



UNIVERSITI
MALAYSIA
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**CONSUMPTION VALUES, PERCEIVED
CONSUMER EFFECTIVENESS, ECO-
KNOWLEDGE AND GREEN PURCHASE
BEHAVIOUR OF ENVIRONMENT FRIENDLY
AND ENERGY EFFICIENT ELECTRONIC
PRODUCTS MARKET**

by

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TABLE OF CONTENTS

DECLARATION OF THESIS	i
ACKNOWLEDGEMENT	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	viii
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
ABSTRAK	xiii
ABSTRACT	xiv
CHAPTER 1 INTRODUCTION	1
1.1 Background of the Study	1
1.2 Problem Statement	13
1.3 Research Questions	24
1.4 Objectives of the Study	25
1.5 The Significance of the Study	26
1.5.1 Theoretical Significance	26
1.5.2 Practical Significance	27
1.6 Scope of the Study	29
1.7 Definition of Key Terms	30
1.8 Organization of the Thesis	32
CHAPTER 2 LITERATURE REVIEW	33
2.1 Introduction	33
2.2 Concept of Green Marketing	34
2.2.1 Green Marketing Strategies Practiced by Firms	38

2.3	Green Consumerism	43
2.3.1	The Green Consumer Purchasing Model	45
2.3.2	Comparing Green and Non-green Purchase Processes	46
2.4	Green Product	47
2.4.1	Green Electronic Products	50
2.5	Difference between Green Purchase Behaviour and Green Purchase Intention	52
2.6	Green Purchase Decision Process	53
2.7	Green Purchase Behaviour	55
2.7.1	Background of Green Purchase Behaviour in Bangladesh	64
2.7.2	Research Works on Green Purchase Behaviour in Bangladesh	67
2.8	The Influence of Perceived Consumer Effectiveness on Green Purchase Behaviour	70
2.9	The Moderating Role of Eco-knowledge	76
2.10	The Influences of Consumption Values on Green Purchase Behaviour	80
2.10.1	Functional Value	87
2.10.2	Social Value	91
2.10.3	Emotional Value	96
2.10.4	Epistemic Value	99
2.10.5	Conditional Value	101
2.10.6	Corporate Image Value	104
2.11	Consumption Values Theory	108
2.12	Chapter Summary	111
CHAPTER 3 RESEARCH METHODOLOGY		113
3.1	Introduction	113
3.2	Research Framework	113
3.3	Hypotheses Formulation	115

3.3.1 The Consumption Values Significantly Influence Green Purchase Behaviour	115
3.3.2 Perceived Consumer Effectiveness as Mediator	119
3.3.3 Eco-knowledge as Moderator	123
3.4 Research Design	123
3.5 Research Methodology	126
3.5.1 Population and Sampling	127
3.5.2 Operational Definition	131
3.5.3 Questionnaire Development	133
3.6 Measurement of Variables/Instrumentation	134
3.7 Pilot Study	144
3.8 Data Collection Procedures	147
3.9 Techniques of Data Analysis	148
3.10 The Partial Least Square (PLS) Path Model	149
3.11 The PLS Measurement Model (Outer Model)	149
3.11.1 Reliability	150
3.11.2 Validity Testing	150
3.11.3 The Measurement of Convergent Validity	151
3.11.4 The Measurements of Discriminant Validity	152
3.12 Assessing the Structural Model (Inner model)	152
3.12.1 Coefficient of Determination (R^2)	153
3.12.2 Hypotheses Testing	153
3.12.3 Predictive Relevance (Q^2)	153
3.13 PLS-SEM Justification	154
3.14 Chapter Summary	156

CHAPTER 4 DATA ANALYSIS AND FINDINGS	157
4.1 Introduction	157
4.2 Response Rate	157
4.3 Respondents' Profile	159
4.4 Descriptive Statistics Analysis	161
4.5 Analysis of Missing Value	163
4.6 Non-Response Bias	164
4.7 Normality Test	166
4.8 Multicollinearity	167
4.9 PLS-SEM Analysis Results	168
4.9.1 Reliability Test	170
4.9.2 Convergent Validity	172
4.9.3 Discriminant Validity	172
4.9.4 Predictive Relevance (Q^2)	175
4.9.5 Coefficient of Determination (R^2)	176
4.10 Structural Model Assessment for Hypotheses Testing	177
4.11 Effect Size Assessment (f^2)	183
4.12 Mediation Analysis	185
4.13 Moderating Effect Analysis	188
4.14 Summary of Findings	189
4.15 Reasons for Not Buying Green Electronics Products	191
4.16 Chapter Summary	194
CHAPTER 5 DISCUSSION AND CONCLUSION	195
5.1 Recapitulation	195
5.2 Discussion	198

5.2.1 Consumption Values and Green Purchase Behaviour	198
5.2.2 Perceived Consumer Effectiveness and Green Purchase Behaviour	204
5.2.3 Mediating Effect of Perceived Consumer Effectiveness	206
5.2.4 Moderating Effect of Eco-Knowledge	208
5.3 Implications of the Findings	209
5.3.1 Theoretical Implications	209
5.3.2 Practical Implications	214
5.4 Limitations of the Study and Directions for Future Research	218
5.5 Conclusion	220
REFERENCES	223
APPENDIX A	276
APPENDIX B	288
APPENDIX C	296
APPENDIX D	299
APPENDIX E	300
APPENDIX F	305
LIST OF PUBLICATIONS	307

LIST OF TABLES

NO.		PAGE
3.1	Breakdown of Samples	130
3.2	Questionnaire Design	134
3.3	Items for Functional Value	136
3.4	Items for Social Value	137
3.5	Items for Conditional Value	138
3.6	Items for Emotional Value	139
3.7	Items for Epistemic Value	139
3.8	Items for Corporate Image Value	140
3.9	Items for Perceived consumer effectiveness	141
3.10	Items for Eco knowledge	142
3.11	Items for Green Purchase Behaviour	143
3.12	Summary of Cronbach's alpha values from pilot test	146
3.13	The Reliability Coefficients of Variable	150
4.1	Response of questionnaire survey	158
4.2	Demography of the respondents	160
4.3	Descriptive Statistics of Variables	162
4.4	Independent Samples Test	166
4.5	Normality test results	167
4.6	Measurement Properties of Constructs	170
4.7	Factor Loadings and Cross-Loadings	173
4.8	Discriminant Validity Assessment	175

4.9	Coefficient of Determination (R^2)	176
4.10	The Structural estimates	179
4.11	Effect size	184
4.12	Mediation effect	186
4.13	Moderating effect	189
4.14	Summary of Hypotheses Testing Findings	189

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LIST OF FIGURES

NO.		PAGE
2.1	Green Consumer Purchasing Model	46
2.2	The Consumer Purchase Decision Model	54
2.3	The Green Purchase Behaviour Process	57
2.4	Theory of Consumption Value	109
3.1	Propos Research Framework	114
4.1	PLS Measurement Model	169
4.2	The Structural Model	178

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LIST OF ABBREVIATIONS

3R	Reduce, Reuse, Recycle
AMA	American Marketing Association
AVE	Average Variance Extracted
BEMMA	Bangladesh Electric Manufacturer and Merchandiser Association
CFLs	Compact Fluorescent Lamps
CO ₂	Carbon Dioxide
CSV	Comma Separated Value
CR	Composite Reliability
EIA	Energy Information Agency
ESDO	Environment and Social Development Organization
EU	European Union
E-waste	Electronic Waste
GCRI	Global Climate Risk Index
GDP	Gross Domestic Product
GE	General Electric
GHG	Greenhouse Gases
GOs	Government Organizations
IEA	International Energy Agency
IEO	International Energy Outlook
IGPN	International Green Purchasing Network
ISO	International Organization for Standardization
KWh	kilowatt-hours
LED	Light Emitting Diode
LOC	Locus of Control
LVs	Latent Variables
MVs	Manifest Variables

MW	Megawatt
NAPA	Nationally Appropriate Plan of Action
NEP	New Environmental Paradigm
NGOs	Non-government Organizations
OECD	Organization for Economic Cooperation and Development
PCE	Perceived Consumer Effectiveness
PCs	personal computers
PLS	The Partial Least Square
PLS-SEM	Partial Least Squares Structural Equation Modelling
R & D	Research and Development
RQ	Research Question
SD	Standard Deviation
SEPA	Swedish Environmental Protection Agency
SPSS	Statistical Package for Social Science
TERI	The Energy and Resources Institute
TPB	The Theory of Planned Behavior
TRA	The Theory of Reasoned Action
TVs	Televisions
UK	United kingdom
UN	United Nations
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
US	United States
USD	United states dollar
VIF	Variance Inflation Factor
WHO	World Health Organization

Nilai-Nilai Penggunaan, Tanggapan Keberkesanan Pengguna, Pengetahuan-Eko Dan Tingkah Laku Pembelian Hijau Yang Mesra Alam Dan Kecekapan Penggunaan Tenaga Bagi Pasaran Produk Elektronik

ABSTRAK

Sejak beberapa dekad yang lalu, pemasar dan penyelidik banyak menumpukan perhatian kepada motivasi yang mendasari tingkah laku pembelian hijau. Kajian ini bertujuan untuk menyiasat tingkah laku pembelian hijau terhadap produk elektronik menggunakan teori Nilai Penggunaan. Nilai fungsi, nilai sosial, nilai emosi, nilai epistemik, nilai bersyarat dan nilai imej korporat telah diuji berhubung dengan tingkah laku pembelian hijau yang mesra alam dan kecekapan penggunaan tenaga bagi pengeluaran produk elektronik. Selain itu, keberkesanan pengguna telah diuji sebagai faktor pengantara perhubungan di antara nilai-nilai penggunaan dan tingkah laku pembelian hijau. Manakala, pengetahuan eko telah diuji sebagai faktor penyederhana dalam menilai hubungan di antara keberkesanan pengguna dan tingkah laku pembelian hijau. Data kajian ini dikumpulkan melalui soal selidik berstruktur di enam bandar besar di Bangladesh iaitu Dhaka, Chittagong, Rajshahi, Khulna, Sylhet dan Comilla. Responden kajian ini terdiri daripada pembeli sebenar produk elektronik yang mesra alam dan jimat tenaga. Partial Least Square Structural Equation Modeling digunakan untuk menganalisis data yang dikumpul menggunakan *Smart PLS* versi perisian 2.0M3. Keputusan analisa menunjukkan bahawa nilai fungsi, nilai sosial, nilai bersyarat, nilai imej korporat dan nilai kecekapan pengguna adalah positif dan mempunyai hubungan yang signifikan dengan tingkah laku pembelian hijau. Di samping itu, hubungan yang signifikan yang positif ditemui dalam kalangan nilai fungsi, nilai sosial, nilai bersyarat, nilai imej korporat dan keberkesanan pengguna dilihat. Tanggapan keberkesanan pengguna telah menjadi pengantara hubungan di antara nilai fungsi, nilai sosial, nilai epistemik, nilai imej korporat dan tingkah laku pembelian hijau. Ia juga didapati bahawa eko-pengetahuan mempunyai hubungan penyederhana di antara keberkesanan pengguna dan tingkah laku pembelian hijau. Dapatan kajian ini telah memberi sumbangan teorikal kepada kajian literatur dan memberikan pemahaman terhadap tingkah laku pembelian hijau dalam kalangan pengguna produk elektronik mesra alam dan menjimatkan tenaga. Dapatan kajian ini juga mempunyai banyak implikasi pengurusan yang bermakna, terutamanya bagi pembuat dasar industri dan juga pihak kerajaan.

Kata Kunci: Nilai-Nilai Penggunaan, Tanggapan Keberkesanan Pengguna, Pengetahuan-Eko, Tingkah Laku Pembelian Hijau.

Consumption Values, Perceived Consumer Effectiveness, Eco- Knowledge and Green Purchase Behaviour of Environment Friendly and Energy Efficient Electronic Products Market

ABSTRACT

Over the past few decades, marketers and researchers have paid much attention to the underlying motivation for green purchase behaviour. The present study is designed to investigate the green purchase behaviour of electronic products market using the theory of consumption values. Functional value, social value, emotional value, epistemic value, conditional value, and corporate image value are tested in relation to green purchase behaviour of environment friendly and energy efficient electronic products market. In addition to that perceived consumer effectiveness is tested as the mediator between the consumption values and green purchase behaviour while eco-knowledge is tested as the moderator in the relationship between perceived consumer effectiveness and green purchase behaviour. Data are collected through a structured questionnaire survey from the six big cities of Bangladesh namely Dhaka, Chittagong, Rajshahi, Khulna, Sylhet and Comilla. The respondents of this study are the actual buyers of environment-friendly and energy efficient electronic products. Partial Least Square Structural Equation Modelling are used to analyse the collected data using Smart PLS software version 2.0M3. The analysis reveals that functional value, social value, conditional value, corporate image value and perceived consumer effectiveness are positively and significantly correlated with green purchase behaviour. Besides, a significantly positive relationship is found among functional value, social value, conditional value, corporate image value and perceived consumer effectiveness. Perceived consumer effectiveness mediates the relationship between functional value, social value, epistemic value, corporate image value and green purchase behaviour. It is also found that eco-knowledge moderates the relationship between perceived consumer effectiveness and green purchase behaviour. The research findings provide some theoretical contributions to the literature and provide insight into consumers' green purchase behaviour towards environment-friendly and energy efficient electronic products. The findings of this study also have a lot of insightful managerial implications, especially for the industry, policy makers and the government.

Key Words: Consumption Values, Perceived Consumer Effectiveness, Eco-Knowledge, Green Purchase Behaviour.

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Rapid economic growth in the last few decades has increased worldwide consumer consumption which is causing environmental deterioration through over-utilization of natural resources (Chen & Chai, 2010; Munasinghe, 2011; Datta, 2011; Biswas & Roy, 2015). The global economy, driven by consumption, already uses natural resources equivalent to almost 1.5 of the planet's earth and almost 85 percent of global outputs are consumed (Munasinghe, 2011). Despite technological advances that have promoted energy efficiency gains, according to the United Nations' (UN) sustainable development goals, energy use in the Organization for Economic Cooperation and Development (OECD) countries will continue to grow at 35 percent by 2020 (UN, 2016). Commercial and residential energy use is the second most rapidly growing area of global energy use after transport (UN, 2016). Households consume 29 percent of global energy and consequently contribute to 21 percent of resultant carbon dioxide (CO₂) emissions (UN, 2016).

Environmental issue has long been the concern of the current generation in many different contexts such as property, businesses, tourism, and higher educational institutions among others. The increased concern about the global climate change and growing media coverage attributed to this issue has led to an increase in the number of consumers actively seeking out and adopting energy efficient and environment-friendly electronic products (Liu et al., 2008; Chen et al., 2013). On the other hand, people are

concerned about climate change, but few are willing to take action to reverse the phenomenon by spending additional money for environment-friendly products.

The increasing consideration on sustainability in the natural environment is changing the competitive trend of modern day markets and motivating organizations to think about greener alternatives (Peattie & Peattie, 2009; Anbumozhi et al., 2011; Organization for Economic Cooperation and Development (OECD), 2011; Allen et al., 2014). Most business corporations have begun addressing this issue based on a strategic viewpoint and have started introducing new products and brands that emphasize positive social and environmental results. Nevertheless, it is an uphill battle to convince consumers to respond in a sustainable manner (Luchs et al., 2010), as the major recipient of green consumption is normally other consumers or the community and not just the consumer (Kronrod et al., 2012).

As society becomes more concerned with the natural environment, businesses have begun to change their strategy in an attempt to address the society's new concerns (Verma & Tanwar, 2014; Basha, 2015). There is a new interest among the consumers to live better with less resource. According to Ashraful and Kutub (2014), in recent years, as a result of fast growing access to technology and the rapid growth of the economy, a market has emerged for computers, electrics, and home appliances. Consequently, consumption of household electricity has continuously increased with the rise in per capita income with the purchase of household appliances such as refrigerators, air-conditioners, microwave ovens, dishwashers, television sets, and washing machines (Kubota et al., 2011). Research on the consumption of household energy in the city of Johor in Malaysia discovered a maximum ownership of appliances in the household including television set at 100%, refrigerator at 99%, washing machine at 96%, rice cooker at 95%, as well as ceiling fans at 93% (Kubota et al., 2011). As a consequence of

the increasing market expansion in electrical and electronic equipment and their short life span, the waste stream of these products reacts as the catalysts for the formation of harmful ingredients for both the environment and human health (Wath et al., 2011; Riyad et al., 2014).

Needhidasan et al. (2014) found that India has generated 0.4 million tons of electronic waste (e-waste) in 2010 which increased to 0.6 million tons in 2013–2014. In 2003, in the markets in the US, about 80 million communication devices were sold; however, by 2008, about 152 million devices were sold pointing to an increase of 90% in 5 years and by 2015, these figures were shooting through the roof. In 2006, statistics revealed that 34 million televisions (TVs) were in the market with approximately 24 million personal computers and 139 million mobile communication devices being manufactured. In the EU region, in 2009, a total of 3.8 billion electronic devices were available in the market including 265 million computers, 245 million home consumer electronics, as well as 197 million consumer appliances. In 2001, in China, more than 48 million television sets and 20 million refrigerators were sold; in 2009, almost 40 million personal computers were sold (Needhidasan et al., 2014). Consumption of these electronic products is producing a huge amount of waste and causing higher demand for electricity.

The current rapid urbanization and growth in population have increased the demand for electricity in most developing nations. The International Energy Outlook (IEO, 2014) estimates that the world consumption of energy will increase by 56% from 2010 to 2040. Most of the development in the consumption of energy takes place in countries outside the Organization for Economic Cooperation and Development (OECD), or non-OECD countries, where strong and long term economic growth drives the demand. The use of energy in developing or non-OECD countries has increased by

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90% (IEO, 2014). Since the fact remains that an increased amount of electricity would be needed, this places an increased amount of pressure on the upstream energy resources including natural gas, crude oil, as well as coal which are slowly depleting. This situation is motivating industries to produce energy-efficient electronic products.

Several researches show that the main driver behind household energy consumption among occupants of developing nations is the improved lifestyle of the people in these countries which allows them to use modern electronic home appliances including the air-conditioner and heater (Tukker et al., 2008; Kusaka, 2012; Malama et al., 2015). Electronics products are made of components with valuable materials with some containing toxic substances that can have an adverse effect on human health and the environment (Needhidasan et al., 2014; Patel & Balachandran, 2015). Alarming levels of dioxin compounds are linked to cancer, the developmental of defects, and other health problems have been found in the samples of breast milk, placenta, and hair. These compounds are linked to the improper disposal of electronic products (Needhidasan et al., 2014). Ivanova et al. (2015) highlighted the importance of environmental pressure arising from households with their consumption contributing to more than 60% of global greenhouse gas (GHG) emissions and between 50-80% of total land, material, and water use. Joshy and Rahman (2015) claimed that purchases made by consumers for their households were responsible for 40% of the environmental damages (Biswas & Roy, 2015). However, this environmental damage can be reduced substantially with the consumption of green products.

Different green electronic products based on energy efficiency are available in the market. The highest ranked light emitting diode (LED) lamps are about 68% energy efficient compared to the conventional light bulbs and this could help reduce the electricity bill by 60% (Amann et al., 2013). Compact fluorescent lamps (CFLs) in

general utilize one-fifth to one-third of the electricity and can last from eight to fifteen times more (Guan et al., 2015). In industrialized countries, lighting is responsible for 5–15% of total consumption of electric energy (Ryckaert et al., 2010). Energy efficient refrigerators and cooling products utilize the latest technology which lowers power consumption in compressors (Amann et al., 2013). This is able to conserve up to 16-22% of energy annually. Washing machines and dishwashers that are of the energy-efficient kind are able to reduce the consumption of power by almost 24% (Amann et al., 2013). The usage of new technologies for power components has lowered the consumption; for example, using an air-conditioner with a high energy rating will reduce the electricity bill by 18% on average. An air conditioner with a higher energy rating is less likely to use a lot of power for starting in comparison to those items with a lower rating (Amann et al., 2013). Thus, usage of energy efficient electronic equipments could save a huge amount of electricity and address the issue with power crisis in developing nations.

Protecting and preserving the earth's resources has become one of the biggest challenges in today's business and consumers' purchase behaviour (Saini, 2013). For example, there has an emerging sense of becoming a more conscious energy consumer, specifically in the use of home appliances (Biswas & Roy, 2015). As a growing number of consumers claim that their purchase decision is influenced by company image and brands that have authentic meaning have the potential to become quite profitable. Popular brands such as Samsung, LG, and Kenmore are producing appliances which are able to inform the users of the best times for electricity usage, allowing them the opportunity to make an informed decision on the ways in which they consume energy (Cavada & Guffey, 2011).

It has been estimated by the International Energy Agency (IEA) that the total usage of electricity out of the total energy consumption has increased tremendously in

the last 30 years globally (IEA, 2010). The UN Economic and Social Commission for Asia and the Pacific (UNESCAP, 2011) reports that by the year 2030, the primary demand for energy worldwide is projected to be about 87% of the growth. In addition, the energy sector is accountable for approximately 65% of the GHG emissions caused by activities performed by humans (Zainudin et al., 2014). Based on the projection by the United Nation University, e-waste will increase to 47 million tons in 2017 from the 41 million tons produced at present annually (Baldé et al., 2015).

This increase is in part due to the fast growth of e-waste quantities as a result of the rapid development of new technologies and more affordable electrical and electronic equipments. E-waste has been found to increase at a rate of 3–5% annually in the European Union (EU), and this increase is approximately three times faster compared to other individual waste materials in the solid waste sector (Swedish Environmental Protection Agency (SEPA), 2011; Agamuthu & Dennis, 2013). Concerns regarding the consequences of e-waste have also increased given the global e-waste growth of approximately 41 million tons annually (Singh & Zeng, 2016).

Given the rapid pace of innovation in electronics goods and the limited incentives given for designs that increase the opportunities for 3R (Reduce, Reuse, Recycle), electronic products have a tendency to become obsolete quickly and discarded more often than not (Bowcock, 2011). The waste created from the electronics products that are discarded is a growing issue due to the harmful substances contained within such as lead, nickel, cadmium, copper, mercury, chromium beryllium, and lithium, among others. Thus, unsafe e-wastes management could be dangerous to the health of human beings as well as the environment given the high content of toxicity (Lundgren, 2012; Herat & Agamuthu, 2012). The global projection is that e-waste lies between 20–50 million tons per annum (Herat & Agamuthu, 2012; Basel Action Network, 2010).

This amount is greater than 5% of the total municipal solid waste creation (Swedish Environmental Protection Agency, 2011; Bowcock, 2012). In addition, e-waste market researchers in the USA confirm that the total global e-waste is projected to increase from 41.5 million tons in 2011 to 93.5 million tons in 2016 (Market & Market, 2011).

Walsh (2009) proposed that the high quantity of e-waste that was not properly disposed has increased the toxicity level in the environment to dangerous levels. It is estimated that about 10 million tons of e-waste is generated annually in the European Union, and reports from Japan show that among others, in the year 2010, 610 million mobile phones were discarded (Swedish Environmental Protection Agency, 2011). It is estimated that in China, more than 70 million mobile phones, 4 million computers, 5 million television sets, 6 million washing machines, as well as 4 million refrigerators have been disposed annually since the year 2003 (Swedish Environmental Protection Agency, 2011). It is also estimated that in India, the total electronic waste creation per annum is from 146,000 to 330,000 tons, and this figure is projected to increase to 470,000 tons by the year 2011. In 2007, it was revealed that in India 380,000 tons of electronic waste are generated from only cell phones, computers, and televisions, and this figure is anticipated to go beyond 800,000 tons by the year 2012 (Herat & Agamuthu, 2012). Only 13.6% of these electronic items were disposed as well as recycled (Zhong & Schiller, 2009; Namias, 2013).

Alternative products that are environmentally friendly are emerging in many product categories among commercial retailers at a rapid speed - from household cleaning products, food stuff, recycled paper, organic clothing, to higher end products including automobiles, household appliances, and utility service providers (Kataria et al., 2013). Consumers are not the only ones going green; support for this social shift also comes from major corporations (Ali & Ahmad, 2012). Toyota, IBM, and Bank of

America have constructed or are constructing green buildings for their offices. However, although environment-friendly and energy efficient products are available in the market, their market share is not expanding compared to the conventional ones.

The Malaysian private sector also has a major role in supporting the initiatives of the government in relation to environmental issues. Nabsiah et al. (2011) claim that corporate organizations must manufacture products that are environmentally-friendly and non-damaging to the environment. Many organizations have in fact undertaken the responsibility to play a bigger role in the search to protect our environment. For example, Panasonic Malaysia had established the inverter technology in its electronic appliances that uses a lower amount of energy compared to the conventional products. This has allowed the country to promote green awareness and using environmentally friendly products in the society (Jeong, 2010). Not only that, many manufacturers produce an ecological product because they know the demand for the green product is increasing day by day. The Nature Marketing Institute documents that the 200 billion market consisting of lifestyle, health, and sustainability is anticipated to double by the year 2010 and quadruple by the year 2015 (Ali & Ahmad, 2012). Thus, we have reached a situation where many large-scale organizations are looking to reduce, or at least control, their GHG emissions.

Bangladesh is not an exception in this regard and there has been a rising concern in the country for businesses and consumers to address some serious environmental issues. These changes pose both an opportunity and challenges to the marketers as they have to monitor and devise strategies according to the changing consumer purchase behaviour (Riyad et al., 2014). In recent years, due to technological development and rapid economic growth in Bangladesh, the market for television, computer, mobile, refrigerator, consumer electronic products, and home appliances has grown

tremendously. Bangladeshis consume approximately 3.2 million electronic products annually. The total usage for PCs, TVs, and Refrigerators in 2010 was 600,000, 1,252,000, and 2,200,000, respectively (Hossain, 2010). Of this amount, only 20 to 30 percent is recycled and the rest of the waste is released into landfills, rivers, drains lakes, canals, and open spaces which are hazardous to health and environment (Hossain, 2010). Industries are trying for a customer driven policy and creating demand for green electronic products as environmental pollution has become a major health concern for the people.

Bangladesh is an extremely polluted country (Alam, 2009). A few steps taken by the government to improve the environmental degradation and pollution control are not enough to address this gigantic problem (Alauddin et al., 2014). A concentrated effort with a joint collaboration of all the concerned ministries and government bodies was made to save the country from facing environmental disasters. For this, the National 3R Strategy 2008 was undertaken to motivate people to use environment-friendly and energy efficient electronics products. In 2008, a clear green public procurement policy was established following the cabinet's approval of the plan to promote green public procurement and to extend green procurement to the private sectors through collaborations in the manufacturing and consumption of green or environmentally friendly products. To save electricity, the government is giving importance to the use of energy-efficient compact fluorescent lamps (CFLs) because it can save 244.80 MW electricity per year; total annual CO₂ emissions could be avoided by 2.1 percent, thus protecting the environment and 105m (USD) can be saved every year (The Energy and Resources Institute TERI, 2014). However, to date, energy efficient compact fluorescent lamps (CFLs) constitute only 25 percent of the total lighting market demand (TERI, 2014).