



## PROFESSED FACTORS INFLUENCING ENVIRONMENTALLY SUSTAINABLE HOUSEHOLD CONSUMER BEHAVIOR: BANGLADESH PERSPECTIVE



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### ABSTRACT

The purpose of the paper is to study the factors influencing environmentally sustainable behavior of the household consumers in Bangladesh. Quantitative method has been used in the paper to attain research objectives and structured questionnaire survey was conducted using convenience sampling method for data collection. IBM SPSS was used for descriptive statistics and exploratory factor analysis. The factor named as 'Environmental Responsibility' explains maximum variation that covers the variables i.e., avoiding environmentally harmful product, avoiding products causing pollution, buying products in reusable container, avoiding products of environmentally irresponsible company, using energy efficient household appliances, and switching towards products for ecological reason, has the highest impact on ensuring environmentally sustainable household consumer behavior. In terms of ranking, the 'Resource Saving' factor was ranked first where people prefer to avoid any kind of waste of natural gas and water during household chores. The results witnessed that the respondents realize environmental responsibilities but yet can't afford to be eco-friendly in full. The results are based on a comparatively small sample size selected from a limited geographic area within two major & biggest metropolitan cities such as Capital City and Commercial Capital City only, which could be expanded throughout the country. The research findings would be useful for professionals involved in environment marketing to promote environmentally sustainable household consumption as a key citizen responsibility through appropriate education, adequate learning along with shaping cultural traits. This research provides valuable insights into sustainable household consumption in Bangladesh by investigating the factors that influence consumers' environmentally conscious behavior.

### 1. Introduction

Extreme Consumption of both goods and services has been increasing all over the world which is causing severe depletion of natural resources as well as damaging the environment rapidly (Chen and Chai, 2010). With the realization of such threat, most of the countries across the globe have begun to work on minimizing the harmful impact of business on society and the environment. The concept of sustainable development is the outcome of such concern regarding society and environment around the globe. It provides emphasis on the promotion of sustainability as well as advocates those forms of developments which cause the least negative impact on the society and environment (Joshi and Rahman, 2015).

It is expected that more people are going to join the middle class globally within the next two decades. Such a population explosion would enhance the demand for natural resources which is scarce and constrained already. With this alignment, by 2021, Bangladesh is also aspiring to become a middle-income country, where around 31.5% populations presently live below poverty line. And the rest belong to middle and upper-middle-class population who are neither behaviorally habituated nor oriented towards sustainable consumption (UNDP, 2018).

Most of the natural resources are valuable as well as scarce. Undue consumption can severely affect the conservation of such limited resources which might cause a negative impact on the society and environment. In Bangladesh, majority of upper middle and middle-class people are involved in wasteful consumption. It is observed that waste around 13,332 tons are generated in the capital city every day, out of which 70% or more are an organic waste. Residential lines here consume around 53% of total electricity whereas industry lines consume 28% only. Around 48% of the total electricity generated is consumed by the residential consumers in Bangladesh. Ecologically conscious consumption and conversion of energy could be the most effective preferences for fulfilling the overall demand. Annually, BDT 51 billion on an average can be saved by practicing the efficient and responsible consumption of energy. 30 gallons of water per head are wasted everyday during household chores i.e. cleaning dishes, brushing teeth, shaving, having a shower, car washing, flushing toilet etc. We would definitely face the irreversible environmental damage until we act responsibly towards our consumption pattern (UNDP, 2018).

Though, most of the people, involved in wasteful consumption belong to middle class or upper, yet, they are the easiest section of the society for being promoted to turn into a set of responsible consumers. Most of the people in this class are

educated who can use efficient technology in reducing consumption of natural gas, water, and electricity. Again, if an effective legal structure can be employed, then they would become the handiest consumers to make the rapid and positive change across the country.

Hence, promoting environmentally conscious consumer behavior would be an effective tool for ensuring sustainable household consumption. This study is aimed to identify, investigate and rank the latent factors which would influence environmentally conscious consumer behavior. In this context the research are: (1) to identify and describe the observed variables representing environmentally sustainable consumer behavior of the household consumers in Bangladesh; (2) to explore the unobserved factors influencing environmentally sustainable behavior of the household consumers in Bangladesh; (3) to rank the factors influencing environmentally sustainable consumer behavior of the household consumers in Bangladesh.

This article contains six consecutive sections including this introduction. The second section presents the earlier research following the construct based literatures including the concept of environmentally conscious consumer behavior, sustainable household consumption, and environmentally sustainable consumer behavior as well as the research gap identification. Then, it is followed by research methodology section including the selection of instrument, sample design, data collection and method used for data analysis. Research results included respondent profile, descriptive statistics, correlation analysis, factor analysis and ranking of factors. Major Findings are discussed with the focus on the managerial implications and finally, conclusions are drawn with the offerings for future research potentials.

## 2. Literature Review

Environmentally conscious consumer behavior represents the form of consumption that harms the environment as little as possible, or even somehow benefits the environment in-fact. Again, in alignment with that, sustainable household consumption shows a responsible consumption pattern of resources that intends to meet human needs in such a way which preserves the environment so that future needs can also be met for upcoming generations.

Increased concern about the environment among social groups and government has acted as a momentum to green marketing. Research on ecologically conscious behavior among consumers in emerging markets is limited. Consumers' concern towards environment has been increased in the last decade. However, consumers feel that obligation lies with the government to protect the environment (Lai, 2000). For encouraging people to understand the importance of environment degradation, it is important to understand the factors influencing their environment-related attitudes (Khare, 2013).

### 2.1 Environmentally Conscious Consumer Behavior

Environmentally conscious consumer behavior can be defined as a form of pro -environmental behavior that protects the environment, or even minimizes the impact of harmful consumption on the environment as well (Steg and Vlek, 2009). Environmentally conscious consumer behavior comprises the activities of choosing purchases, use of products, post use behaviors, managing households, and collective as well as consumer activism behaviors which reflect various level of ecological motivation (Peattie, 2010). Again, environmentally conscious consumer behavior includes the purchase and consumption of those products which have minimum impact on the environment, for example, use of low energy products, recycled or least possible packaging and use of biodegradable products (Costa Pinto et al., 2014). In fact, an environmentally conscious consumer is a person who often makes purchases of products and services which have a positive or least negative impact on the environment (Haws et al., 2014, Alsikkah et al., 2018).

Environmentally conscious consumer behavior has been identified often when an individual acts ethically, motivated not only by his/her personal needs, but also by the respect and preservation of the welfare of entire society. A conscious consumer shows concern about the environmental consequences (costs and benefits) of his/her private consumption. They are expected to be more conscientious in their use of assets, for example by using their goods without wasting resources (Ertz et al., 2016). Some researchers find that personal values are influential determinants of consumption and that pro-environmental behavior might serve as a signal of personality dimension. Considering the time-horizon in the acquisition of green behavior, two types of consumers can be distinguished i.e., prevention and promotion type consumers. Prevention type consumers would feel moral obligations regarding eco-friendly living. And promotion type consumers would be particularly paying attention to their personal aspirations rather than focusing in the direction of turning into the more eco-friendly lifestyle (Miniero et al., 2014).

### 2.2 Sustainable Household Consumption

Sustainable consumption was defined at the Oslo Symposium in 1994 as *“the use of services and related products which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of further generations”* (Ministry of the Environment Norway, 1994). For achieving sustainable consumption, improved efficiency of consumption can be considered to be the most significant precondition (Fuchs and Lorek, 2005).

With the alignment of environmentally conscious living, Sustainable development denotes, “*meets the needs of the present without compromising the ability of future generations to meet their own needs,*” (Brundtland, 1987; Our Common Future, 1987). Sustainable development (SD) is a pattern of resource use that aims to meet human needs along with preserving the environment so that these needs can be met not only in the present but also for generations to come. Out of 17 Sustainable Development Goals (SDG), 12<sup>th</sup> goal represents ‘Sustainable Consumption and Production (SCP)’ (SDG, 2018). The theme named ‘consume with care’ can be achieved by the appropriate practice of the aforementioned goal. The goal covers the aim of promoting the concept ‘more and better with less’. Reduction of pollution, degradation and resource consumption throughout the life cycle of products as well as services has been the main agenda of that goal. It intends to improve the quality of living and well being as a whole. SCP has been considered as a holistic approach encompassing the triple bottom line of sustainable development. It has been focusing on the prevention of wasteful consumption by enhancing efficiency (Bhuiyan, 2015). Hence, sustainable consumption is concerned with the selection, consumption, and disposal of products and services in such a way that would bring social along with environmental benefits. A consumer can behave in a more environmentally friendly way by changing the pattern of regular consumption (Spangenberg and Lorek, 2002; Haron et al., 2005).

### 2.3 Environmentally Sustainable Consumer Behavior

Most of the empirical studies are found exploring the measurement indicators of sustainability through triple bottom line including social (*people*), economical (*profit*) and environmental performances (*planet*) (Elkington, 1998; Slaper and Hall, 2011). Among the three indicators, in this study, we are focusing on the environmental consciousness of household consumers only. Environmental performance indicators include climate, land and soil quality, water for irrigation, natural resource management, environmental risk (Vasileiou and Morris, 2006; Saeed et al., 2018), material consumption, energy consumption, local impact, regional impact and global impact (Fiksel et al., 1999), water usage, water and solid discharges, energy consumption, efficient use of natural resources (SDG, 2018) etc. The issues mentioned above cover both the perspective including demand-side (marketing) and supply side (business strategy) involved in the research on sustainable behaviour during production and consumption (Kostadinova, 2016). But, in this proposed research, we would study the sustainable consumer behaviour from marketing perspective only where the factors will cover the areas including environmental responsibility of the households.

Both the direct and indirect use of energy related to household consumer behavior has been a useful indicator of the environmental impact of that behavior (Kramer et al., 1998). In-fact, energy use has been considered as a superior indicator regarding the environmental impact of consumer behavior (Durr, 1994). Direct energy consumption of households often refers to the use of natural gas, electricity, water, and car fuel etc. And, indirect energy consumption often refers which is used for relevant production sector in order to produce and deliver goods (e.g., food products) as well as services (e.g., public transport) to the ultimate consumers. Now, it has to be considered that, use of energy (fossil) is not only related to the exhaustion of resources but also one of the major causes of air pollution because of the burning of fossil fuel (e.g., coal, petroleum, and natural gas) (Gatersleben et al., 2002; Spangenberg and Lorek, 2002).

### 2.4 Research Gap

Previous studies regarding environmentally responsible behavior have been conducted in past decades by using different terms interchangeably, such as ecological behavior, environmental behavior, environmentally friendly behavior, green behavior, and sustainable behavior (Carrete et al., 2012). However, it remains undecided whether these terminologies are mere synonyms or nuances between them that should be considered in the development of theory as well as practical applications. Most of the widespread research on ecologically conscious and environment friendly behavior are conducted in western countries (i.e. Ertz et al., 2016; Straughan et al., 1999; Laroche et al. 2002; Park et al., 2010; Pickett-Baker and Ozaki, 2008; Chan et al., 2006; D’Souza et al., 2006; Guraşu and Ranchhod, 2005; Yeung, 2004; Hartmann et al., 2005). The ecological behavior of Asian consumers has also been examined by some researchers (i.e. Kim et al., 2012; Chan, 2000, 2001; Chan and Lau, 2002; Haron et al., 2005; Kalantari et al., 2007; Lee, 2008, 2009, 2010, 2014; Chen, 2009). Though, most of the past studies in earlier decades had a focus on determining the items which represent environmentally conscious consumer behavior, but very few were found to explore the latent factors as per researcher’s wisdom.

In-fact, the extensive study of different national and international literature on the subject of proposed research has made it crystal clear that a number of studies carried out on the multiple issues of ecologically conscious consumer behaviour as well as sustainable household consumption. Consequently, in the alignment of the past research in different countries, this paper would add value to the present wisdom by empirical study regarding the application of existing variables in different culture, society, and community. However, no in-depth study has been found on the subject of proposed research in the context of Bangladesh according to the literature review of International recognized journals and researcher's present wisdom. This particular contextual research gap has motivated to conduct the research on "***Professed Factors Influencing Environmentally Sustainable Household Consumer Behavior: Bangladesh Perspective***". Hence, in terms of contribution of this paper, focus will be given on the exploration of latent factors which will describe the observed variables within the clusters and finally ranking of factors would be drawn to determine the most significant cluster of observed factors in the context of Bangladesh.

In the proposed research, items are compiled from the past research around the globe covering different cultures in past decades which would be investigated in the perspective of Bangladesh. This paper would evaluate the environmentally sustainable behavior of household consumers in Bangladesh where the unobserved factors would cover the areas including i.e. avoiding waste of electricity, avoiding waste of natural gas & water in household chores, buying reusable & repairable products (Carrete et al., 2012), buying recyclable products, limited use of scarce resource, using energy efficient appliances, replacing current lights with energy saving lights (Ertz et al., 2016), buying energy saving home appliance, least consuming electricity, avoiding excessive packaging, inspiring family members to avoid environmentally harmful products, using products which cause less pollution (Straughan et al., 1999), avoiding product that causes environmental damage (Laroche et al. 2002), avoiding environmentally harmful products, switching products for ecological reason (Chan and Lau, 2000), avoiding environmentally irresponsible companies (Kim et al., 2012), using costlier energy saving light (Lee, 2008), and buying goods in reusable container (Lee, 2009) etc. Details of the abovementioned variables have been presented in the Appendix-01(Table A1).

### **3. Research Methodology**

#### *3.1 The Instrument*

Primary data was used in this empirical research. Only the literatures from peer reviewed journals which are found available online have been reviewed for getting the sequence of earlier research as well as to prepare the structured questionnaire that was divided into two parts. First part contains the demographic profiles (gender, age, education) and second part contains the selected scales which have been adapted to study environmentally conscious consumer behavior across different countries (*See Appendix 01, Table A1*). Likert scale with five points, ranging from "strongly agree (5)" to "strongly disagree (1)" has been utilized in the assessment of the level of agreement with given statements.

#### *3.2 Sample Design and Data Collection*

The questionnaires were both physically distributed and sent as an email among the household consumers having at least higher secondary level of education. Questionnaires were distributed in Chittagong city (Commercial Capital City) and sent as an email to the respondents residing at Dhaka City (Capital City). As these two cities are the biggest cities in Bangladesh thus the respondents can be quite adequate source for exploring the contextual factors involved in the proposed research. To collect data, convenience sampling method was applied, which involved in selecting only those cases that are easiest to obtain as a sample, such as the person interviewed at random (Saunders, 2012). Only willing consumers are supplied with structured questionnaires, and until reaching the required sample size, the sample selection procedure was persistent. Data collection was done over a period of one month.

#### *3.3 Data Analysis*

Data analysis was based on 211 valid questionnaires where the statistical package IBM SPSS was used. Demographic profiles of the respondents have been examined. Through descriptive analysis, consumers' perception regarding environmental consciousness is observed. Before factor analysis, normality and reliability tests are conducted. Then, exploratory factor analysis was employed to explore the latent factors. Finally, ranking of factors was undertaken to evaluate the most frequently perceived environmentally sustainable consumer behavior.

### **4. Research Results**

#### *4.1 Respondent Profile*

Respondents' profile is characterized below in the Table-01. The observations can be drawn that more males (71.6.7%) were agreed to participate in the survey then the females (28.43%). Most of the respondents were in the age between 26 years and 35 years (53.1%). Again, most of the respondents had completed their graduation (54.5%). Thus, the study was mostly revealing the frequent perception of more males than females who have just completed their graduation as well as young in the age.

**Table 01: Respondent Profile**

Gender	Frequency	Percentage	Education	Frequency	Percentage	Age	Frequency	Percentage
Male	151	71.6	Higher Secondary	18	8.5	16-25	56	26.5
Female	60	28.4	Graduation	115	54.5	26-35	112	53.1
			Post Graduation	68	32.2	36-45	24	11.4
			Above Post Graduation	10	4.7	46-55	11	5.2
						56-65	8	3.8

Source: Survey questionnaire and output generated by SPSS

4.2 Descriptive Statistics

Selected variables representing environmentally sustainable household consumer behavior have been depicted below in the Table-02. The mean scores of consumers' perception were found between 4.63 and 3.68. Consumers' highest perceptions were regarding the avoiding waste of water (4.63), avoiding waste of electricity (4.63), avoiding waste of natural gas (4.62), and replacing energy saving lights (4.49). On the other hand, the lowest perception items were avoiding excessive packaging (3.69), buying energy saving light, even if costlier (3.78) and switching products for ecological reason (3.84).

**Table 02 : Descriptive Statistics**

Code	Variables	Mean	SD	Code	Variables	Mean	SD
V1	Avoid waste of water	4.63	.567	V11	Inspire family members to avoid environmentally harmful product	4.34	.680
V2	Avoid waste of electricity	4.63	.541	V12	Replacing energy saving lights	4.49	.605
V3	Avoid waste of natural gas	4.62	.608	V13	Avoid product causing pollution	4.26	.670
V4	Limited use of scarce resource	4.19	.687	V14	Buy product in reusable container	3.90	.759
V5	Buy energy saving home appliance	4.19	.734	V15	Avoid environmentally harmful product	4.25	.644
V6	Avoid excessive packaging	3.69	.974	V16	Avoid environmentally irresponsible company	4.17	.687
V7	Least consuming electricity	4.36	.643	V17	Buy energy saving light, even if costlier	3.78	1.143
V8	Avoid products causing environmental damage	4.28	.707	V18	Buy Recyclable Product	4.14	.668
V9	Switch product for ecological reason	3.84	.863	V19	Buy Reusable Product	4.12	.655
V10	Energy Efficient Appliances	4.16	.692	V20	Buy Repairable Product	3.95	.901

Source: Output generated by SPSS

4.3 Measures of Sampling Adequacy

All the items are evaluated by measuring the sampling adequacy in correlation matrix which is shown in the Table-03 representing strong correlations (Burton and Mazerolle, 2011). The sampling adequacy has been assessed by examining the KMO test (Kaiser, 1970). KMO value represents that sample size is quite adequate for factor analysis as the value is 0.807 which is much higher than 0.50. Moreover, an anti-image matrix of co-variances and correlations has been observed also where all the elements on the diagonal of that matrix are greater than 0.5 which represent the sample size to be quite adequate (Field, 2000). Bartlett's test of Sphericity (Bartlett, 1950) provided a chi-square output which is found significant. It indicates that the matrix is not an identity matrix and accordingly it should be considered as significant (p<.05) for factor analysis (Hair et al., 2006; Tabachnick and Fidell, 2001).

**Table 03: KMO, Bartlett's Test and Anti-image Correlation**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.807	Anti-image Correlation												
		V1	V2	V3	V4	V5	V11	V12	V13	V14	V15			
Bartlett's Test of Sphericity	Aprx. Chi-Square 976.805 D.f. 190 Sig. (p<05) .000	V1	.644 <sup>a</sup>					V11	.795 <sup>a</sup>					
		V2		.685 <sup>a</sup>				V12		.762 <sup>a</sup>				
		V3			.688 <sup>a</sup>			V13			.849 <sup>a</sup>			
		V4				.830 <sup>a</sup>		V14				.845 <sup>a</sup>		
		V5					.792 <sup>a</sup>	V15					.839 <sup>a</sup>	
		V6	.792 <sup>a</sup>				V16	.845 <sup>a</sup>						
		V7		.778 <sup>a</sup>			V17		.742 <sup>a</sup>					
		V8			.784 <sup>a</sup>		V18			.787 <sup>a</sup>				
		V9				.854 <sup>a</sup>	V19				.775 <sup>a</sup>			
		V10					V20					.827 <sup>a</sup>		

Source: Output generated by SPSS

4.4 Item Communalities

Past studies witnessed that the adequacy of sample size is determined by the nature of data (Fabrigar et al., 1999; MacCallum et al., 1999). Usually, the stronger the data, the smaller the sample can be justified for an accurate analysis. “Strong data” in factor analysis means uniformly high communalities without cross-loadings and several variables have loading strongly on each factor (Costello and Osborne, 2005). Item communalities greater than 0.800 is considered as “high” (Velicer and Fava, 1998) although it is unlikely to happen in real data. More common magnitudes are found from 0.40 to 0.70 and known as low to moderate communalities. Thus, extraction has been stated in the Table-04. It shows that communalities are quite moderate in nature which indicates towards appropriate factor analysis.

**Table 04: Communalities**

Variable	Initial	Extraction									
V1	1.000	.614	V6	1.000	.624	V11	1.000	.650	V16	1.000	.567
V2	1.000	.775	V7	1.000	.624	V12	1.000	.616	V17	1.000	.702
V3	1.000	.683	V8	1.000	.641	V13	1.000	.600	V18	1.000	.741
V4	1.000	.631	V9	1.000	.475	V14	1.000	.544	V19	1.000	.690
V5	1.000	.635	V10	1.000	.546	V15	1.000	.631	V20	1.000	.617

Source: Output generated by SPSS

4.5 Factor Summary

Summary of exploratory factor analysis has been depicted in the Table-05. The items having factor loading more than 0.5 and Eigen value greater than 1.000 were retained. Twenty (20) initially sorted variables of environmentally sustainable household consumer behavior were analyzed by using ‘Principal Component Analysis’ with ‘Varimax Rotation Method’. The variables all together accounted for 63.026 per cent of the total variance. The result provides statistical evidence to support newly identified seven factors of environmentally sustainable household consumer behavior, where F1 is named as ‘Environmental Responsibility’ followed by F2 as ‘Green Buying Behavior’, F3 as ‘Green Power Consumption’, F4 as ‘Environmental Concern’, F5 as ‘Resource Saving’, F6 as ‘Power Saving’, and F7 as ‘Efficient Consumption’.

**Table 05: Factor Summary**

Factor	Variables	Factor Loading	Eigen Value	Variation Explained
F1 Environmental Responsibility	V15 Avoid environmentally harmful product	.753	4.814	24.069%
	V13 Avoid product causing pollution	.685		
	V14 Buy product in reusable container	.682		
	V16 Avoid environmentally irresponsible company	.566		
	V10 Energy Efficient Appliances	.521		
	V09 Switch product for ecological reason	.519		
F2 Green Buying Behavior	V18 Buy Recyclable Product	.823	1.733	8.664%
	V19 Buy Reusable Product	.787		
	V20 Buy Repairable Product	.606		
F3 Green Power Consumption	V05 Buy energy saving home appliance	.721	1.464	7.320%
	V07 Least consuming electricity	.702		
	V04 Limited use of scarce resource	.640		
F4 Environmental Concern	V08 Avoid products causing environmental damage	.716	1.350	6.752%
	V11 Inspire family members to avoid environmentally harmful product	.649		
F5 Resource Saving	V03 Avoid waste of natural gas in household chores	.809	1.147	5.735%
	V01 Avoid waste of water in household chores	.746		
F6 Energy Saving	V02 Avoid waste of electricity in household chores	.830	1.090	5.451%
	V17 Buy energy saving light, even if costlier	.508		
F7 Efficient Consumption	V12 Replacing energy saving lights	.696	1.007	5.035%
	V06 Avoid excessive packaging	-.655		
Total Variance				63.026%

Source: Output generated by SPSS

#### 4.6 Ranking of Factors

Ranking of factors has been stated in the Table-06. It has been observed that factor 05 (Resource Saving) belongs to rank 1<sup>st</sup>, which shows that most of the respondents were intended to save resources by avoiding waste of natural gas and water in household chores. In continuation, factor 02 (Green Buying Behavior) was ranked 2<sup>nd</sup>, factor 04 (Environmental Concern) was ranked 3<sup>rd</sup>, factor 03 (Green Power Consumption) was ranked 4<sup>th</sup>, factor 06 (Energy Saving) was ranked 5<sup>th</sup>, factor 01 (Environmental Responsibility) was ranked 6<sup>th</sup>, and factor 07 (Efficient Consumption) was ranked 7<sup>th</sup>.

**Table 06: Ranking of Factors**

Factor Rank	Factor	Variable Code	Factor Loading (A)	Factor Mean (R)	Factor Loading*Mean (A*B)	Total Weighted Score	Average Factor Score	
1 <sup>st</sup>	F5	Resource Saving	V03	0.809	4.62	3.74	7.19	3.59
			V01	0.746	4.63	3.45		
2 <sup>nd</sup>	F2	Green Buying Behavior	V19	0.823	4.14	3.41	9.04	3.01
			V17	0.787	4.12	3.24		
			V20	0.606	3.95	2.39		
3 <sup>rd</sup>	F4	Environmental Concern	V08	0.716	4.28	3.07	5.88	2.94
			V11	0.649	4.34	2.81		
4 <sup>th</sup>	F3	Green Power Consumption	V05	0.721	4.19	3.02	8.77	2.92
			V07	0.702	4.36	3.06		
			V04	0.640	4.19	2.68		
5 <sup>th</sup>	F6	Energy Saving	V02	0.830	4.63	3.84	5.76	2.88
			V17	0.508	3.78	1.92		
6 <sup>th</sup>	F1	Environmental Responsibility	V15	0.753	4.25	3.20	15.29	2.55
			V13	0.685	4.26	2.92		
			V14	0.682	3.90	2.69		
			V16	0.566	4.17	2.36		
			V10	0.521	4.16	2.17		
7 <sup>th</sup>	F7	Efficient Consumption	V09	0.519	3.84	1.99	0.71	0.36
			V12	0.696	4.49	3.13		
			V06	-0.655	3.69	-2.42		

Source: Output generated by SPSS

## 5. Discussion

The study was aimed at identifying the factors lying with the environmentally conscious behavior of Bangladeshi household consumers. As, we discussed earlier that over the last decade, household consumption of goods and services has been increased tremendously across the world which is causing depletion of natural resources and severe damage to the environment. Marketers from several countries around the globe are realizing the threat and intended towards minimizing the harmful impact of business activities on the environment. Unfortunately, In Bangladesh, about 31.5% of the present populations live below poverty line and remaining are considered middle and upper-middle-class who are neither behaviorally habituated nor oriented towards sustainable consumption. Hence, wasteful consumption behavior is found predominant among the middle and upper-middle-class section of the society.

### 5.1 Demographic and Descriptive results

In this study, most of the respondents were young males who have completed their graduation recently. Higher perceptions representing the preference among environmentally conscious consumer behaviors were found regarding the variables i.e. 'avoiding waste of water', 'avoiding waste of electricity', 'avoiding waste of natural gas', and 'replacing energy saving lights'. The consumers are serious about conserving natural resources during household consumption. In contrary, items with lower perception score were i.e. 'avoiding excessive packaging', 'buying energy saving light, even if costlier', and 'switching products for ecological reason'. Most of the consumers are not yet ready to support the factor 'avoiding excessive packaging'. Affordability of majority do not allow them to buy costlier energy saving lights and switch towards eco-friendly products immediately.

### 5.2 Factor Analysis

In preliminary stages of factor analysis, measures of sampling adequacy are well explained by KMO value which is 0.807. An anti-image matrix of co-variances and correlations are observed where all the elements on the diagonal matrix are quite greater than 0.5 representing the sample size to be fairly adequate. Bartlett's test of Sphericity provides a chi-square output which is found significant ( $p < .05$ ) and indicates the matrix to be suitable for factor analysis. Communalities of almost all the items are found to be moderate between 0.50 and 0.80, which somehow represents strong data in factor analysis, that avoid cross-loadings as well as several variables loading strongly on each factor.

Twenty (20) initially sorted variables of environmentally sustainable household consumer behavior were analyzed by using 'Principal Component Analysis' with 'Varimax Rotation Method' where items having factor loading more than 0.5 and Eigen value greater than 1 were retained. Those variables were found to be grouped in seven new factors and all together accounted for 63.026 per cent of the total variation. The results provide statistical evidence to support newly identified seven factors of environmentally sustainable household consumer behavior, where F1 is named as 'Environmental Responsibility', followed by F2 as 'Green Buying Behavior', F3 as 'Green Power Consumption', F4 as 'Environmental Concern', F5 as 'Resource Saving', F6 as 'Energy Saving', and F7 as 'Efficient Consumption'.

The factor named "Environmental Responsibility", covers the variables i.e. V15, V13, V14, V16, V10, and V09, is representing highest Eigen value 4.814 and explains 24.069% of variation. Within the factor, avoiding environmentally harmful product has been found with the highest loading value. Along with that variable, other variables within this factor i.e. avoiding products causing pollution, buying products in reusable container, avoiding the products of environmentally irresponsible company, using energy efficient household appliances, and switching towards products for ecological reason have the highest impact on ensuring environmentally sustainable household consumer behavior. It has been witnessed in a developing country like Bangladesh that most of our buying decisions are controlled by affordability rather than willingness. Generally, eco-friendly products are costlier. Again, companies involved in environmentally irresponsible production or distribution process can afford to serve their products at competitively fewer prices as they have to expend least for waste management and maintaining eco friendly production process. Besides, switching towards products for ecological reason only is still far beyond due to lack of affordability. Yet, increasing the awareness regarding environmental impact can make a huge positive change in social and ecological household consumption.

The factor named "Green Buying Behavior" covers the variables i.e. V18, V19 and V20 having second highest Eigen value 1.733 and explains 8.664% of total variation. Within the factor, buying recyclable, reusable and repairable products are found to be grouped altogether representing the loading value ranging from 0.823 to 0.606.

The factor named "Green Power Consumption" covers the variables i.e. V05, V07 and V04 having Eigen value 1.464 and explains 7.320% of total variation. Within the factor, buying energy saving home appliances, least consumption of electricity and limited use of scarce resources are found to be grouped altogether having the loading value ranging from 0.721 to 0.640.

The factor named "Environmental Concern" covers the variables i.e. V18, V19 and V20 contain Eigen value 1.350 and explains 6.752% of total variation. Within the factor, avoiding products that cause environmental damage and inspiring family members to avoid environmentally harmful product are found to be grouped altogether having the loading value ranging from 0.716 to 0.649.

The factor named "Resource Saving" covers the variables i.e. V03 and V01 have Eigen value 1.147 and explains 5.735% of total variation. Within the factor, avoiding waste of natural gas and water in household chores are found to be grouped altogether having the loading value ranging from .809 to .746.

The factor named "Energy Saving" covers the variables i.e. V02 and V17 have Eigen value 1.090 and explains 5.451% of total variation. Within the factor, avoiding waste of electricity in household chores and buying energy saving lights, even if costlier are found to be grouped altogether having the loading value ranging from .830 to .508.

The factor named "Efficient Consumption" covers the variables i.e. V12 and V06 have Eigen value 1.007 and explains 5.035% of total variation. Within the factor, replacing energy saving lights and avoiding products with excessive packaging are found to be grouped altogether having the loading value ranging from .696 to .655.

### 5.3 Factor Ranking

In the ranking of factors, it has been observed that factor 05 (Resource Saving) belongs to rank 1<sup>st</sup>, which shows that most of the respondents were intended to save resources by avoiding waste of natural gas and water in household chores. The consumers preferred not to waste water from any source while drinking, washing and flushing. Again, they also preferred to switch off gas stove or cooker immediately after cooking. The study observed that the consciousness in this sector achieved highest perception due to the initiatives of the Government (i.e. mandatory pre-paid meter for household utilities), mass media coverage and public awareness related programs across the country. Moreover, such consumption is under the direct control of the households. Again, the cost-saving tendency is also influencing to facilitate reducing consumption of natural gas and water.

In continuation, factor 02 (Green Buying Behavior) was ranked 2<sup>nd</sup> representing the consciousness of buying recyclable, reusable and repairable products. With the growth of plastic industry, it has been observed that use of plastic made household products have been increased tremendously which can be recycled although it may cause pollution also. Again, we find our community believes in sharing personal belongings with nearest ones and such social attitude inspires to make reusable purchase. Repair & maintenance is quite common here as we use to consume household commodities until

or unless those become irreparable. In addition, Factor 04 (Environmental Concern) was ranked 3rd, Factor 03 (Green Power Consumption) was ranked 4th, and Factor 06 (Energy Saving) was ranked 5<sup>th</sup>.

Factor 01 (Environmental Responsibility) which was reflecting six variables with highest Eigen value and explained maximum percentage of variation, was ranked 6<sup>th</sup>. As most of the variables here depend on buying power rather than emphasizing on conscious behavior, thus it has got such a lower average weight. Thus, future research focusing on the influence of income along with knowledge can make a tremendous change in turning the people into more environmentally conscious consumers. In the end, Factor 07 (Efficient Consumption) was ranked 7<sup>th</sup> which has received the lowest loading values and explained the least percentage of variation.

## 6. Conclusion

The study was examining the factors covering the observed variables influencing environmentally conscious household consumer behavior in Bangladesh. As, we witnessed that wasteful consumption pattern affects the burden on scarce and valuable natural resource and puts irreversible negative impact on the economy, environment, and society. Research reveals the efficient use of energy can save on an average BDT 51 billion annually.

‘Environmental Responsibility’ was found to be the most significant factor covering maximum observed variables by explaining major percentage of the variation and particularly the variable i.e. avoiding environmentally harmful product has been found with the highest loading value among the other variables within this factor. But, in contrary, according to average weight of factor, it has been observed that ‘Resource Saving’ factor was ranked first where the result indicates that people prefer to avoid any kind of waste of natural gas and water during household chores. Govt. initiatives, media coverage and public awareness program thus proved to pursue most of the respondents with a positive change towards conserving scarce resources. Hence, we should promote environmentally sustainable household consumption as a key citizen responsibility through appropriate education, adequate learning along with shaping cultural traits. For attaining environmentally sustainable production as well as household consumption, proper research and innovative technology should be employed for efficient allocation along with the monitoring of resources. In fact, observation from the experiences of western countries as well as neighboring countries can be a good source.

However, the study has several limitations in spite of its effective managerial implications. Rather than conducting survey throughout the country, the research results are based on a comparatively small sample size selected from a limited geographic area within two major metropolitan cities only, though these two are the biggest cities in Bangladesh i.e. Dhaka (Capital City) and Chittagong (Commercial Capital City). Moreover, only environmental performance (planet) of household consumers to ensure sustainability was studied containing twenty variables. Yet, other two measurement indicators, such as economic performance (profit) and social performance (people) among the triple bottom line concept of sustainability have not been included in the research. Thus, an extensive research covering the rest of the measurement indicators can be conducted throughout the country and subsequently confirmatory factor analysis could be employed to justify the currently explored constructs of sustainable consumer behavior as well.

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## Appendix 01

Statements compiled in the Survey Questionnaire - Part 02 have been stated below:

**Table-A1: Survey Questions**

Statements	Source
01 I strictly prefer not to waste water from any source, while drinking, washing and flashing.	<i>Carrete et al., 2012</i>
02 I prefer to immediately switch off lights, fans or any electrical appliances, if not needed.	<i>Carrete et al., 2012</i>
03 I prefer to immediately switch off gas stove or cooker, if not needed.	<i>Carrete et al., 2012</i>
04 I try my best to limit my use of those products which are made of scarce or limited resources.	<i>Ertz et al., 2016</i>
05 I prefer to buy energy efficient household appliances (TV, air conditioner, freezers, microwave, lights etc.)	<i>Straughan et al., 1999</i>
06 I don't prefer those products which have excessive packaging.	<i>Straughan et al., 1999</i>
07 I try my best to consume or use electricity as less as possible.	<i>Straughan et al., 1999</i>
08 If I understand the potential damage to the environment of any product, I do not purchase such product.	<i>Laroche et al. 2002</i>
09 I have switched products for ecological and environmental reasons.	<i>Chan and Lau, 2000</i>
10 I have purchased a household appliance because it uses less electricity than other brands.	<i>Ertz et al., 2016</i>
11 I encourage my family members, not to buy those products which are harmful to the environment.	<i>Straughan et al., 1999</i>
12 I have replaced energy saving light bulbs in my home to minimize the use of electricity.	<i>Ertz et al., 2016</i>
13 I often choose those products which cause less pollution.	<i>Straughan et al., 1999</i>
14 Whenever possible, I buy products that are packaged in reusable containers.	<i>Lee, 2009</i>
15 I prefer to purchase those products which are less harmful to the environment.	<i>Chan and Lau, 2000</i>
16 I will not buy a product of those companies those are environmentally irresponsible.	<i>Kim et al., 2012</i>
17 I prefer to buy energy saving light bulbs, even if those are more expensive.	<i>Lee, 2008</i>
18 I prefer to buy products that can be recycled.	<i>Ertz et al., 2016</i>
19 I prefer to buy products that can be reused.	<i>Carrete et al., 2012</i>
20 I prefer to buy products which are repairable.	<i>Carrete et al., 2012</i>