






Role of Habit in Household Waste Recycling Behavior: Evidence from an Emerging Country

Md Tamzidul Islam^{1*}, Md Hasibul Islam¹, Md Asif Kamal²

¹ Department of Operations and Supply Chain Management, Faculty of Business Administration, American International University-Bangladesh, Dhaka 1229, Bangladesh

² Department of English, Faculty of Arts and Social Science, American International University-Bangladesh, Dhaka 1229, Bangladesh

Corresponding Author Email: tamzidul@aiub.edu

Copyright: ©2024 The authors. This article is published by IETA and is licensed under the CC BY 4.0 license (<http://creativecommons.org/licenses/by/4.0/>).

<https://doi.org/10.18280/ijstdp.190616>

ABSTRACT

Received: 4 March 2024
Revised: 17 April 2024
Accepted: 29 April 2024
Available online: 24 June 2024

Keywords:

recycle, household waste, waste management, theory of planned behavior, habit, developing country, Bangladesh

This paper explores the inter-relationship between cognitive and non-cognitive factors that form an individual's household recycling behavior. Habit, a noncognitive factor, is combined as an additional construct with the Theory of Planned Behavior (TPB). Data was collected from 467 eco-friendly consumers residing in economically emerging country- Bangladesh and analyzed using the partial least square-based structural equation modelling (PLS-SEM). Result showed significant direct impact of individual's habit and perceived behavioral control (PBC) on actual recycling behavior of household waste. When forming recycling intention, individual's habit was found to be more dominant compared to the attitude, subjective norms and PBC. In addition, it was found that habit is significantly impacted by the PBC. However, the moderating role of habit towards the linkage of recycling intention to actual behavior was found insignificant. The paper provides significant contribution for the practitioners and policy makers to focus on forming individual habits to promote sustainable recycling behavior from an emerging country context.

1. INTRODUCTION

The amount of household waste is constantly increasing at an unprecedented rate in developing countries due to various reasons, ranging from the countries' rapid economic growth to irresponsible consumption behavior. A recent report suggests that more than 90% of the collected waste in developing countries is dumped in open spaces [1]. This waste is often decomposed or burnt in the open ground, leading to further environmental pollution. Hence, in developed countries, municipalities have been providing the utmost attention to recycling household waste, potentially reducing landfill waste and incineration [2].

Efficient management of household waste recycling system requires integration of various factors including government support, awareness building of residents and their spontaneous participation in the management task [3]. Developing countries face several challenges in receiving government support and developing infrastructure, technology, and skills to manage the waste recycling system efficiently. Hence, it was advised to focus on developing responsible consumer behavior, including waste sorting and recycling behavior that would further assist in sustainable household waste management programs [4, 5].

Several researchers tried to identify the factors that drive residents to take proper actions to recycle their household waste. The recent literature review on the recycling behavior

of household wastes addressed that the Theory of Planned Behavior (TPB) is widely used in the existing literature to understand the residents' recycling intention and behavior [6].

According to TPB, consumers' recycling behavior is influenced by their intention, which is ultimately driven by their psychological and cognitive factors such as attitude, social norm, and perceived behavior control [7]. However, earlier research questioned the predictive power of TPB on human behavior due to its overemphasis on cognitive factors [8]. Prior studies confirm that an individual's positive attitude or strong intention may not always converted to performing such behavior, leading to attitude-behavior or intention-behavior gaps [9].

According to the Theory of Interpersonal Behavior (TIB), human behavior is impacted by both cognitive and noncognitive factors [10]. Hence, several studies reported better explanations of behavior by integrating cognitive and noncognitive factors (i.e., habit, moral norm) [11-13]. However, how the cognitive and noncognitive factors interplay to form actual human behavior is yet to be further explored in the recycling context [12-14].

According to Ajzen and Kruglanski [15], TPB shows lack of predicting accuracy in habitual behavior that does not require much systematic and controlled thinking. Waste recycling behavior is a day-to-day activity that could be done intuitively with minimal engagement of effort and time [16]. In this scenario, a noncognitive factor, such as human habit

plays a vital role as it strongly impacts on individual's behavior [17]. Thereby, earlier research emphasized incorporating habit with TPB to predict recycling behavior. Yet, the findings from earlier research are not consistent. Some researchers argue that consumers' habit directly impact the actual recycling behavior [18-20], whereas some other studies argue that habit mainly influences consumers' intention toward recycling that ultimately leads them to perform recycling activities [4, 21, 22]. Due to the lack of consistency of findings from empirical studies in existing literature, further research is required to generalize a holistic understanding of how human habit interplays with other cognitive factors to impact actual recycling behavior.

Reviewing the relevant literature has identified several research gaps. Firstly, there is a lack of understanding of the underlying dynamic mechanism of how cognitive and noncognitive factors directly and indirectly interplay to impact actual recycling behavior. Secondly, lack of consistency in findings from existing research on the role of habit in recycling behavior, delimiting the generalization of the findings. Thirdly, the interrelation between habit and other cognitive factors is not adequately explored. Forth, study related to impact of habit on household waste recycling behavior in developing country context is limited.

To address these research gaps, the objective of this study is to explore how habit interplays with other cognitive factors to promote recycling behavior of household waste from a developing country context. This study theoretically contributes by augmenting our understanding of 1) how habit interacts with other cognitive factors impacting an individual's recycling behavior and 2) the role of habit in household waste recycling behavior in a developing country's context. The potential practical implications of the study relate to develop strategies for practitioners to improve waste management system from a developing country's perspective resulting in minimizing landfill waste.

1.1 Research context

An empirical study is conducted in Dhaka, the capital of Bangladesh. Dhaka was stranded as the second polluted city in the world from 2018 to 2021 [23]. In addition, Bangladesh stands within the top 15 countries to release plastic waste in the ocean (73,000 ton per year) [24]. Approximately, 89 percent of plastic waste is mismanaged across the country [25]. The country has set a national strategy to enhance plastic recycling to 50% [26].

At present, Bangladesh is the country with the fastest-growing GDP in Southeast Asia. As the GDP rises, household consumption also increases resulting in escalating domestic waste. In 2017, a total of 6448.373 tons of Municipality solid wastes (MSW) was generated per day (0.57 Kg per capita per day) in Dhaka city [26]. However, around 40-60% of these wastes remain uncollected [27]. It is projected that the population of Dhaka city will reach 24.66 million by 2025, and the solid waste generation will also increase substantially from 2017 (0.60 KG per capita per day by 2025) [28].

Furthermore, Bangladesh's waste management system has been poorly managed for a long time. The country faces several challenges regarding waste management, such as the lack of proper awareness among the residents, proper hygienic

methods to collect waste from households, adequate disposing facilities, proper legislation, technical skills to utilize the waste for other activities, such as energy generation, making biofuel, etc. [27, 28]. Hence, considering the severe environmental impact due to poor waste management, the country requires urgent actions to enhance the recycling rate of MSW justifying the significance of this study's location from the practical viewpoint.

2. THEORETICAL FRAMEWORK

2.1 Extended theory of planned behavior incorporating habit in recycling context

TPB has been found very useful in explaining eco-friendly behavior [29-31]. However, despite the noteworthy contribution and wide level of acceptance, TPB has been criticized in habitual behavior, like recycling that does not require much systematic controlled thinking [32]. Additionally, the TPB model does not consider non-cognitive behavioral determinants such as habits, moral norms, and emotions [8, 13].

Ajzen [33] suggested that TPB is open for inclusion of new predictors if it can be shown that significant amount of variation of intention and behavior can be explained by additional variables. Therefore, it is highly suggested to incorporate additional constructs in addition to the constructs addressed under TPB [31, 34]. Several research reported better explanation of behavior by extending TPB with other factors [5, 18, 31].

Wang et al. [16] considered noncognitive factor as individuals' patterns of thought and feelings toward human behavior. Habit, a noncognitive factor, could be viewed as a specific behavior or response, that occurs repeatedly without self-instruction, on specific circumstances depending on past experience [10]. Fang et al. [18] addressed that if a behavior is habitual and routine in nature, it may not be influenced by other cognitive factors, such as personal attitude, social norms, perceived behavior control etc. It becomes insignificant as the action is performed intuitively or voluntarily without much intention to fulfill specific goal.

Several research extended TPB by using habit as an additional construct in recycling context. A summary of the literature that addressed recycling habits with the TPB model in recycling context is given (Table 1). Based on this Table, most of the research addressing the role of habit in recycling context is conducted in developed countries, urging for further studies in developing countries context [14, 19, 20]. Additionally, most of the research considered the inter-relation of habit with either intention or actual behavior. Few research addressed the impact of habit with both intention and actual behavior [14, 35], and moderating role of habit in the intention-behavior relationship [35]. However, the findings are not consistent. Furthermore, Sabbir et al. [14] considered impact of habit with other cognitive factors (i.e., attitude), indicating lack of exploration of the interaction of habit with other cognitive variables. Therefore, further research is required to explore the role of habit in a developing country's context with deeper insight of its inter-relations with other cognitive factors.

Table 1. Overview of literature incorporating habit within TPB in recycling context

Reference	Context	Location of Study	Inter-Relation of Habit with Other Variables	Findings
[35]	Household waste	Developed (China)	Intention, Actual behavior	Habit directly impacts on the recycling intention and behavior of house waste. In addition, habit moderates the relation between recycling intention to recycling behavior
[20]	E-waste	Developing (India)	Actual behavior	Habit directly impacts on the recycling behavior of e-waste
[14]	E-waste	Developing (Bangladesh)	Attitude, Intention, Actual behavior	Habit directly impacts on intention. However, impact of habit on recycling behavior is not significant. Additionally, habit impacts forming attitude towards recycling.
[21]	Clothes	Developed (Italy)	Intention	Eco-friendly habit directly impacts on the intention for purchasing green clothes
[36]	Household waste	Developed (New York)	Actual behavior	Habit directly impacts on household waste recycling behavior
[18]	Household waste	Developed (China)	Actual behavior	Habit directly impacts on the household waste sorting behavior in Taipei city
[4]	E-waste	Developed (UAE)	Intention	Habit directly impacts on the intention of recycling
[37]	Soft plastic	Developed (Australia)	Intention	Habit impacts on the intention of recycling
[19]	Household waste	Developing (South Africa)	Actual behavior	Habit directly impacts on the recycling behavior
[22]	Household waste	Developed (China)	Intention	Habit directly impacts on the intention and recycling behavior
[38]	Household waste	Developed (Norway)	Actual behavior	Habit of recycling household waste at home impact on the recycling behavior in university
[13]	Food waste	Developed (UK)	Actual behavior	Habit directly impacts food waste behavior
[39]	Household waste	Developed (Lithuania)	Intention	Habit directly impacts on the intention to recycling
[40]	Household waste	Developed (Scotland and UK)	Intention	Habit directly impacts on the intention to recycling
[41]	Household waste	Developed (Scotland)	Intention	Habit directly impacts on the intention to recycling

2.2 Developing hypotheses

2.2.1 Attitude towards recycling

In the TPB framework, attitude is one of the determinants of whether a person will perform certain action or not [33]. Attitude refers to individual's positive or negative perception towards accomplishing a certain behavior that is being developed by individual's knowledge, emotion, value, and feelings [3]. Lou et al. [11] addressed that despite the knowledge of impact of recycling on environment and health, residents having negative attitude towards household waste sorting activities will feel disgusted with the activities for various reasons, which will enhance their unwillingness towards recycling behavior.

On the contrary, individuals with positive attitude towards pro-environmental behavior will most likely drive themselves to recycling [42]. Khalili et al. [43] underscored that individual's engagement towards recycling is determined by their mentality. Thereby, attitude can actively affect the intention towards recycling behavior. Several studies suggest that the recycling intention is strongly predicted by resident's attitude towards recycling [20, 38, 39]. However, this relationship between attitude and intention was found to be inconsistent in several studies that suggest further testing in different contexts [5, 22]. In numerous studies, attitude is highly criticized for its limited predictive abilities because of the gap between attitude and behavior [5]. Zhang et al. [31] suggested that attitudes can only provide stimuli for selective behaviors not applicable in every situation. Therefore, despite positive attitudes, individuals can be prevented from performing a behavior due to unfavorable situations, demographic factors, or moral obligations [44, 45]. Hence, this

study proposes following hypothesis (H1):

H1: Resident's positive attitude towards recycling can significantly influence their recycling intention.

2.2.2 Subjective norm towards recycling

Subjective norm could be viewed as individual's assessment on other people's (i.e., family members, relatives, friends, neighbors, colleagues, etc.) expectation and support to perform certain action [11]. According to TPB, a person's intention to perform certain behavior is impacted by the acceptance of their social peers that is guided by socio-cultural norms, religious guidelines, social pressure, and group beliefs [33].

Earlier study shows that customers' willingness to spend extra time for recycling is influenced by social norm [46]. Study of Yuan et al. [47] conducted on the residence of a city in China justified that residents' waste sorting intention is impacted by subjective norm. However, subjective norms were found to be very weak predictors of pro-environment behavior, such as e-waste recycling behavior, and it suggested to test further in different contexts [5]. Some of the recent studies found that subjective norms insignificantly impact on intention [4, 39, 48]. Hence, a second hypothesis (H2) is proposed in this study:

H2: Subjective norm has a significant positive influence on the individual's intention on household waste recycling.

2.2.3 Perceived behavioral control towards recycling

Perceived behavioral control refers to the individual's belief regarding the degree of ease or the degree of hardship to perform a certain action [11], which is controlled by several entities such as facility, knowledge, personal time, physical

energy, convenience of the process, etc. Lou et al. [3] addressed that availability of proper knowledge, time and individual energy or enthusiasm will boost a person's intention and actual behavior. Several studies showed that availability of waste recycling facility nearby, proper instruction to sort waste, availability of separate bins to dump designated types of waste directly and indirectly impact with significance the residents' recycling intention and behavior [3, 14, 47]. Thereby, despite having positive attitude and subjective norm, the lack of availability of recycling facilities could discourage a person from recycling household wastes.

On the contrary, studies conducted in a developing country like Malaysia suggested perceived behavioral control (PBC) as a weak predictor of intention and behavior primarily due to the lack of knowledge, information, and available resources [5]. Similarly, several studies showed similar results related to the significant impact of perceived behavioral control on intention [4, 22, 39]. Due to the contradiction in the findings from earlier study this study will test the following hypotheses (H3a, H3b):

H3a: Perceived behavioral control towards recycling significantly influences recycling intention.

H3b: Perceived behavioral control towards recycling significantly influences actual recycling behavior.

2.2.4 Intention to recycling behavior

Intention refers to the individual's decision that forms before the actual behavior takes place, or tendency to take certain action related to actual behavior [33]. For instance, the study of Wang et al. [12] reported that consumers' energy saving behavior is positively impacted by their intention to take actions related to energy savings. Similarly, consumers' e-waste recycling intention has a substantial and favorable impact on recycling behavior of e-waste [20]. However, it is also well documented in pro-environmental consumer behavior literature that intention may not always be converted into actual behavior, and this intention-behavior gap is very much evident [5]. Study conducted by Zhang et al. [31] suggested that despite residents having positive intention to participate in waste sorting/recycling, many of them fail to sort their waste in reality; hence, this condition seeks further studies. Therefore, the following hypothesis (H4) is proposed:

H4: Positive recycling intention significantly influences actual recycling behavior.

2.2.5 Recycling habit

Individuals' recycling behavior has been reported to be influenced by their relevant past behavior [18]. Recent study on household waste recycling behavior underscored that the recycling behavior may not be related to intention or facilities provided by local government, but rather correlated to habit [49]. Also, the latest empirical research showed that eco-friendly habits significantly impact the intention to purchase green clothes [21], and to perform e-waste recycling [4]. Recent study conducted by Sabbir et al. [14] in Bangladesh on e-waste recycling context identified significant direct impact of habit on intention and indirect impact on actual recycling behavior mediated via intention. However, it also shows insignificant impact on actual recycling behavior of e-waste. Due to inconsistency in existing findings, this study proposes further exploration of the following hypotheses (H5a, H5b, H5c):

H5a: Recycling habit directly influences the actual

recycling behavior.

H5b: Recycling habits directly influence recycling intention.

H5c: Recycling habit is mediated by consumers' recycling intention to actual recycling behavior.

Lakhan's [50] study on Ontario's household recycling behavior addressed that habit could be a barrier of household waste recycling. Mullan and Novoradovskaya [16] and Gardner et al. [51] compiled the earlier research on impact of habit on intention to behavior relationship and concluded that habit moderates the intention to actual behavior relation. The study of Dorina et al. [37] conducted on soft-plastic recycling context in Australia empirically showed that with strong habit, actual recycling behavior is not impacted by level of intention, whereas when habit remains weak, the actual recycling behavior increases with intention. Hence, in this research the following hypothesis (H6) will be tested:

H6: Recycling habit significantly moderates the relation of recycling intention and actual recycling behavior.

Regarding the inter-relation of habit with cognitive factors, Sabbir and Taufique [52] addressed that individual's habit impacts personal feeling. When a person is habituated to perform a particular activity, s/he receives positive feeling performing same activity. For instance, Kashif et al. [53] addressed that managers' attitude towards taking an ethical decision is influenced by their habitual ethical actions in daily life. Recent research by Sabbir et al. [14] identified significant impact of pro-environmental habit on individual's attitude that ultimately impacts recycling intention. Thereby, it could be argued that habit impacts individual's attitude directly, and indirectly as well as it impacts individual's intention mediated through attitude. Thereby, the current study will test the following hypotheses (H7a, H7b):

H7a: Recycling habit significantly impacts the individual's attitude.

H7b: Recycling habits significantly impact the intention mediated through attitude.

Regarding the impact of cognitive factors on habit, formation of habit requires certain factors that will facilitate repeating that particular action. The experiment of Holland et al. [54] identified that recycling habits formed among office employees within 2 months after introducing recycling bins placed nearby their desks make the recycling process easier. Ittiravivongs [55] suggested to form waste sorting habit initially by providing proper facilities with instructions require to be provided. The experiment of Comber and Thieme [56] on integrating smart technology in bins facilitated self-reflection and re-evaluation to users, leading them to form recycling habit.

Thereby, it could be argued that addressing proper measure on PBC such as, introducing recycling facility nearby, making the recycling system convenient, providing additional signal, or reminding during the time of action impacts on recycling habit formation. Hence, the following hypotheses (H8a, H8b) are proposed:

H8a: Perceived behavioral control significantly impacts recycling habits.

H8b: Recycling habits significantly mediate the impact of perceived behavioral control on actual recycling behavior (Figure 1).

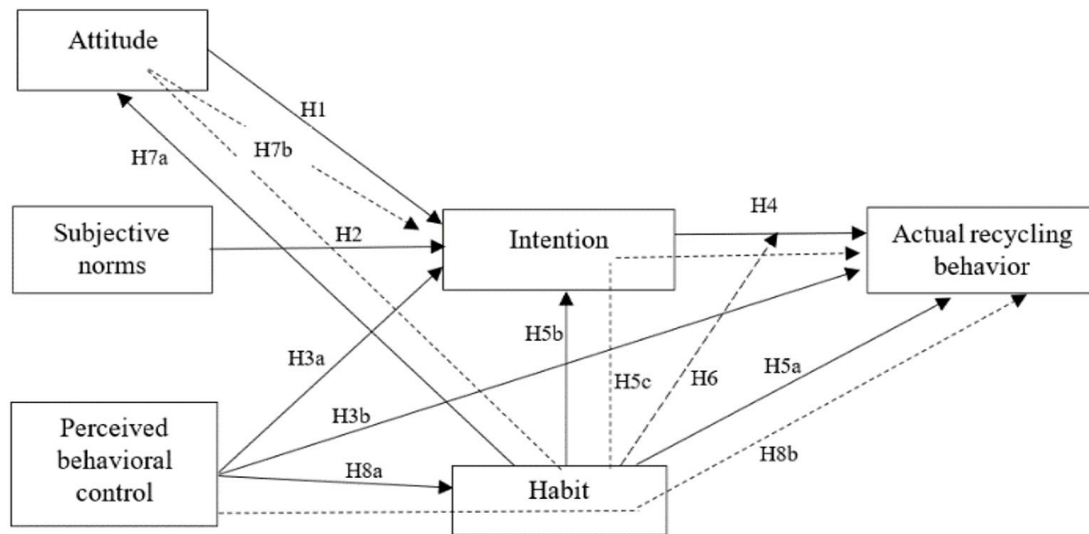


Figure 1. The research model with corresponding hypotheses

3. METHODOLOGY

Data were collected by conducting a face-to-face survey from randomly selected consumers. First, a pilot study was conducted with 30 consumers to check the ambiguity and redundancy and improve the clarity of the questionnaire. Based on their feedback, after a few adjustments, the main study was conducted. After two months of data collection, a total of 1131 responses were received. After initial screening, 1119 responses were deemed to be useable. To identify the respondents' environmental concern mindset, a questionnaire containing ten screening questions, were used as suggested by Moons and de Pelsmacker [57] (Table 2). To be justified as an eco-friendly consumer, at least 50% of the eco-friendly behavior should be reasoned with environmental concerns.

Table 2. Screening questions

Eco-Friendly Behavior
1. I mostly prefer to install energy saving lights at home
2. I mostly prefer packaging made from environment friendly ingredients (e.g., jute, paper)
3. I always use waste bin to assist in recycling
4. My household appliances have eco-friendly features
5. I turn off lights, fans, AC, burner (can be either of these) if they are not in use
6. I try not to waste water in my daily activities (e.g., shower, washing, cleaning etc.)
7. I regularly talk to others about more environment friendly lifestyle
8. Whenever possible, I prefer to commute through bicycle
9. I prefer to buy organic foods
10. I regularly do the plantation

(*Scale: (1- No, 2- yes, because I have to, 3- yes, because it saves me money, 4- yes, because it is better for the environment, 5- yes, because everybody does it))

After this screening, 467 responses were selected that met the eco-friendly criteria. Minimum sample size was calculated by using G*Power version 3.1 software [58]. In the software, considering the effect size as 0.15, significance criterion as 0.05, and power of 0.95, minimum sample size was found 178. Hence, the final sample of 467 respondents satisfies the minimum requirement. In addition, considering the 10 times of total number of items [59], minimum sample size appears

240, that justifies the final sample size of 467.

Among the finally selected respondents, 54% were male and 46% were female. The age group of the respondents was evenly distributed (around 36% was less than 25 years, 22% was between 26 to 35 years, 14% was between 36 to 45 years, 14% between 46 to 55 years and the rest 14% belonged to more than 55 years age group). To ensure the content validity, all the measurement items were adopted from past studies. Appendix Table 3 presents the list of measurement items with their sources. A 7-point Likert scale is used to measure all items. According to Preston and Colman [60], the reliability of the test result remains higher and almost similar from a scale of 7 to 11, and convergent validity remains higher from a scale of 6 to more. The analysis was conducted using a two-step approach: measurement model and structural model, as suggested by Anderson and Gerbing [58]. Firstly, the measurement model was assessed to identify the adequacy (i.e., reliability and validity) of the theoretical framework. Then, the Structural Equation Modelling (SEM) was used for hypothesis testing. SPSS and Smart-PLS software were used to conduct analysis.

Table 3. Constructs and items

Constructs	Code	Indicators	Sources
Attitude (ATT)	ATT1	Recycling is a good practice	[7, 13, 50]
	ATT2	Recycling is useful	
	ATT3	Recycling is rewarding	
	ATT4	Recycling is my responsibility	
	ATT5	I find the idea of recycling pleasing/satisfactory	
	ATT6	I am not interested in the idea of recycling	
	ATT7	My feelings toward recycling are favorable	
Subjective norms (SN)	SN1	Most people who are important to me think that I should recycle	[51]
	SN2	Most people who are important to me want me to engage in household recycling	
	SN3	Most of my family members	

		and friends think that household recycling is a good thing to do	
	SN4	It is expected of me to recycle at my workplace	
	PBC1	Recycling is easy	[6, 13, 52]
	PBC2	Recycling is inconvenient	
Perceived behavioral control (PBC)	PBC3	I know where to take my waste for recycling	
		There are plenty of opportunities for me to engage in recycling in my surroundings	
	PBC4	Recycling in costly	
	PBC5	I intend to recycle at home over the next 2 weeks	[35, 52]
Intention (INT)	INT1	Over the next 2 weeks, I will try to recycle at home	
	INT2	I plan to recycle outside over the next 2 weeks	
	INT3	In the past 2 weeks, how frequently did you recycle in your everyday life?	[35, 52]
Habit (HB)	HB1	In the past 2 weeks, how consistently (every day) did you recycle?	
	HB2	In the past 2 weeks, how effortlessly (without thinking much) did you recycle in your daily life?	
	HB3	In the past 2 weeks, how frequently did you recycle at home?	[13, 41]
Actual recycling behavior (ARB)	ARB1	In the past 2 weeks, how frequently did you recycle outside of your home (office, restaurant, street, university etc.)?	
	ARB2		

4. RESULT AND ANALYSIS

4.1 Measurement model

At first, Confirmatory Factor Analysis (CFA) was conducted on the theoretical framework to identify the reliability and validity of the constructs before proceeding with the analysis of the theoretical structural model as suggested by Hair et al. [59]. After checking the factor loading of each item, ATT3, ATT6, ATT7, PBC2 and PBC5 were eliminated due to low factor loading (<0.6) [61]. Finally, the factor loading of items appeared ranging from 0.654 to 0.938 (see Table 4).

Cronbach's Alpha (α) and Composite Reliability (C.R.) were respectively used to measure the reliability, internal consistency and construct reliability among the items measured. The Cronbach's alpha (α) values were between 0.61 to 0.89, which exceeded the threshold value of 0.6, and the composite reliability (CR) score ranged from 0.79 to 0.94 exceeding the suggested threshold value.

The validity of the constructs was checked by measuring convergent validity and discriminant validity. Convergent validity was measured using factor loading and average variance extracted (AVE). The AVE values were higher than 0.5 as recommended [59]. The discriminant validity was checked using Fornell-Larcker criteria [62] shown in Table 5, where the square root of AVE value is higher than inter-

construct correlations.

Table 4. Reliability and validity indices

Constructs & Items	Factor Loading	Cronbach's (α)	C.R.	AVE
Attitude (ATT)		0.70	0.813	0.520
ATT1	0.654			
ATT2	0.687			
ATT4	0.809			
ATT5	0.727			
Subjective Norm (SN)		0.746	0.84	0.569
SN1	0.779			
SN2	0.815			
SN3	0.709			
SN4	0.709			
Perceived behavioral control (PBC)		0.612	0.79	0.563
PBC1	0.669			
PBC3	0.820			
PBC4	0.735			
Habit (HB)		0.895	0.935	0.828
HB1	0.914			
HB2	0.938			
HB3	0.837			
Intention (INT)		0.781	0.869	0.689
INT1	0.864			
INT2	0.809			
INT3	0.816			
Actual recycling behavior (ARB)		0.819	0.917	0.846
ARB1	0.924			
ARB2	0.916			

Table 5. Fornell-Larcker criterion for discriminant validity

Constructs	ARB	ATT	HB	INT	PBC	SN
ARB	0.920					
ATT	0.263	0.721				
HB	0.609	0.324	0.910			
INT	0.233	0.157	0.262	0.830		
PBC	0.330	0.280	0.396	0.168	0.750	
SN	0.284	0.304	0.412	0.200	0.440	0.754

4.2 Structural model: Hypothesis testing

As the measurement fit indices provide adequate support for the reliability and validity of the proposed theoretical model, hypothesis testing was conducted. The R^2 value of Intention (INT) and actual recycling behavior (ARB) were found to be 0.08 and 0.381 respectively, and Q^2 values were 0.03 and 0.09 for INT and ARB respectively suggesting acceptable level of predictive relevance of the constructs. After that, the model fit shows adequate predictive accuracy having NFI= 0.702 and SRMR = 0.095.

Summary of the hypothesis testing is presented on Table 6. Based on Table 6, the impact of attitude (ATT) ($p=0.324$), subjective norm (SN) ($p=0.122$), perceived behavioral control (PBC) ($p=0.496$) were not found significant on intention (INT) (H1, H2, H3a). However, the impact of habit (HB) to form intention (INT) ($p=0.001$) was significant (H5b). The result shows that perceived behavioral control (PBC), habit (HB), and intention (INT) have a significant impact on actual recycling behavior (ARB) (having p value 0.012, less than 0.001, 0.043 respectively, H3b, H4, H5a). The moderating impact of habit (HB) on the relationship to intention (INT) to actual recycling behavior (ARB) was not significant (H6, $P=0.421$).

Regarding the indirect impact, result did not support the hypotheses on indirect impact of habit (HB) towards recycling behavior (ARB) mediated via intention (INT), and indirect impact of habit (HB) towards intention (INT) mediated through attitude (ATT) was not supported (H5c, H7b having $P=0.099$ and 0.353 respectively). Other hypotheses, H7a, H8a and H8b found strongly significant having P value less than 0.001.

Table 6. Overview of hypothesis testing

Hypothesis	β -Value	t-Statistics	p-Value	Hypothesis Supported
H1: ATT > INT	0.06	0.987	0.32	Not supported
H2: SN > INT	0.09	1.546	0.12	Not supported
H3a: PBC > INT	0.04	0.681	0.50	Not supported
H3b: PBC > ARB	0.10	2.401	0.01	Supported
H4: INT > ARB	0.08	2.027	0.04	Supported
H5a: HB > ARB	0.56	12.695	***	Supported
H5b: HB > INT	0.19	3.468	0.00	Supported
H5c: HB > INT > ARB	0.02	1.653	0.10	Not supported
H6: HB moderate INT > ARB	0.03	0.805	0.42	Not supported
H7a: HB > ATT	0.32	7.361	***	Supported
H7b: HB > ATT > INT	0.02	0.952	0.35	Not supported
H8a: PBC > HB	0.40	9.368	***	Supported
H8b: PBC > HB > ARB	0.22	7.194	***	Supported

5. DISCUSSION

The result shows that ATT, SN, and PBC do not significantly impact recycling intention (INT), contradicting with the TPB (H1, H2, and H3). However, several studies reported similar findings in the recycling context as of the insignificant impact of ATT to INT [24], SN to INT [4, 39, 48], and PBC to INT [4, 39, 22]. The study of Mohamad et al. [5] for e-waste recycling in Malaysian households depicted similar results showing an insignificant impact of ATT, SN, and PBC in INT formation of recycling behavior. However, this result contradicts the findings of other studies [14, 63] conducted in the Bangladeshi context, where the impact of ATT, SN, and PBC to INT was found significant in household waste and e-waste recycling context. In Bangladesh, there is a lack of environmental awareness, and perceived negative consequences are comparatively poor. It is very common to throw plastic bottles, papers, and garbage in the outer premises [28]. There is no social pressure to perform eco-friendly behavior and conduct recycling. In addition, the facilities and bins are inadequate. The waste sorting and collection system from households is very poor [27]. Hence, the impact of ATT, SN and PBC towards recycling INT was found to be not significant.

Regarding the role of habit in recycling behavior, one of the research gaps addressed in this paper is the lack of consistency

of findings in the literature. This empirical study showed that HB directly impacts INT and ARB, supporting the earlier researches [4, 18, 20, 21]. However, the latest study by Sabbir et al. [14] conducted in Bangladesh for e-waste recycling context addressed that habit does not significantly impact an individual's ARB, but rather indirectly impacts ARB mediated via INT. This study shows the opposite result (i.e., the direct impact of HB to ARB is significant, whereas the indirect impact of HB to ARB mediated via INT is not significant). In Bangladesh, receiving monetary reward is one of the main motivator to engage in recycling of household waste (i.e., selling plastic, e-waste, and papers to proper channels from households) [63]. The study of Sabbir et al. [14] found that economic benefit is one of the drivers that leads to e-waste recycling intention in the Bangladeshi context. Because of the monetary reward and/or learning similar practices from parents, individuals become habituated to perform similar actions. Hence, the actual recycling behavior is driven by the personal habit of getting monetary reward by conducting recycling. The habit of getting monetary reward also influences their intention to perform recycling. Therefore, the empirical study shows the significant impact of HB on both INT and ARB.

Whereas most of the literature viewed habit directly or indirectly impacting ARB, Gardner et al. [16] viewed habit as a moderator of the relationship between INT to ARB. The empirical result shows insignificant moderating impact of habit on the relation of INT to ARB, contradicting the earlier researches [12, 16]. Hence, further empirical study is required to understand the moderating role of habit towards impact of INT to ARB.

One of the research gaps addressed in this paper is lack of understanding of how habit, interacts with other cognitive factors impacting recycling behavior. It was found that recycling HB significantly impacts forming positive ATT towards recycling (H7a), supporting the earlier research of Sabbir et al. [14] in Bangladeshi context. However, the indirect impact of HB towards INT mediated via ATT was found not significant (H7b). It is because the impact of ATT towards INT was found not significant in this study. This study also hypothesized that PBC positively impacts ARB and habit formation, which was found significant (H3b, H7c). Additionally, the impact of PBC on ARB mediated via Hb was also found significant (H7d). In Bangladesh, household waste is being collected from households directly. In addition, e-waste, paper, plastic, glass bottles could be sold directly from home to the collectors. Having such convenience allowed residents to perform recycling easily and assisted to form recycling habit within them.

To summarize the above discussion, this research shows that among various cognitive and noncognitive factors, the impact of habit and PBC are more dominant to perform recycling compared to attitude and social norms. This phenomenon could be linked to the attitude-behavior gap. Mason et al. [21] suggested that despite having strong positive attitude individuals can be prevented to perform certain behavior due to various factors such as demographic factors, unavoidable situations, or moral obligations. Gardner et al. [16] addressed that despite having positive intentions, individuals may not perform the action because of less will power to change their current habits. Attitude towards recycling is impacted by a person's eco-awareness and environmental knowledge [3, 11]. Hence, apart from developing eco-awareness and environmental knowledge,

proper measures need to be taken to develop recycling habits and develop supportive, user-friendly recycling infrastructure that would ultimately lead to proper management of the household waste recycling system.

6. CONCLUSION

This study aimed at exploring the impact of cognitive and noncognitive factors on individual's recycling behavior from a developing country's context. It was found that habit and perceived behavioral control have significant impact on individual's action to perform recycling of their daily life waste. In addition, other cognitive factors such as attitude and subjective norms were found to have insignificant impact on recycling intention that leads to actual recycling behavior. In this study, all the respondents were practicing eco-friendly behavior in their daily life that signifies their eco-awareness. Despite this fact, their recycling behavior was found to be more impacted by their habit. The result also suggests that perceived behavioral control plays an important role in forming the recycling habit. Essentially, when individuals behave as part of their habit, this requires less cognitive effort to motivate individuals to perform recycling behavior.

6.1 Theoretical implication

The interactions of cognitive and non-cognitive factors to influence recycling behavior in developing countries' context are yet to be understood better. This research provides further empirical evidence from a developing country context on how cognitive and non-cognitive factors interplay together to form a recycling behavior. The study findings assert the importance of habit (e.g., noncognitive factor) in better understanding pro-environmental behavior, such as household waste recycling where individuals tend to adopt behavior that requires less cognitive effort. Additionally, habit formation is overlooked in existing models. This study identifies the significant impact of PBC to form individual's habit of pro-environmental behavior, indicating the importance of cognitive factors in habit formation, which is another novelty.

6.2 Practical implication

This empirical study identifies individual's habit and PBC have a profound impact on recycling behavior, rather than attitude and subjective norms. Hence, this research suggests that in developing countries like Bangladesh, where environmental knowledge, awareness, and social support are very less than the requirement [27, 28], Government stakeholders and private sector organizations should focus on taking proper measures to form the recycling habit among individuals. Building on this finding, waste recycling policies and programs in Bangladesh should first create cues that trigger waste recycling habit. Some action plans could be prepared to construct more facilities, improve waste sorting and collection systems from households, provide monetary and non-monetary schemes, and marketing campaigns to promote recycling activities. Academic institutions can nurture the recycling practice in students' daily routine and integrate with study curriculum. Providing these facilities would induce individuals to recycle properly. Once individuals can recycle conveniently with all facilities in place, this would lead individuals to be habituated and form

sustainable recycling behavior.

6.3 Limitations and future research direction

This research is delimited by the self-reported behavior of the respondents during the data collection process which can potentially mismatch with their actual behavior. Such tendency might cause discrepancy on the findings of this research with earlier research. The study did not rule out the effects of demographic and cultural variations due to the sample size and research constraint since the sample were chosen from the Dhaka city only which represent certain profile. This also reveals opportunity for the future researchers to consider wide variety sample and examine its impacts. For further research direction, this research only considered habit as a noncognitive factor. Hence, other noncognitive factors, such as moral norms, emotion, and situational constraints, could be integrated with the TPB model to explore further interrelation between cognitive and noncognitive factors on recycling behavior. In addition, this study contradicts the earlier research on the indirect impact of habit on actual recycling behavior and the moderating impact of habit on the relation between intention and behavior. Therefore, further research is required to generalize and validate our understanding of the role of habit on actual behavior, especially in the recycling context. Finally, this research only addressed the impact of PBC on habit formation. Inclusion of factors impacting habit formation could be another scope of future research.

REFERENCES

- [1] The World Bank. (2022). Solid waste management. World Bank. <http://tinyurl.com/ykz8v869>.
- [2] Di Foggia, G., Beccarello, M. (2021). Designing waste management systems to meet circular economy goals: The Italian case. *Sustainable Production and Consumption*, 26: 1074-1083. <https://doi.org/10.1016/j.spc.2021.01.002>
- [3] Lou, S., Zhang, X., Zhang, D. (2022). What influences urban residents' intention to sort waste? Introducing Taoist cultural values into TPB. *Journal of Cleaner Production*, 371: 133540. <https://doi.org/10.1016/j.jclepro.2022.133540>
- [4] Aboelmaged, M. (2021). E-waste recycling behaviour: An integration of recycling habits into the theory of planned behaviour. *Journal of Cleaner Production*, 278: 124182. <https://doi.org/10.1016/j.jclepro.2020.124182>
- [5] Mohamad, N.S., Thoo, A.C., Huam, H.T. (2022). The Determinants of consumers' e-waste recycling behavior through the lens of extended theory of planned behavior. *Sustainability (Switzerland)*, 14(15): 9031. <https://doi.org/10.3390/su14159031>
- [6] Phulwani, P.R., Kumar, D., Goyal, P. (2020). A Systematic literature review and bibliometric analysis of recycling behavior. *Journal of Global Marketing*, 33(5): 354-376. <https://doi.org/10.1080/08911762.2020.1765444>
- [7] Ajzen, I. (2015). The theory of planned behaviour is alive and well, and not ready to retire: A commentary on Sniehotta, Pesseau, and Araújo-Soares. *Health Psychology Review*, 9(2): 131-137. <https://doi.org/10.1080/17437199.2014.883474>

- [8] Klöckner, C.A. (2013). A comprehensive model of the psychology of environmental behaviour - A meta-analysis. *Global Environmental Change*, 23(5): 1028-1038. <https://doi.org/10.1016/j.gloenvcha.2013.05.014>
- [9] Wang, J., Shen, M., Chu, M. (2021). Why is green consumption easier said than done? Exploring the green consumption attitude-intention gap in China with behavioral reasoning theory. *Cleaner and Responsible Consumption*, 2: 100015. <https://doi.org/10.1016/j.clrc.2021.100015>
- [10] Triandis, H.C. (1977). *Interpersonal Behavior*. Brooks/Cole Publishing Company.
- [11] Razali, F., Daud, D., Weng-Wai, C., Anthony Jiram, W.R. (2020). Waste separation at source behaviour among Malaysian households: The theory of planned behaviour with moral norm. *Journal of Cleaner Production*, 271: 122025. <https://doi.org/10.1016/j.jclepro.2020.122025>
- [12] Wang, S., Lin, S., Li, J. (2018). Exploring the effects of non-cognitive and emotional factors on household electricity saving behavior. *Energy Policy*, 115: 171-180. <https://doi.org/10.1016/j.enpol.2018.01.012>
- [13] Russell, S.V., Young, C.W., Unsworth, K.L., Robinson, C. (2017). Bringing habits and emotions into food waste behaviour. *Resources, Conservation and Recycling*, 125: 107-114. <https://doi.org/10.1016/j.resconrec.2017.06.007>
- [14] Sabbir, M.M., Taufique, K.M.R., Nomi, M. (2023). Consumers' reverse exchange behavior and e-waste recycling to promote sustainable post-consumption behavior. *Asia Pacific Journal of Marketing and Logistics*, 35(10): 2484-2500. <https://doi.org/10.1108/APJML-07-2022-0647>
- [15] Ajzen, I., Kruglanski, A.W. (2019). Reasoned action in the service of goal pursuit. *Psychological Review*, 126(5): 774-786. <https://psycnet.apa.org/doi/10.1037/rev0000155>
- [16] Gardner, B., Lally, P., Rebar, A.L. (2020). Does habit weaken the relationship between intention and behaviour? Revisiting the habit-intention interaction hypothesis. *Social and Personality Psychology Compass*, 14(8): e12553. <https://doi.org/10.1111/spc3.12553>
- [17] Orbell, S., Verplanken, B. (2020). 13 Changing behavior using habit theory. In *the Handbook of Behavior Change*.
- [18] Fang, W.T., Huang, M.H., Cheng, B.Y., Chiu, R.J., Chiang, Y.T., Hsu, C.W., Ng, E. (2021). Applying a comprehensive action determination model to examine the recycling behavior of Taipei city residents. *Sustainability (Switzerland)*, 13(2): 490. <https://doi.org/10.3390/su13020490>
- [19] Issock, P.B., Roberts-Lombard, M., Mpinganjira, M. (2020). Understanding household waste separation in South Africa: An empirical study based on an extended theory of interpersonal behaviour. *Management of Environmental Quality: An International Journal*, 31(3): 530-547. <https://doi.org/10.1108/MEQ-08-2019-0181>
- [20] Vijayan, R.V., Krishnan, M.M., Parayitam, S., Anantharaman Duraisami, S.P., Saravanaselvan, N.R. (2023). Exploring e-waste recycling behaviour intention among the households: Evidence from India. *Cleaner Materials*, 7: 100174. <https://doi.org/10.1016/j.clema.2023.100174>
- [21] Mason, M.C., Pauluzzo, R., Umar, R.M. (2022). Recycling habits and environmental responses to fast-fashion consumption: Enhancing the theory of planned behavior to predict Generation Y consumers' purchase decisions. *Waste Management*, 139: 146-157. <https://doi.org/10.1016/j.wasman.2021.12.012>
- [22] Xu, L., Ling, M., Lu, Y., Shen, M. (2017). Understanding household waste separation behaviour: Testing the roles of moral, past experience, and perceived policy effectiveness within the theory of planned behaviour. *Sustainability (Switzerland)*, 9(4): 625. <https://doi.org/10.3390/su9040625>
- [23] The World Bank. (2022). High air pollution level is creating physical and mental health hazards in Bangladesh: World bank. <https://www.worldbank.org/en/news/press-release/2022/12/03/high-air-pollution-level-is-creating-physical-and-mental-health-hazards-in-bangladesh-world-bank>
- [24] Meijer, L.J., Van Emmerik, T., Van Der Ent, R., Schmidt, C., Lebreton, L. (2021). More than 1000 rivers account for 80% of global riverine plastic emissions into the ocean. *Science Advances*, 7(18): eaaz5803. <https://doi.org/10.1126/sciadv.aaz5803>
- [25] Khatun, F., Saadat, S.Y., Mahub, A. (2023). Plastic pollution in Bangladesh: Drivers, impacts, and solutions. Dhaka: Centre for Policy Dialogue (CPD). <https://cpd.org.bd/resources/2023/04/Plastic-Pollution-in-Bangladesh-Drivers-Impacts-and-Solutions.pdf>
- [26] The World Bank. (2021). Meeting Bangladesh's plastic challenge through a multisectoral approach. <https://www.worldbank.org/en/news/feature/2021/12/23/meeting-bangladesh-s-plastic-challenge-through-a-multisectoral-approach>
- [27] Jerin, D.T., Sara, H.H., Radia, M.A., Hema, P.S., Hasan, S., Urme, S.A., Audia, C., Hasan, M.T., Quayyum, Z. (2022). An overview of progress towards implementation of solid waste management policies in Dhaka, Bangladesh. *Heliyon*, 8(2): e08918. <https://doi.org/10.1016/j.heliyon.2022.e08918>
- [28] Habib, Md.A., Ahmed, M.M., Aziz, M., Beg, Mohd.R.A., Hoque, M.E. (2021). Municipal solid waste management and waste-to-energy potential from Rajshahi city corporation in Bangladesh. *Applied Sciences*, 11(9): 3744. <https://doi.org/10.3390/app11093744>
- [29] Yuriev, A., Dahmen, M., Paillé, P., Boiral, O., Guillaumie, L. (2020). Pro-environmental behaviors through the lens of the theory of planned behavior: A scoping review. *Resources, Conservation and Recycling*, 155: 104660. <https://doi.org/10.1016/j.resconrec.2019.104660>
- [30] Ertz, M., Huang, R., Jo, M.S., Karakas, F., Sarigöllü, E. (2017). From single-use to multi-use: Study of consumers' behavior toward consumption of reusable containers. *Journal of Environmental Management*, 193: 334-344. <https://doi.org/10.1016/j.jenvman.2017.01.060>
- [31] Zhang, B., Lai, K.H., Wang, B., Wang, Z. (2019). From intention to action: How do personal attitudes, facilities accessibility, and government stimulus matter for household waste sorting? *Journal of Environmental Management*, 233: 447-458. <https://doi.org/10.1016/j.jenvman.2018.12.059>
- [32] Dang Vu, H.N., Nielsen, M.R. (2022). Understanding determinants of the intention to buy rhino horn in Vietnam through the theory of planned behaviour and the theory of interpersonal behaviour. *Ecological Economics*,

- 195: 107361.
<https://doi.org/10.1016/j.ecolecon.2022.107361>
- [33] Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2): 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- [34] Hosta, M., Zabkar, V. (2021). Antecedents of environmentally and socially responsible sustainable consumer behavior. *Journal of Business Ethics*, 171(2): 273-293. <https://doi.org/10.1007/s10551-019-04416-0>
- [35] Wang, J., Nketiah, E., Cai, X., Obuobi, B., Adu-Gyamfi, G., Adjei, M. (2023). What establishes citizens' household intention and behavior regarding municipal solid waste separation? A case study in Jiangsu province. *Journal of Cleaner Production*, 423: 138642. <https://doi.org/10.1016/j.jclepro.2023.138642>
- [36] Kashif, M., Zarkada, A., Thurasamy, R. (2017). The moderating effect of religiosity on ethical behavioural intentions. *Personnel Review*, 46(2): 429-448. <https://doi.org/10.1108/PR-10-2015-0256>
- [37] Dorina, I., Mullan, B., Novoradovskaya, E. (2021). Applying temporal self-regulation theory to identify correlates of soft plastic recycling in Australia. *Australian Journal of Psychology*, 73(4): 512-522. <https://doi.org/10.1080/00049530.2021.2002125>
- [38] Ofstad, S., Tobolova, M., Nayum, A., Klöckner, C. (2017). Understanding the mechanisms behind changing people's recycling behavior at work by applying a comprehensive action determination model. *Sustainability*, 9(2): 204. <https://doi.org/10.3390/su9020204>
- [39] Pikturnienė, I., Bäumle, G. (2016). Predictors of recycling behaviour intentions among urban Lithuanian inhabitants. *Journal of Business Economics and Management*, 17(5): 780-795. <https://doi.org/10.3846/16111699.2014.951957>
- [40] Knussen, C., Yule, F. (2008). "I'm not in the habit of recycling": The role of habitual behavior in the disposal of household waste. *Environment and Behavior*, 40(5): 683-702. <https://doi.org/10.1177/0013916507307527>
- [41] Knussen, C., Yule, F., MacKenzie, J., Wells, M. (2004). An analysis of intentions to recycle household waste: The roles of past behaviour, perceived habit, and perceived lack of facilities. *Journal of Environmental Psychology*, 24(2): 237-246. <https://doi.org/10.1016/j.jenvp.2003.12.001>
- [42] Lu, B., Wang, J. (2022). How can residents be motivated to participate in waste recycling? An analysis based on two survey experiments in China. *Waste Management*, 143: 206-214. <https://doi.org/10.1016/j.wasman.2022.02.034>
- [43] Khalili Nasr, A., Tavana, M., Alavi, B., Mina, H. (2021). A novel fuzzy multi-objective circular supplier selection and order allocation model for sustainable closed-loop supply chains. *Journal of Cleaner Production*, 287: 124994. <https://doi.org/10.1016/j.jclepro.2020.124994>
- [44] Si, H., Shi, J., Tang, D., Wu, G., Lan, J. (2020). Understanding intention and behavior toward sustainable usage of bike sharing by extending the theory of planned behavior. *Resources, Conservation and Recycling*, 152: 104513. <https://doi.org/10.1016/j.resconrec.2019.104513>
- [45] Zhang, S., Mu, D., Liu, P. (2022). Impact of charging and reward-penalty policies on household recycling: A case study in China. *Resources, Conservation and Recycling*, 185: 106462. <https://doi.org/10.1016/j.resconrec.2022.106462>
- [46] Ananno, A.A., Masud, M.H., Dabnichki, P., Mahjabeen, M., Chowdhury, S.A. (2021). Survey and analysis of consumers' behaviour for electronic waste management in Bangladesh. *Journal of Environmental Management*, 282: 111943. <https://doi.org/10.1016/j.jenvman.2021.111943>
- [47] Yuan, Y., Nomura, H., Takahashi, Y., Yabe, M. (2016). Model of Chinese household kitchen waste separation behavior: A case study in Beijing City. *Sustainability (Switzerland)*, 8(10): 1083. <https://doi.org/10.3390/su8101083>
- [48] Taufique, K.M.R., Vaithianathan, S. (2018). A fresh look at understanding green consumer behavior among young urban Indian consumers through the lens of theory of planned behavior. *Journal of Cleaner Production*, 183: 46-55. <https://doi.org/10.1016/j.jclepro.2018.02.097>
- [49] Liu, Z., Yang, J.Z. (2022). Predicting recycling behavior in New York state: An integrated model. *Environmental Management*, 70(6): 1023-1037. <https://doi.org/10.1007/s00267-022-01708-6>
- [50] Lakkan, C. (2016). Out of sight, out of mind: Issues and obstacles to recycling in Ontario's multi residential buildings. *Resources, Conservation and Recycling*, 108: 1-9. <https://doi.org/10.1016/j.resconrec.2016.01.005>
- [51] Mullan, B., Novoradovskaya, E. (2018). Habit mechanisms and behavioural complexity. *The Psychology of Habit*, pp. 71-90. https://doi.org/10.1007/978-3-319-97529-0_5
- [52] Sabbir, Md.M., Taufique, K.M.R. (2022). Sustainable employee green behavior in the workplace: Integrating cognitive and non-cognitive factors in corporate environmental policy. *Business Strategy and the Environment*, 31(1): 110-128. <https://doi.org/10.1002/bse.2877>
- [53] Kashif, M., Zarkada, A., Thurasamy, R. (2017). The moderating effect of religiosity on ethical behavioural intentions: An application of the extended theory of planned behaviour to Pakistani bank employees. *Personnel Review*, 46(2): 429-448. <https://doi.org/10.1108/PR-10-2015-0256>
- [54] Holland, R.W., Aarts, H., Langendam, D. (2006). Breaking and creating habits on the working floor: A field-experiment on the power of implementation intentions. *Journal of Experimental Social Psychology*, 42(6): 776-783. <https://doi.org/10.1016/j.jesp.2005.11.006>
- [55] Ittiravivongs, A. (2012). Recycling as habitual behavior: The impact of habit on household waste recycling behavior in Thailand. *Asian Social Science*, 8(6): 74-81.
- [56] Comber, R., Thieme, A. (2013). Designing beyond habit: Opening space for improved recycling and food waste behaviors through processes of persuasion, social influence and aversive affect. *Personal and Ubiquitous Computing*, 17(6): 1197-1210. <https://doi.org/10.1007/s00779-012-0587-1>
- [57] Moons, I., de Pelsmacker, P. (2012). Emotions as determinants of electric car usage intention. *Journal of Marketing Management*, 28(3-4): 195-237. <https://doi.org/10.1080/0267257X.2012.659007>
- [58] Anderson, J.C., Gerbing, D.W. (1988). Structural equation modeling in practice: A review and

- recommended two-step approach. *Psychological Bulletin*, 103(3): 411-423. <https://doi.org/10.1037/0033-2909.103.3.411>
- [59] Hair, J.F., Sarstedt, M., Ringle, C.M., Mena, J.A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science*, 40: 414-433. <https://doi.org/10.1007/s11747-011-0261-6>
- [60] Preston, C.C., Colman, A.M. (2000). Optimal number of response categories in rating scales: Reliability, validity, discriminating power, and respondent preferences. *Acta Psychologica*, 104(1): 1-15. [https://doi.org/10.1016/S0001-6918\(99\)00050-5](https://doi.org/10.1016/S0001-6918(99)00050-5)
- [61] Chin, W.W., Gopal, A., Salisbury, W.D. (1997). Advancing the theory of adaptive structuration: The development of a scale to measure faithfulness of appropriation. *Information Systems Research*, 8(4): 342-367. <https://doi.org/10.1287/isre.8.4.342>
- [62] Fornell, C., Larcker, D.F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research*, 18(3): 382. <https://doi.org/10.2307/3150980>
- [63] Ahmed, F., Hasan, S., Rana, M.S., Sharmin, N. (2023). A conceptual framework for zero waste management in Bangladesh. *International Journal of Environmental Science and Technology*, 20(2): 1887-1904. <https://doi.org/10.1007/s13762-022-04127-6>