.043	0.940	0.347	[-0.124, 0.041]	Not Supported
H5b	$NC \rightarrow TRAN$	0.083	0.050	1.668	0.095	[-0.015, 0.178]	Not Supported
H5c	$NC \rightarrow REC$	-0.237	0.049	4.842	0.000	[-0.333, -0.141]	Supported
H6	$PC \rightarrow AT$	0.226	0.053	4.225	0.000	[0.117, 0.325]	Supported
H7	$\text{NC} \rightarrow \text{AT}$	-0.212	0.037	5.724	0.000	[-0.279, -0.135]	Supported



Figure 3. Parameter path of the structural equation model standardized path coefficient estimates (* p < 0.05, ** p < 0.01, *** p < 0.001).

The mediation effect (indirect effect) was also calculated using the Bootstrapping method after 5000 replicate samples. As shown in Table 7, the results demonstrated that the mediation effect of PC has a significant positive impact on the relationships between AT and PUR ($\beta = 0.071$, p < 0.001), TRAN ($\beta = 0.059$, p < 0.003) and REC ($\beta = 0.036$, p < 0.012). NC has a significant negative impact on the relationships between AT and PUR ($\beta = -0.055$, p < 0.000) and REC ($\beta = -0.034$, p < 0.008). Thus, all six hypotheses regarding mediation effects (H8a, H8b, H8c, H9a, H9b, H9c) were supported.

Hypotheses Path Estimate **Standard Error T-Value** 95%CI Results p value $PC \rightarrow AT \rightarrow$ H8a 0.071 0.021 3.370 0.001 [0.032, 0.113] Supported PUR $PC \to AT \to$ H8b 0.059 0.020 2.991 0.003 [0.025, 0.102] Supported TRAN $PC \to AT \to$ H8c 2.501 0.012 0.036 0.015 [0.010, 0.067]Supported REC $NC \to AT \to$ H9a -0.0660.016 4.228 0.000 [-0.098, -0.037]Supported PUR $NC \rightarrow AT \rightarrow$ H9b -0.0550.016 3.526 0.000 [-0.090, -0.028]Supported TRAN $NC \rightarrow AT \rightarrow$ H9c -0.0340.013 2.637 0.008 [-0.062, -0.011]Supported REC

Table 7. The path coefficient result of mediating effect model.

5. Discussion

This study divides sustainable consumption behavior into three sectors: green purchase behavior, green transportation behavior and recycling and resource conservation behavior. The influence paths of internal motivations and external contexts are investigated on different sustainable consumption behaviors. Meanwhile, the validity of the TPB–ABC integrated model as a research model to explain consumers' sustainable consumption behavior is confirmed, which is in line with the conclusion of previous studies [31,32,34].

As mentioned earlier, these three sectors of sustainable consumption behaviors are all positively or negatively influenced by both internal motivation and external contexts, but the paths of influence are different. For green purchase behavior, SN, AT and PBC of internal motivation positively influence behavior, with AT considered the most critical determinant ($\beta = 0.312$). This indicates that consumers' subjective preferences for green purchase behavior directly influence their implementation of this behavior. This is in line with Tan's study [107]. PC in external contexts can directly contribute to the formation of green purchase behavior. However, the effect of NC on consumers' green purchase behavior was not statistically significant. Therefore, it can be inferred that advertising, government regulations and financial incentives are positively associated with green purchase behavior. Still, high cost, time consumption and lack of infrastructure are indirect constraints on green purchase behavior. The results also suggest that attitude plays a mediating role in the relationship between external context and behavior. In other words, PC indirectly motivates green purchase behavior by promoting the formation of consumer attitudes towards sustainable consumption. Although NC does not directly limit green purchase behavior, the attitude is susceptible to the negative influence of NC, thus limiting the occurrence of green purchases. A possible explanation is suggested by the low-cost hypothesis [108]. The smaller the perceived negative context in which the behavior is engaged in a given situation, the greater the likelihood that attitudes will be transformed into actual behavior.

The second section of sustainable consumption in this study is green transportation behavior. According to the measurement results, external contexts do not directly influence green transportation behavior, unlike green purchases. Still, PC and NC can have a modestly positive and negative influence on green travel, respectively, with attitude as a mediator. This is consistent with behavioral reasoning theory (BRT) findings that consumers use positive or negative psychological processes or paths to make consumption decisions [18]. The reasonable reason is that the advertising, policy regulation and economic incentives for green transportation in China are developing reasonably with a better social atmosphere forming. At the same time, public transportation in China is cheap and timesaving, so the constraints on green transportation might not come from the external context. Therefore, the indirect effect of the external context on green transportation is mainly caused by subjective attitudes. In addition to AT, the other two internal motivations, SN and PBC, also positively impact green transportation.

The significant effects of PC ($\beta = 0.159$) and NC ($\beta = -0.237$) on recycling and resource conservation behavior suggest that, on the one hand, the policy context, advertising and economic incentives of recycling and resource conservation directly promote consumers to perform this behavior in China. On the other hand, waste separation facilities are not complete, and consumers still have to overcome many constraints, such as time and effort, when implementing waste separation. Unlike the first two sections, neither SN nor PBC significantly affects recycling and resource conservation among internal motivations. The above findings are corroborated by the relevant studies of Meng et al. [109].

6. Conclusions

Promoting the transformation of consumers' consumption patterns is a crucial breakthrough in promoting sustainable development. Unlike previous studies, this study constructs a theoretical framework that includes both internal motivations and external contexts to explain the decision-making mechanism of consumers' sustainable consumption behaviors. The conclusions show that, in general, attitudes significantly influence the implementation of sustainable consumption behaviors, while attitudes are positively and negatively affected by positive and negative contexts, respectively. The strength of the effects of each influencing factor on different sectors of sustainable consumption behaviors varied slightly. For green purchase and green transportation behaviors, the impact of internal motivations is higher than the external contexts' and becomes the most important influencing factor. In contrast, consumers' recycling and resource conservation behaviors are more influenced by external contexts. In addition, attitudes are partially mediated between external contexts and sustainable consumption behaviors.

The theoretical implications of this study are reflected as follows. First, two critical variables influencing sustainable consumption behavior, internal motivations and external contexts, are verified. Consumers' sustainable consumption behavior can be effectively motivated by internal motivations; at the same time, when consumers perceive that external contexts have positive or negative effects on their behavior, they will increase or decrease their sustainable consumption behavior accordingly. Second, this study extends the theory of planned behavior (TPB) and Attitude-Behavior-Context (ABC) theory to sustainable consumption. By developing to the micro and macro levels and systematically exploring the factors influencing sustainable consumption behavior, the theories become more effective in explaining the implementation process of consumers' sustainable consumption behavioral decision-making mechanisms.

The findings of this study have the following implications for urban authorities to develop measures to motivate citizens to implement sustainable consumption behaviors. Firstly, relevant authorities should work to reduce or eliminate negative contexts that prevent consumers from participating in sustainable consumption behaviors. For example, relevant authorities should strive to improve the appropriate infrastructure, such as increasing the number of sorting bins recycling service staff to make it more convenient for consumers to participate in sustainable consumption behavior. Secondly, the government and companies should provide incentives or promotional strategies to reduce the high costs of sustainable consumption, such as reducing taxes or lowering the prices of environmentally friendly products. Finally, the internal drivers of consumers cannot be ignored, as some negative contexts for sustainable consumption behavior are long-standing

and objective. Therefore, in such a realistic situation, policymakers should take some effective measures to foster consumers' attitudes toward sustainable consumption, such as strengthening publicity and education to enhance their level of perceived behavioral control. By improving sustainable consumption attitudes, the adverse effects of negative situations that are difficult to overcome in the short term can be reduced. An internal driving mechanism for sustainable consumption can be formed over a long time.

The limitations of the study are as follows. Firstly, because of the limited number of influencing factors identified in this study, the behavioral decision-making mechanism established can only partially explain the occurrence of sustainable consumption behavior, which can be discussed in more depth in future studies. Secondly, the research methodology also needs improvement. Although the sample was randomly selected from the residents of Dongying and the findings are close to the actual situation, as a study of Chinese consumers, this study's sample size and representativeness are still limited. Thirdly, due to the difficulty of obtaining actual observed data on individual sustainable consumption behavior based on the self-report measure commonly used in the previous literature. Thus, it cannot effectively avoid the measurement error caused by the inconsistency between the subjective reports of respondents' behavior and their actual objective behavior.

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