D.U. JOURNAL OF
marketing
Vol. 18, June, 2015 and Vol. 19, June, 2016
ISSN-1996-3319

DEPARTMENT OF MARKETING, UNIVERSITY OF DHAKA

D. U. JOURNAL OF MARKETING

Vol. No. 18-19, June 2015 & 2016 (Published in March 2019)
A Journal of the Department of Marketing
Faculty of Business Studies
University of Dhaka
Dhaka 1000, Bangladesh
www.dumarketing.ac.bd
ISSN-1996-3319

EDITORIAL BOARD

D.U. Journal of Marketing is an annual publication of the Department of Marketing, University of Dhaka. The journal contains research-based papers, which are original in nature in the field of marketing.

This journal follows a 'twin-review' system in which a manuscript (paper) is reviewed by two experts. Moreover, it uses 'double-blind review' which means that identities of both the reviewers and authors are concealed from each other throughout the review process.

The Editorial Board initially determines whether a paper is suitable for review based on the set criteria for the journal. Then it selects two reviewers for each paper. On the basis of their recommendations, the Editorial Board decides whether the paper should be published.

The Editorial Board does not bear any responsibility for the views and opinions expressed by the authors in the papers.

Print: Natundhara Printing Press, 277/3, Elephant Road, Dhaka-1205.
Contact: 01711019691, 01911294855, natundhara2014@gmail.com

Price: BDT 200.00

$ 10.00

CONTENTS

D.U. Journal of Marketing, Vol. 18, June, 2015 and Vol. 19, June, 2016

INVESTIGATING THE NATURE OF PLASTIC RECYCLING SUPPLY CHAIN: BANGLADESH PERSPECTIVE

Nasrin Akter[1]
Muhammad Ismail Hossain[2]

Abstract: *Recycling has experienced tremendous growth as a technique to reduce the volume of plastic waste stream. Despite the global appeal and acceptance of recycling, the supply chain used in plastic recycling has received minimal academic attention in Bangladesh. At this outset, this study demonstrates the role of supply chain members and their capabilities in plastic recycling which has a significant impact on the efficiency of processing recyclable plastic materials. The study uses a modified customer visit program based on in-depth interview and current literature to identify supply chain members, their functions, and issues affecting the logistics of recyclable plastics. The findings of the study demonstrate the logistics channel structure, membership, and functions, which may work as a foundation for identifying the issues affecting efficiency and marketability of the existing supply chain of plastic recycling.*

Keywords: *Plastic, Recycling, Supply Chain, Structure, Reverse Logistics, Bangladesh.*

INTRODUCTION

The plastic industry in Bangladesh has been emerging as an important industrial sector for the last two decades. There are about 5000 plastic manufacturing units, 98 percent of which belongs to the Small-Medium Enterprises (SMEs) (The Independent, 2016). Almost all major industries in Bangladesh use plastic materials due to their substantial benefits in terms of low weight, durability and lower cost relative to many other material types (Andrady & Neal, 2009; Thompson, Swan, Moore, & vom-Saal, 2009). In Bangladesh, plastic has many uses across different sectors, such as household works (e.g. home appliances, kitchenware, furniture, etc.), packaging (e.g. food and non-food), building construction (e.g. plastic pipe, door, etc.), electronics (e.g. cables, wires, switches, commuter accessories, telecommunication equipment, etc.), health care (e.g. blood bag, saline, injection, medical container, etc.) and agricultural products (e.g. pipes for irrigation, container for transportation and the like).

[1] Professor, Department of Marketing, University of Dhaka.
[2] Professor, Department of Marketing, University of Dhaka.

Plastic, in spite of its multifaceted uses as a manufacturing material, is causing significant environmental and health problems. The current level of plastic usage and disposal also creates environmental problems like acute sanitary and hygiene threat in Dhaka city, as the majority of the types of plastic are not biodegradable (Alam, 2015). As a consequence, substantial quantities of end-of-life plastics are being accumulated in landfills and as wreckage in the natural environment, resulting in both waste-management issues and environmental damage (Barnes, Galgani, Thompson, & Barlaz, 2009; Gregory, 2009; Oehlmann, Schulte-Oehlmann, Kloas, Lutz, Kusk, Wollenberger, Santos, Paull, Van-Look, & Tyler, 2009; Ryan, Moore, van-Franeker, & Moloney, 2009; Teuten, Saquing, Knappe, Barlaz, Jonsson, Björn, Rowland, Thompson, Galloway, Yamashita, Ochi, Watanuki, Moore, Viet, Tana, & Prudente, 2009).

Effective recycling is one of the major challenges of waste management in Bangladesh and the challenge is much higher for the Dhaka city. The plastic waste management, specifically the thin polyethylene (PE) bags, has been a serious environmental problem in Bangladesh. For example, the littering of thin polyethylene bags created such an unmanageable situation throughout the country that in April 2002 the Parliament passed a bill banning thin plastic bags. It has been more than thirteen years since the bill was passed; still, the problem has not been fully resolved. Recycling is one of the major means through which Bangladesh can reduce the negative impacts of plastics usage. In addition, recycling can provide the opportunities of conservation of oil and energy, reduction of greenhouse gas emissions, saving of landfill space, the environment friendly sources of materials for the manufacturing of new products, new employment and overall a sustainable environment (Hopewell, Dvorak, & Kosior, 2009).

In Bangladesh, waste management related issues have drawn considerable attention in recent years. However, little has been done so far to understand the recycling process and the ways to develop a recycling industry. Although a few researchers have demonstrated the logistic chains of mixed waste, and recyclable waste in Dhaka city, none of these are descriptive enough to understand the detailed process of recycling or reverse logistics. Moreover, little has been done till now to explore the reverse logistics (RL), their value-added process and possible loopholes although the effectiveness of post-consumer packaging recycling is largely dependent upon the detailed understanding of the key steps of recycling (e.g. collection, sorting, cleaning, etc.).

This paper, therefore, urges upon conducting a comprehensive study that will focus on understanding the logistics chain of plastic recycling in Dhaka city for three reasons. Firstly, Bangladesh could emerge as a global player in the plastics industry by raising its annual turnover to US$ 4 billion by 2020, according to a study conducted by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP, 2015). Secondly, in spite of the high potential of

recycling, the reverse supply chain of plastics is largely unexplored. Finally, such analysis has practical significance and policy implications for government, industry, and people in general as it justifies the merits of diverting the majority of the plastic waste from landfills, dumpsite and roads to the recycling industry. It is worthy to mention that the scope of the study is confined to the recycling process of PET bottles.

LITERATURE REVIEW

A literature review is a fundamental section of any scientific work as it sets the context for conducting an investigation. Likewise, to set the rationale of conducting the present investigation relevant literature pertaining to waste management, plastic recycling process and system of Dhaka city is consulted and consequently presented in the following sub-sections.

Waste Management in Dhaka City: An Overview

The management of solid waste continues to be a major challenge in urban areas throughout the world especially in the rapidly growing cities of the developing world (Thompson et al., 2009). Dhaka, the capital city of Bangladesh, is not an exception and is currently experiencing the problem of inefficient solid waste management due to the rapid growth of industries, lack of financial resources, inadequately trained manpower, inappropriate technology, poor governance and lack of awareness of the community. Dhaka city is expanding fast through rapid but unplanned urbanization (Erik & Solana, 2010; Rahman, 2011), and is turning into a mega-city with the enormous growth of population. Compared to the year 1951, the urban migration increased by 19.67 percent in 2001 (Rahman, 2011; Enayetullah & Hashimi, 2006). The urbanization level has increased from 8.78 percent to 28.37 percent from 1974 to 2011 (Islam, 2015). This rapid urbanization is generating a large amount of waste (Sujauddin, Huda, & Hoque, 2008), which poses a serious threat to the environmental quality and human health (Swan, Main, Liu, Stewart, Kruse, Calafat, Mao, Redmon, Ternand, Sullivan, & Teague, 2005; Swan, 2008; Lang, Galloway, Scarlett, Henley, Depledge, Wallace, & Melzer, 2008). The solid waste problem in Dhaka city is acute even in comparison to that of many other cities in developing countries.

In Dhaka, solid waste generation amounts to 4634.53 tonnes/day and the operational and collection efficiency of the Dhaka City Corporation (the authority responsible for managing the solid waste in Dhaka City) is 45 percent and 60 percent respectively (Saifullah & Islam, 2016). However, a recent study conducted by BRAC Institute of Governance and Development (BIGD) (2015) estimated that approximately 6110.47 tonnes/day of solid waste is generated out of which DCC has the capacity to collect 4643 tonnes/day. This results in uncollected waste of 1467.47 tonnes/day or 31.61 percent of the total generated

solid waste in a day in Dhaka City. The inclusion of Non-government Organizations (NGOs)/Community Based Organizations (CBOs)/Private Organizations to provide door to door waste collection services improves the solid waste collection scenario as found in a recent study (BIGD, 2015). Matter, Dietschi and Zurbrugg (2013) in their study demonstrated how the informal sector along with Municipal Corporation manages the flow of recyclables and mixed waste produced by households in Dhaka city. It implies that some households and informal sectors (*Feriwala, gariwala*) are working towards separating the recyclable items at the source. This is also evident in the BIGD study (2015). However, Dhaka still has a long way to go regarding achieving considerable economic benefit from the recycling activities.

In Bangladesh, waste management related research has attracted considerable attention in recent years, which is evident from **Table 1**. These studies primarily emphasized on different perspectives related to waste management and recycling in Dhaka city, such as recycling behaviour (Afroz, Hanaki, Tuddin, & Ayupp, 2009), public-private partnerships for solid waste management (Ahmed & Ali, 2006), city governance and its impact on waste management system (Bhuiyan, 2010), the effect of waste composting and landfill location on environment, the nature and problems of waste management in Dhaka (Hai & Ali, 2005), role of informal groups in waste recycling through segregation of household waste (Matter, Dietschi, & Zrbrugg, 2013), socio-cultural practices in household waste collection system (Sufian & Bala, 2007) and solid waste management in Dhaka city: towards decentralised governance (BIGD, 2015). Dhaka City Corporation – the only responsible authority for waste management of Dhaka City also conducted a study on solid waste management in Dhaka city with the collaboration of Japan International Cooperation Agency (JICA). The objective of that study was to formulate a master plan concerning solid waste management in Dhaka City. Another objective was to improve and strengthen the capabilities and management skills of DCC personnel in terms of solid waste management through technology transfer during the study (JICA, 2005). However, little has been done so far on understanding the reverse logistics chain of plastic recycling and the way to develop a recycling industry.

The reverse logistics chain of plastic recycling system is different in many ways from the regular forward logistics chain. For example, reverse logistics (RL) chain is more complex than forward logistics (FL) chain because the former originates from many points to one whereas the latter originates from one point to many points. Moreover, recycling requires the management of different quality of products (recyclable items) and different packaging (e.g. plastic bottles and poly bags need to pack separately for transportation) simultaneously where the cost of these packaging and distribution is less visible to the stakeholders. For example, the cost of transportation is higher in reverse logistics due to smaller shipment size thereby results in more material handling costs. A number of other costs, such as costs of refurbishment, repacking, changing value, reworking also

occurs in reverse logistics but not in forwarding logistics. However, all of the above-mentioned costs contribute towards the total costs of the returned products. Moreover, the negotiation process throughout the reverse supply chain is very complicated and less transparent (Grabara, 2004). Therefore, there would be no compelling reason to argue that the logistics chain of recycling is more complicated than the forward logistics chain and requires special attention.

Table 1: Literature on Waste Management in Bangladesh

Research Area	Focus	Authors	Name of the Journal	Year
City Based				
Dhaka	The Decentralized Governance of Solid Waste	BIGD	BRAC Institute of Governance and Development Publication	2015
Chittagong	SWM (General and Institutional)	Das et al.	International Journal of Research in Management	2013
Rangpur	SW Generation and Recycling	Rakib et al.	International Journal of Scientific Research in Environmental Sciences	2014
Pabna	Environmental Impact	Saha	IJASETR	2013
Sylhet	Hospital Waste Management	Kaiser et al.	ARPN Journal of Engineering and Applied Sciences	2006
Combined cities	Overall Management of SW	Alamgir and Ahsan	Iranian Journal of Environmental Health Science & Engineering	2007
Governance/Regulatory				
Crisis in Governance	Examine the Extent of Operational Problems	Bhuiyan	Habitat International	2010
Predictors of recycling behavior	Factors Influence Recycling Behaviour	Afroz et al.	Waste Management & Research	2009
Community -based Behavior	Impact of the Community Differences in SWM	Maruful Hoque	JICA Study	2005

Research Area	Focus	Authors	Name of the Journal	Year
Perception about WM	a. Performance Measurement by Citizen Report Card b. Perception about 3R	a. Akhter et al. b. Ivy, Uddin and Hossain	a. CCASP b. International Journal of Applied Science, Technology and Engineering research	a. 2009 b. 2013
Socio-Economic Perspective				
Demographic variables	Factors Influencing the Willingness to minimize SW	Afroz et al.	Journal of Environmental Planning and Management	2010
Solution-Based Approach				
Database to Improve Healthcare WM	Application of GIS	Rahman and Rahman	Journal of Civil Engineering	2009
Sustainability	Design of the Integrated Biogas Plant using Integrated Market Waste	Bhuiyan et al.	International Journal of Engineering and Innovative Technology	2010
Public-Private Partnership	a. Decentralized Community-based model b. People as Partner	a. Rahman b. Ahmed and Ali	a. CCAP Report b. Habitat International	a. 2011 b. 2006
Optimization of Transportation	Road Network and Water Ways Integrated with GIS	Islam, Pervin and Muyeed	Canadian Journal on Environmental, Construction and Civil Engineering	2012
Alternative Energy	A system to Generate Electricity	Alam, Dip and Boie	4th International Conference on Mechanical Engineering, December	2001
Waste Segregation	Importance of Segregation for Recycling	Matter et al.	Habitat International	2013

Research Area	Focus	Authors	Name of the Journal	Year
Impact-based Research				
Environ-mental Impact	a. Effect of Composting and Landfill Location b. Investigate the Physical and Chemical Characteristics of Decomposed Solid Waste c. Ecological Footprint	a. Hai and Ali. b. Haque et al. c. Salequzzaman et al.	a. UAP Journal of Civil and Environmental Engineering b. American Journal of Civil Engineering and Architecture	a. 2005 b. 2013 c. 2006
Win Approach	Reduction, Reuse, Recycling, and Recovery	Enayetullah and Sinha	Report of 'ASHOKA'	2000

The Need to Investigate Plastic Bottles Recycling

Plastic bottles are not biodegradable and, therefore, may persist in the soil for a considerable period of time depending on various environmental factors (Swift & Wiles, 2004). Furthermore, the additives as used to mix polymer resins and optimize the performance of materials are causing health concerns. On the one hand, the toxicity of some additive chemicals may have negative effects on animals and/or humans and on the other hand, mixed polymers are more difficult and complicated to recycle than products made up of a single polymer (Hopewell et al., 2009).

Given the growth of plastic bottle usage, there is currently no mandatory system of taking back of the plastic bottles after use in Bangladesh. Most used bottles are either buried in landfills or burned in incinerators, or they make their way to the far corners of the earth: blown underneath train platforms, into the back of caves and alleys, along roadways, onto beaches, and out to the middle of the ocean. These bottles will end up in landfills, which are quickly being filled up. "In a landfill, heavy equipment crushes water bottles, but they still take up space. For how long? No one knows: after all, PET is only about 25 years old. But estimates range up to 1,000 years," (Royte, 2008, p. 156). If landfilling is not the longer-term solution, it makes sense to look for alternative methods of disposing of these plastic bottles.

The preceding illustration indicates that valuable spaces in landfills are wasted by filling it up with bottles that are perfectly recyclable. Moreover, the packaging is

the major plastic consuming sector in Bangladesh where recycling is the best option for disposing of the plastic bottles. Plastic recycling provides many economic and social benefits including the generation of employment, conservation of energy, earning foreign currency and utilizing the efficient use of scarce resources. For example, the growth of the recycling industry and its untapped opportunities motivate many young individuals to start their business in this sector, thereby creating new entrepreneurs and employment opportunities. By recycling 15 million metric tonnes of plastic waste every year, the plastic recycling industry saves landfill space and energy. For example, recycling one pound of plastic bottles results in a saving of approximately 12000 BTUs (British Thermal Units). Approximately 3.8 barrels of petroleum is saved when a ton of plastics are recycled. Moreover, the substitution of recycled materials reduces the emission of greenhouse gases that are produced in the manufacturing of virgin materials. Recycled plastic not only reduces the virgin plastic import but also brings foreign currency for the country. Bangladesh exported 5500 tons of PET flakes in the FY 2011-12 and earned $39.09 million from waste plastic by exporting PET flakes to China, Korea, Taiwan and Vietnam (Arafat, 2013).

Plastics Recycling System

"Plastics" is the generic term for synthetic materials formed by the polymerization of simple monomers. Both the terms "polymer" and "resin" may be used interchangeably for particular plastics. The Society of Plastics Industry (2015) defines a plastic material as "any one of a large group of materials consisting wholly or partly of combinations of carbon with oxygen, hydrogen, nitrogen and other organic or inorganic elements, and capable of being formed into various shapes by heat and pressure".

Terminology for plastics recycling is complex and sometimes confusing because of the wide range of recycling and recovery activities (Hopewell et al., 2009). According to the American Society for Testing and Materials (ASTM-D5033) recycling can be of four categories. They are primary (mechanical reprocessing into a product with equivalent properties), secondary (mechanical reprocessing into products requiring lower properties), tertiary (recovery of chemical constituents) and quaternary (recovery of energy). Primary recycling is often referred to as closed-loop recycling and secondary recycling as downgrading. Tertiary recycling is either described as chemical or feedstock recycling, and quaternary recycling as energy recovery (Hopewell et al., 2009). Moreover, the International Organization for Standardization (ISO, 2006) distinguishes between two different types of recycling process- 'closed-loop' and 'open-loop'. Closed-loop recycling can be of two types. One is the process where the product is recycled at the end of its life into the same product (e.g. a plastic ice-cream pot is recycled into an identical ice-cream pot) and the other is the process where the product is recycled into different products but the materials undergo no changes

in inherent properties (e.g. an ice-cream pot is recycled into a plastic yogurt pot with no change in inherent properties of the recycled materials). Conversely, in open-loop recycling, the recycled material undergoes a change in inherent properties (Kyung, 2012). This implies that the use of closed-loop recycling is more limited than open-loop recycling.

Apart from the above-mentioned process, generally post-consumer recycling comprises several key steps. These are collection, sorting, cleaning, size reduction and separation, and/or compatibilization to reduce contamination from incompatible polymers. Collection of plastic waste can be done by 'bring-schemes' or through 'kerbside' collection. Bring schemes to originate from individual collection containers where, local authorities provide residents with bags, boxes or kitchen containers to store waste and transport afterward. In contrast, recyclable materials are collected directly from a household rather than the householder being required to take the materials to a drop-off point in kerbside schemes. However, in kerbside schemes materials are normally collected as a mixture of recyclable materials (Waite, 1995). The next step is to sort the co-mingled rigid recyclable materials. Both manual and automated methods are used for sorting. However, sorting of mixed materials is not enough for plastic recycling. Rigid plastics are typically grounded into flakes and cleaning is needed to remove residues, fibers and adhesives thus require cleaning and size reduction. After size reduction and cleaning it is important to separate the plastic according to their categories [e.g. low-density polyethylene (LDPE), high-density polyethylene (HDPE) and polypropylene (PP)] so that those can be compatible for further production of the same products or different products.

Plastic Recycling: Bangladesh Perspective

Almost 15 percent (i.e. more than 467.65 tonnes) inorganic fraction of the waste is recycled in Dhaka city (Enayetullah & Hashimi, 2006), which certainly has increased in recent times. The total size of the recycle market is estimated at 290.92 tonnes/day (BIGD, 2015). Wastes having economic value in the market are reclaimed and salvaged in different stages by the informal sector. According to a study conducted by JICA (2005) recycling activities raise a total of 436 tonnes/day of material recovery in Dhaka city. Among them, paper (5.3 percent) and plastic (3.2 percent) contribute to a considerable reduction of the waste disposal while composting contributes very little in spite of the largest content of generated wastes. Plastic recycling has also developed into a sizeable component of the plastic industry with major recycling centers operating in and around Dhaka, according to the UN report (The Daily Star, 2012). Prior research found that despite the economic value of recycling, the municipal authority/ city corporation does not have enough interest in providing lands for recycling and to put efforts in small-scale recycling projects (Yousuf, 2000).

Plastic recycling industry recycles different types of plastics every day to reduce the plastic waste in Bangladesh. According to the waste concerned consultants, 50,213 tonnes/year plastic products have been collected for recycling and 33,140 tonnes/year is recycled. This implies that 66 percent of the total available plastics are recycled every year (Shimo, 2014). Moreover, plastics recycling have developed into a sizeable component of the plastics industry, with major recycling centers operating in and around the capital city Dhaka, according to the UN report 2012. Around 300 small facilities are recycling some 138 tonnes of plastic wastes each day (Recycling International, 2012). The availability of river water and low transportation costs has made these units economically attractive. Plastic products are used in various applications in Bangladesh, such as packaging, construction, pharmaceuticals, garbage bags, toothbrushes, artificial flowers, ballpoint pens, PVC pipes, polythene sheets, electric switches and computer accessories.

Plastic recycling industry consists of different types of recycling activities. Generally, plastic recycling means creating all types of plastics reusable, however, it is limited to PET bottles recycling in Bangladesh. Five types of plastics are recycled in Bangladesh, which is: Polyethylene terephthalate (PET), polyethylene (PE), polypropylene (PP), polystyrene (PS) and polyvinyl chloride (PVC). PET bottles are recycled for exporting and to use in local production for producing fiber, net, a jar of packaging, etc.

The preceding discussion relating to waste management, need of investigating plastic recycling system and Bangladesh plastic recycling system sets the context of investigation as intended in this study. The following sections will lead towards the study objective, methodology followed by the exploration of the plastics recycling supply chain, discussion, and conclusion.

OBJECTIVES

The objectives of this study are to investigate the nature of plastic recycling supply chain, channels' membership, functions, issues and courses for future directions. More specifically, the study aspires

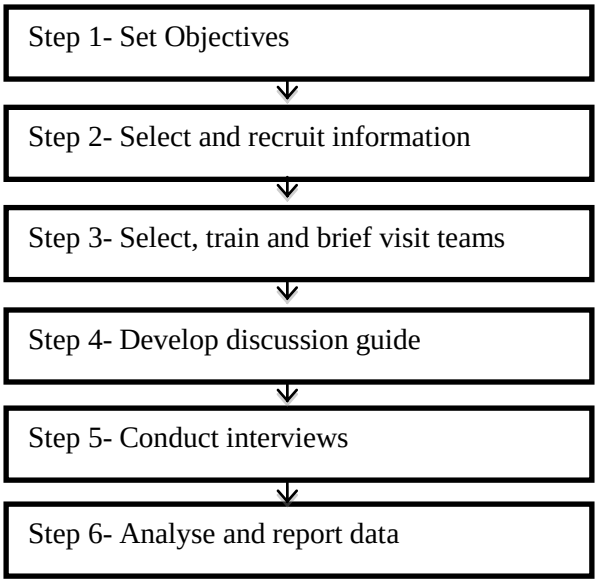
1. To investigate the existing supply chain of plastic recyclables.
2. To explore the number of supply chain members, their functions and issues affecting the logistics flows.
3. To offer a future course of action for boosting the plastic recycling industry of Bangladesh.

METHODOLOGY

A qualitative research approach was adopted to understand the plastic recycling process in Bangladesh. The qualitative method adopted in this study is a modified version of the customer visit program in which the qualitative interview is used to identify the factors that describe the existing reverse supply chain of plastic recycling in Bangladesh. The customer visit program, as suggested by McQuarrie (1991), allows researchers to collect information through an interview in addition to the information that can be collected visually. According to him, the implementation of customer visitation program involves six-step procedure which is: setting objectives, select and recruit information providers, train and brief visit team, develop discussion guide, conduct interviews and analyze, and report data (**Figure 1**).

The first step in the customer visit program was to set the research objective for the study. In the current research context, the research objective was to portray the existing plastic recycling process emphasizing on its opportunities and challenges. The second step was to identify, select and recruit the stakeholders to be interviewed. In the present context, potential stakeholders were determined on the basis of prior literature and are grouped into four major categories: *tokai, Feriwala/gariwala, refuse dealers/junk buyers and recycling dealers*. The third step was to make the interviewers acquainted (in this research context the interviews were jointly conducted by the researchers) with the particulars of potential stakeholder visit. In other words, this step focused on the type of information needed and how the interview should be structured in order to obtain information. This led us to the fourth step, which was the development of a discussion guide with a formal set of questions for conducting the interview. The fifth step was conducting the actual interview. Since the researchers conducted the interviews, the interview structure was consistent throughout the process. One researcher served as the moderator while the other served the role of a listener and note-taker. After completing the interview, the final step was to conduct a debriefing session, which includes analysis of interview notes and recording of results. The researchers performed such roles accordingly.

Figure 1: Six-step Procedure for Implementing a Visitation Program



Source: Adopted from McQuarrie (1991)

DATA COLLECTION

Data were collected from the field by following the methodology mentioned in the above section. A total of 28 interviews were conducted with 4 stakeholder groups via personal visit. Ten *tokais* and 5 *gariwalas* were interviewed while collecting waste from landfill and households respectively. Eight *junk buyers* and 5 *recycling dealers* were interviewed at their shops/factories. The average duration of the interview for *tokai* and *feriwala* was thirty minutes to one hour, whereas the average duration of the interview for *junk buyers* and *recycling dealers* was one to two hours. The participants in those interviews represent the stakeholders who are directly involved in the plastic recycling process. A visit/interview team was formed to conduct the interviews. The moderator guided the discussion, while the listeners were responsible for taking notes and for recording the conversation. All the interviews were designed to identify potential sources of plastic supply, potential markets, practices for plastic recycling and de-manufacturing/dismantling.

In order to explore the reverse supply chain of plastic, its opportunities and challenges, the interviews covered a wide range of topics. These included stakeholders' interest to be involved in plastic recycling, their ability to act in the recycling process and their current activities and level of expertise. The recycle factory management personnel were also requested to provide suggestions on how to make this recycling process effective and efficient.

RESULTS OF THE STUDY

Recycling process of all types of plastic is not the same. The recycling process of PET is different from the other types of plastic. PET is recycled for local production as well as for export. In addition, PP, PVC, PS, PE are recycled for further use in local production and for producing new goods. The supply chain of PET bottle recycling consists of five layers (**Figure 2**).

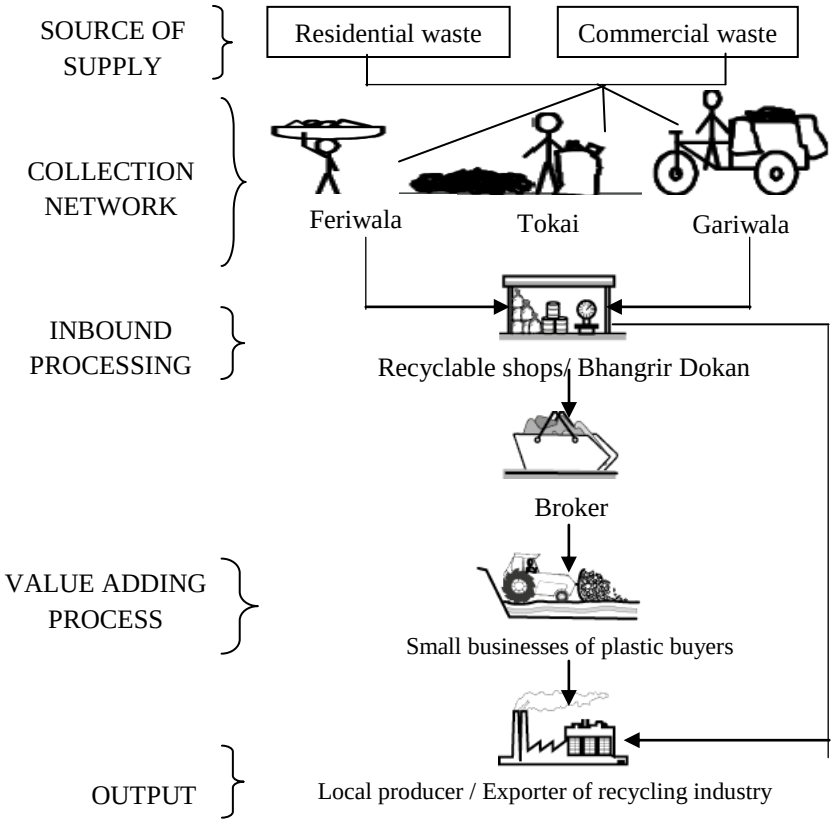
Supply Chain Members

The plastic recycling process consists of four different layers where eight different members (i.e. *tokai, feriwala, recyclable shops, brokers, small businesses of plastic buyers, exporter* and *local producers*) are performing a broad range of activities, such as collection of recyclable plastics, inbound processing, value-added processing and manufacturing, and the distribution of recyclable plastic output. The following subsections elaborate on the supply chain members' activities, their business capabilities, and weaknesses.

Tokai: *Tokai* is a class of boys and girls who pick different types of plastics, paper, bottle, tin, iron, polyethylene, etc. from the road-side bin, street, station, park, bank of rivers, municipality landfill and other places. Few women also collect plastics from the same sources of waste. *Tokai* mostly uses a stick to search and a separate bag for storing PET bottles. The group-*tokai* sell their collected products as per market price. They usually earn on average 120 to 180 BDT/day by selling their collected plastics and other recyclable materials. Sometimes *tokai* takes a loan or advance payment from *bhangarir-dokan* (the recycling shops that buy plastic waste collected by *tokai* group). *Tokai* used to sort plastics from mixed waste; however, they do not clean the products before selling. *Tokai* usually sell their collected PET bottles to *bhangarir-dokan.*

Gariwala: *Gariwala* is a group of people who collect the mixed waste from households and commercial places. They separate recyclable items, such as plastic bottles, paper, and tin that they can resell in recycling shops afterward. *Gariwala, in general,* collects recyclable goods from every house in a designated area by using a three-wheel van. They also collect PET bottles from other commercial places, such as community centers, restaurants, clubs and theme parks. They purchase those PET bottles at a nominal price and resell those to the *bhangarir-dokan* at market price. *Gariwala* buys PET bottles at 22 to 24 BDT/kg and sells at 28 to 30 BDT/kg to *bhangarir-dokan*. *Gariwala* runs his/her own small business and sometimes is employed by the owner of *bhangarir-dokan*. Apart from PET bottles, they buy PS at 5 BDT/kg, PE at 25 BDT/kg, PP at 30 BDT/kg, PVC at 32 BDT/kg and sells at 15 to 40 BDT/kg to *bhangarir-dokan*. Some *Gariwalas* earn 8,000 to 10,000 BDT/month when they are employed by *bhangarir-dokan* to collect recyclable plastics. The *gariwala* segregates collected recyclable items as per categories and quality of products.

Figure 2: Supply chain of plastic recycling



Source: Developed by Authors

Feriwala: *Feriwala* is a person who carries a basket and goes from door to door for purchasing recyclable goods from dwellers (who keep their used recyclable items for resale). *Feriwala* is mostly interested in different types of plastics especially PET, PE and PVC. *Feriwala* earns on an average 12000 - 16000 BDT/month by selling their collected goods to *bhangarir-dokan*.

Recycling Shop (Bhangarir-Dokan): *Bhangarir-dokan* is the second layer of the supply chain of PET bottle recycling. These are privately owned small and medium size businesses that are located in the local areas of almost every city in Bangladesh. The shop owners do not collect goods from door to door rather they employ *gariwala* with a three-wheel van to collect recyclable/resalable items. It is noteworthy that a small portion of dwellers usually go to the *bhangarir-dokan* to sell the recyclable goods. The recycling shop is run by the owner

himself/herself where the owner and his/her employees sometimes clean the assorted recyclable items and segregate the products according to color, size, quality, and quantity. The shop owner sells his/her collected goods to the small businesses of the plastic buyer and/or broker and earns 12000-20000 BDT/month.

Broker: A *Broker* is a person/entity that collects PET bottles from different *bhangarir-dokan* of different places who continuously communicates with the owner of *bhangarir-dokan* for collecting PET bottles. *Brokers* own/rent warehouse for assorting PET bottles and sell the assorted goods to small businesses. A *broker* covers two or more Upazila or Thana for collecting PET from *bhangarir-dokan*. *Broker* purchases PET at 33 or 34 BDT/kg and sells at 36 - 38 BDT/kg. However, the price of the PET bottles may vary depending on market demand. For example, if *broker*s segregate the collected PETs according to the color, they can sell those at a premium price.

Plastic Buyers (Small Businesses): *Plastic buyers* purchase PET bottles from different *brokers*. A small business of *plastic buyer* maintains a good relationship with different *brokers* for collecting bottles at a fair price. After collecting bottles from different *brokers*, they involve in the real recycling process. The recycling of PET bottles is a four-stage process. The first stage starts with the segregation of bottles on the basis of color. Then, the workers (mostly female) clean the bottles and take out the labels from bottles. Cleaned bottles are kept in a dob (a large bag which is locally called as “dob”) and for every dob, the workers get BDT 40.

Segregated and cleaned bottles are then moved to the second stage of recycling where a reaper machine is used for cutting plastic bottles into flakes of 1 inch. At least three persons are engaged for the cutting of bottles. In the third stage, the flakes are washed manually according to color and are dried afterward by using the dryer machine (**Figure 3**). Employees involved in cutting and drying activities are paid BDT 1200 to BDT 1500/week. Dried flakes are generally segregated as per the thickness (e.g. thick and thin) and by using the air ventilation process in a room they accomplish such separation work. Thin flakes are packed for sending to the exporters (the last layer of the recycling supply chain) and thick flakes are stored for selling to the local producer. Most small business deals with 2 to 6 tonnes PETs/day. The selling price of these PET flakes is BDT 42 to BDT 44/kg to the exporter and BDT 48 to BDT 52/kg to a local producer.

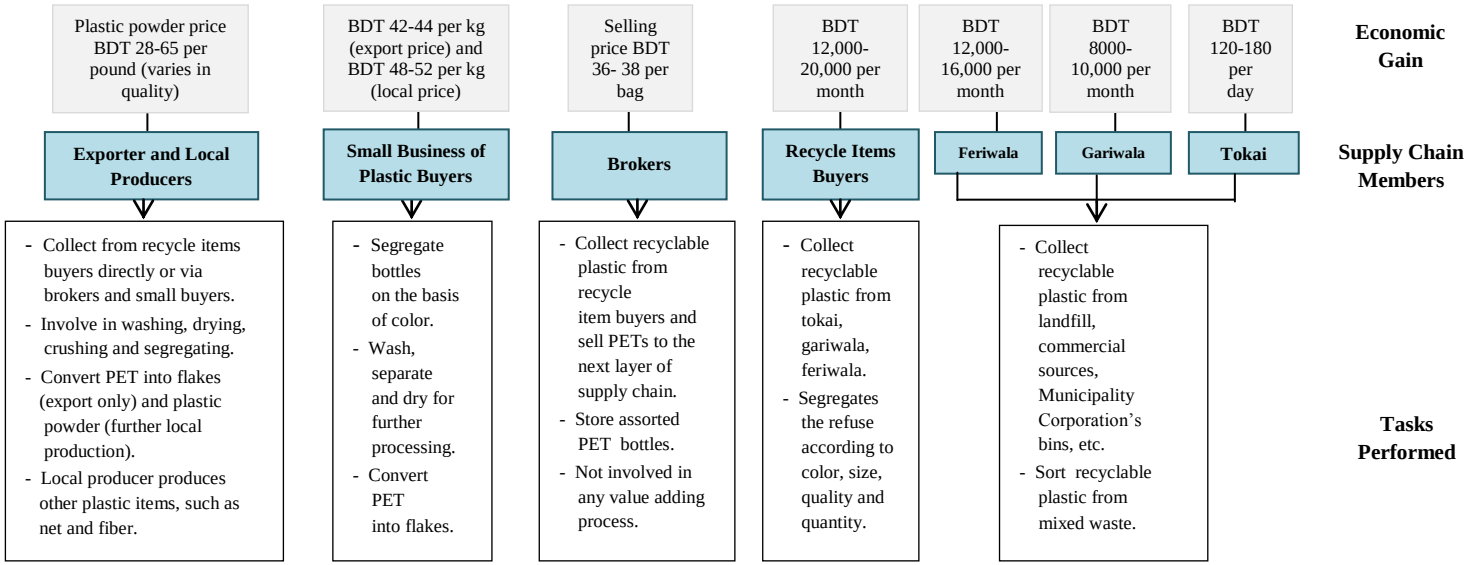
Figure 3: Schematic Diagram of Crushing, Washing, Drying and Separating of Flakes

Exporter: *Exporter* collects pet flakes from small businesses on daily basis and further processes the recyclable PET flakes that include crushing, washing, separating and drying. Exporter assorts the flakes and puts it into a semi-automatic machine. This machine is used to cut flakes into new shapes according to buyers' demand that is typically 4mm to 6mm. These newly shaped flakes are then washed and dried in an automatic machine. After drying the flakes are kept in an open space and are then sorted and classified as per thickness, color and scrap. The flakes are then poured into 25 Kg bags, stored in warehouses and later delivered to the port to fulfill the customer order. Bangladesh exports most of the used PET flakes to China, Korea, Taiwan, and Vietnam, etc.

Local Producer: *Local producers* collect thick flakes from small businesses. They purchase PET bottles from different *Bhangarir-dokan* using their employed persons. Employees maintain a good business relationship with different *bhangarir-dokan* so that they can collect bottles at a fair price. The local producers use an automated machine for further processing of the flakes into new shapes, which afterward is turned into plastic powder through further automated processing. Plastic powders are packed into bags, which generally contain 25 kg or 55 pounds of plastic powder. Local plastic powder producers sell plastic powder through their own shops. There are specific plastic powder markets in Bangladesh which are located in the old part of Dhaka city, namely Urdu Road and Islambugh. Local producers typically sell each pound of powder at 28 to 65 BDT where the price largely depends on quality. Few local producers, such as Akij group and Dart group turn the thick flakes into plastic powder for creating new fiber, net, packaging bottles, jars, and toys.

Figure 4 demonstrates a schematic overview of the plastic recycling supply chain of Bangladesh, which among others accommodates the members, their activities, and the payoff pattern.

Figure 4: Schematic Overview of Plastic Bottle Recycling in Bangladesh



DISCUSSION

This paper presents the reverse supply chain framework, its members, the task performed and economic gain at each stage of the reverse supply chain of plastic recycling in Bangladesh. To our knowledge, this is the first study that performs such an analysis in the context of Bangladesh. The framework presented in this paper provides a foundation for examining the reverse logistics of recyclable plastic materials. It offers an insight into the recycling of plastics, specifically the sources of plastic waste, the recyclable plastic collection network, value-adding process and output of recyclable plastics.

Despite the tangible benefits of plastic recycling, the actual practice and hence the achievement is far less than expected in Bangladesh. The amount of plastic waste being diverted for recycling now stands at approximately only 9.2 percent (Waste Concern, 2014). However, the recycling process has been carried out informally and the plastic recycling industry in Bangladesh is labor intensive. The reverse logistics channel for recycling confronts and must overcome several issues to improve overall efficiency and promote the marketability of recycled products. Lack of regulations and guidelines can be sited as one of the most serious problems that hinder the success of a recycling program in Bangladesh. The Government incentive is only 10 percent to the exporters, which is very insignificant to motivate the exporter, or local producer to invest in the automated recycling process. Moreover, some government policies, such as 'no permission will be granted for a captive power generator to a new factory to produce electricity'- discourage the industry players for further investment. Though Bangladesh government provides loan facilities with a single digit interest rate in the plastic recycling industry, the benefits of the loan facilities are not fully realized yet due to operational and technological inefficiency. Resolving these issues would improve recyclable return rates, reduce handling inefficiency, and make recycled products cost competitive in the world market.

Strategic planning is critical to the success of recycling programs. There is a strong need to determine ways to incorporate plastic recycling into the existing solid waste management program having short and long-term goals. Short-term goals for a recycling program could be oriented toward planning and implementation. These include developing a recycling plan; determining which plastic recyclable materials can initially be targeted for and how the residential, service, commercial and institutional sectors of the community can actively participate in the implementation process. Long-term goals normally pertain to program expansion and attainment of mandated and self-imposed waste reduction-recycling goals.

More specifically, there is a strong need to strengthen the involvement of the key stakeholders in the plastic recycling process. For example, community participation could be one of the critical steps to the success of a recycling

program. The efficient recovery of the large volume of high-quality recyclable depends on citizen involvement. Separation of wastes at the household level would reduce collection time, hence the cost of collection. For example, many developed countries, such as Australia and Germany use the two bins system or "green bin" system for separating solid waste from other recyclable waste at source. Municipalities must also ascertain the most effective techniques for obtaining consumer co-operation in the accumulation of recyclable materials. Effective implementation of the separation of waste at source requires continuous efforts from government and nongovernment organizations to create effective educational programmes that can reach community people, commercial sector, and others. The programs should emphasize not only the importance of recycling but also the protection and conservation of the environment as a whole.

Scavengers (the collection unit) are undertaking the waste separation work at a minimal monetary cost to the formal recycling system. However, the work itself incurs some physical health costs to them. The lower costs of collection can be transformed to sustainable comparative advantage by increasing the efficiency of waste collection with more systematic scavenging activities, such as - allowing only scavengers registered with the authority at the disposal site, equipping scavengers with at least safety boots, gloves, mask and health education and setting up of scavenger's cooperative. Any attempt to abolish the scavenging of waste would lead to mechanical separation and the costs involved would not be favorable in relation to the market price offered by the manufacturers.

CONCLUSION

The future directions for recycling continue to focus on developing and improving the performance of the reverse channel. Channel development includes actions, such as expanding efforts to identify new markets for recycled products and more frequent contact between sellers and buyers. The recycling industry needs to expand in each district to reduce the cost of intermediary. To build an efficient recycling industry, government should take necessary steps, such as- small-scale loan with low-interest rate for small recycling shops, brokers, and other collection stakeholders, increase the number of incentives to the recycled PET flakes exporters, assist and motivate the entrepreneurs to bring new technology and machine by providing capital to entrepreneurs at minimum interest rate. To supplement government initiatives the non-government organizations, such as plastic recycling owner association may train the stakeholders of the recycling industries and build a skilled workforce. Implementing these actions require greater co-ordination among the

intermediaries, non-government organizations and government. Improvements in channel performance require actions, such as the introduction of new technology, improving sorting capabilities as well as the flexibility in transporting recyclable products, and providing incentives in the accumulation function. These initiatives will certainly increase the ability of capacity utilization and improve channel performance in the plastic recycling industry of Bangladesh.

REFERENCES

Afroz, R., Hanaki, K., Tuddin, R., & Ayupp, K. (2009). A survey of recycling behavior in households in Dhaka, Bangladesh. *Waste Management Research*, *28*(6), 552-60.

Ahmed, A., & Ali, S. (2006). People as partners: facilitating people's participation in public-private partnerships for solid waste management. *Habitat International*, *30*, 781-796.

Akther, S., Islam, I., & Hasan, M. U. (2009). Evaluation of municipal services in selected wards of Dhaka city corporation: citizen's perspective. *Theoretical and Empirical Researches on Urban Management*, *Special Issue: Urban Issues in Asia*, 1, 133-145.

Alam, O. (2015). Problems with plastic bag consumption and its solutions. *Financial Express*, 22. Available at: http://print.thefinancialexpress-bd.com/2015/11/14/117402 [Accessed 14 November 2015].

Alam, J., Dip.-I., & Boie, W. (2001). *Energy recovery from municipal solid waste in Dhaka city*. Proceedings of the 4th International Conference on Mechanical Engineering, Dhaka, Bangladesh, 125-130. Available at: http://buet.ac.bd/me/icme/icme2001/cdfiles/Papers/Energy/23.%20E-55%20Final%20(125-130).pdf [Accessed 3 July, 2015].

Alamgir, M., & Ahsan, A. (2007). Municipal solid waste and recovery potential: Bangladesh perspective. Iranian *Journal of Environmental Health Science & Engineering*, *4*(2), 67-76.

Andrady, L., & Neal, A. (2009). Applications and societal benefits of plastics. *Philosophical Transactions of the Royal Society B*, 364, 1977–1984.

Arafat, A. (2013). PET bottle waste flakes export marks 38pc Rise. *Financial Express*, 20.

Barnes, D., Galgani, F., Thompson, R., & Barlaz, M. (2009). Accumulation and fragmentation of plastic debris in global environments. *Philosophical Transactions of the Royal Society B*, 364, 1985–1998.

Bhuiyan, S. (2010). A crisis in governance: Urban solid waste management in Bangladesh. *Habitat International*, *34*(1), 125-133.

BIGD - BRAC Institute of Governance and Development, (2015). *The state of cities: solid waste management of Dhaka city–towards decentralized governance*. BRAC University, Dhaka.

Enayetullah, I., & Hashimi, Q. (2006). Community-based solid waste management through public-private-community partnerships: experience of waste concern in Bangladesh', *3R Asia Conference*, Tokyo, Japan, Available at: http://www.env.go.jp/recycle/3r/en/asia/02_03-3/06.pdf [Accessed 18 March, 2016].

Enayetullah, I., & Sinha, M. (2000). *Cash for trash: Solving Dhaka's waste problems*. Ashoka Innovators for Public. Available at: https://www.ashoka.org/files/Cash%20for%20Trash.pdf [Accessed 3 July 2015].

Erik, G., & Solana, P. (2010). *Dhaka: Fastest growing megacity in the world.* Global Post, Available at: http://www.globalpost.com/dispatch/asia/100831/bangladesh-megacities-part-one [Accessed 14 March 2014].

ESCAP - Economic and Social Commission for Asia and the Pacific, (2015). United Nations *ESCAP report*. Available at: http://www.unescap.org/search/node/Bangladesh%20plastic [Accessed 18 April 2015].

Das, R., Hossain, L., Salam, A., Talukder, S., Wahab, Khanam M., Aktar, F., & Hossain, K. (2013). Generation and assessing the composition of commercial solid waste in commercial city of Bangladesh. *Indian Journal of Engineering*, *2*(5), 36-41.

Grabara, J. (2004). Outsourcing in reverse logistics. *Transport*, 1-6.

Gregory, R. (2009). Environmental implications of plastic debris in marine settings-entanglement, ingestion, smothering, hangers-on, hitch-hiking and alien Invasions. *Philosophical Transactions of the Royal Society B*, 364, 2013–2025.

Hai, F., & Ali, A. (2005). A study on solid waste management system of Dhaka City Corporation: effect of composting and landfill location. *UAP Journal of Civil and Environmental Engineering, 1*(1), 18-26.

Haque, M. A., Hoque, M., Modal, M., & Tauhid-Ur-Rahman, M. (2013). Characterization of leachate and solid waste of Dhaka city corporation landfill site for solid waste stabilization. *American Journal of Civil Engineering and Architecture*, *1*(2), 39-42.

Hopewell, J., Dvorak, R., & Kosior, E. (2009). Plastics recycling: challenges and opportunities. *Philosophical Transactions of the Royal Society B*, 364, 2115–2126.

ISO - International Standard Organization, (2006). *Environmental management–life cycle assessment–requirements and guidelines- principles and framework*. ISO 14040:2006, 20, Available at: http://www.iso.org/iso/catalogue_detail?csnumber=37456 [Accessed 3 January, 2016].

Islam, N. (2015). 'Urbanization in Bangladesh: Challenges and Opportunities'. *Towards Sustained Eradication of Extreme Poverty in Bangladesh, NEC Conference Room*, Planning Commission, GOB, Dhaka.

Ivy, N., Main-Uddin, M., & Hossain, K. (2013). People's perception on using waste bins in reduces, reuse and recycle (3Rs) process for solid waste management (SMW) in Chittagong, Bangladesh. *International Journal of Applied Science, Technology and Engineering Research*, *2* (3), 30-40.

JICA- Japan International Cooperation Agency, (2005). T*he study on the solid waste management in Dhaka city by Dhaka city corporation*. The People's Republic of Bangladesh and Japan International Cooperation Agency, 2. Available at: http://open_jicareport.jica.go.jp/pdf/11785243.pdf [Accessed 10 June 2015].

Kaisar, S., Sarkar, A., Haque, A., & Khan, T. (2006). Hospital waste management in Sylhet city. *ARPN Journal of Engineering and Applied Sciences*, *1*(2), 32-40.

Kyung, H. H. (2012). Open-loop recycling to apply refrigerator plastics from post-consumer waste polypropylene. *Materials and Design*, 35, 310-317.

Lang, A., Galloway, S., Scarlett, A., Henley, E., Depledge, M., Wallace, B., & Melzer, D. (2008). Association of urinary bisphenol: A concentration with medical disorders and laboratory abnormalities in adults. *The Journal of the American Medical Association*, 300, 1303–1310.

Matter, A., Dietschi, M., & Zurbrugg, C. (2013). Improving the informal recycling sector through segregation of waste in the household - The case of Dhaka, Bangladesh. *Habitat International*, 38, 150-156.

McQuarrie, E. (1991). The customer visit: Qualitative research for business to business marketers. *Marketing Research*, *3*(1), 15-29.

Oehlmann, J., Schulte-Oehlmann, U., Kloas, W., Jagnytsch, Lutz, I., Kusk, K., Wollenberger, L., Santos, E., Paull, G., Van-Look, K., & Tyler, C. (2009). A critical analysis of the biological impacts of plasticizers on wildlife. *Philosophical Transactions of the Royal Society B*, 364, 2047–2062.

Plastic Identification Code, (2015). *SITA- the leader in resource recovery*. Available at: http://www.sita.com.au/media/general/Plastics_identification_code.pdf [Accessed 01 January, 2016].

Rakib, M., Rahman, A., Akter, S., Ali, M., Huda, E., & Bhuiyan, A. H. (2014). An emerging city: Solid waste generation and recycling approach. *International Journal of Scientific Research in Environmental Sciences*, *2*(3), 74-84, Available at: http://www.ijsrpub.com/ijsres [Accessed 14 March, 2015].

Rahman, H., & Rahman, S. (2009). *Urban solid waste management using GIS technique: A case study on Mohammadpur thana at Dhaka of Bangladesh*. Proceedings of the International Conference on Solid Waste Management Technical, Environmental and Socio-economical Contexts–Waste Safe, Khulna, Bangladesh, 239-248. Available at: http://www.academia.edu/2814756/APPLICATION_OF_GIS_TECHNIQUES_IN_URBAN_SOLID_WASTE_MANAGEMENT_IN_A_PART_OF_DHAKA_CITY_MOHAMMADPUR_THANA [Accessed 03 January, 2015].

Rahman, H. (2011). *Waste concern: A decentralized community-based composting through public-private community partnership*. United Nations development program, December 2012. Available at: http://growinginclusivemarkets.com/media/cases/Bangladesh_WasteConcern_2011.pdf [Accessed 13 June, 2015].

Recycling International, (2012). *Bangladesh plastics industry to hit US$ 4 Billion by 2020*. Available at: http://www.recyclinginternational.com/recycling-news/6452/plastic-and-rubber/bangladesh/bangladesh-plastics-industry-hit-us-4-billion-2020 [Accessed 01 January, 2016].

Royte, E. (2008). Bottle Mania: big business, local sprigs, and other battle over American's drinking water, In *Bottle Water the Risk to Our Health, Our Environment and Our Wallets* by Huber, M. K. 2010, New York, Bloomsbury, USA Available at: http://www.slideshare.net/MargueriteKHuber/iu-spea-honors-thesis [Accessed 03 July, 2015].

Ryan, G., Moore, J., van-Franeker, A., & Moloney, L. (2009). Monitoring the abundance of plastic debris in the marine environment. *Philosophical Transactions of the Royal Society B*, 364, 1999–2012.

Salequzzaman, M., Sultana, U-T., Iqbal, A., & Hoque, A. (2006). *Ecological footprint of waste generation: A sustainable tool for solid waste management of Khulna city corporation of Bangladesh*. International Conference on Complex Systems, Available at: http://www.necsi.edu/events/iccs6/viewabstract.php?id=362 [Accessed 09 May, 2016].

Bhuiyan, S. H. (2010). A crisis in governance: Urban solid waste management in Bangladesh. *Habitat International*, 34, 125-133.

Saha, A. K. (2013). Environmental aspects of solid waste management: A case study of Pabna city in Bangladesh. *International Journal of Advanced Science and Engineering Technology, 2*(2), 1-8.

Saifullah, A. Z. A., & Islam, M. T. (2016). Municipal solid waste (MSW) management in Dhaka city, Bangladesh. *American Journal of Engineering Research, 5* (2), 88-100.

Shimo, H. (2014). Plastic recycling in Bangladesh, what needs to be done? Thesis, Arcada University of Applied Sciences. Available at: https://www.theseus.fi/bitstream/handle/10024/87021/Plastic%20Recycling%20Thesis.pdf?sequence=1 [Accessed 01 January, 2016].

Sujauddin, M., Huda, S., & Hoque, A. (2008). Household solid waste characteristics and management in Chittagong, Bangladesh. *Waste Management*, 28, 1688–1695.

Sufian, A., & Bala, K. (2007). Modelling of electrical energy recovery from urban solid waste system: The case of Dhaka city. *Renewable Energy*, 31, 1573-1580.

Swan, H. (2008). Environmental phthalate exposure in relation to reproductive outcomes and other health endpoints in humans. *Environment Research,* 108, 177–184.

Swan, H., Main, M., Liu, F., Stewart, L., Kruse, R., Calafat, A., Mao, C., Redmon, B., Ternand, C., Sullivan, S., & Teague, L. (2005). Decrease in anogenital distance among male infants with prenatal phthalate exposure. *Environmental Health Perspectives, 113* (8), 1056-1061.

Swift, G., & Wiles, D. (2004). Degradable polymers and plastics in landfill sites. *Encyclopaedia Polymer Science and Technology*. 9, 40–51.

Teuten, E. L., Saquing, J. M., Knappe, D. R., Barlaz, M. A., Jonsson, S., Björn, A., Rowland, S. J., Thompson, R. C., Galloway, T. S., Yamashita, R., Ochi, D., Watanuki, Y., Moore, C., Viet, P. H., Tana, T. S., & Prudente, M. (2009). Transport and release of chemicals from plastics to the environment and to wildlife. *Philosophical Transactions of the Royal Society B*, 364, 2027–2045.

The Daily Star, (2012). *UN report spurs plastic industry in Bangladesh*. Available at: http://www.thedailystar.net/news-detail-240790 [Accessed 05 January, 2016].

The Independent, (2016). *Plastic products*. Available at: http://www.theindependentbd.com/arcprint/details/31385/2016-01-24 [Accessed 26 May, 2016].

Thompson, C., Moore, J., vom-Saal, S., & Swan, H. (2009). Plastics, the environment and human health: current consensus and future trends. *Philosophical Transactions of the Royal Society B*, 364, 2153–2166.

Waite, R. (1995). *Household Waste Recycling*. London. Earthscan, ISBN 1853832421

Waste Concern, (2014). *Composition of plastic waste and market assessment of the plastic recycling sector in Dhaka city*. Available at: http://www.wasteconcern.org/Publication/Plastic%20Study_Summary.pdf [Accessed 18 September, 2015].

Yousuf, T. (2000). *Community waste management –possibilities of partnership*. 26th Water Sanitation and Hygiene in Challenges of the Millennium Conference. Available at: https://wedc-knowledge.lboro.ac.uk/details.html?id=14362 [Accessed 05 January, 2016].

D.U. Journal of Marketing, Vol. 18, June, 2015 and Vol. 19, June, 2016

DO'S AND DON'TS OF BEST-WORST SCALING METHOD IN CONSUMER VALUE RESEARCH

Shehely Parvin[1]

Abstract: *The Best-Worst Scaling (BWS) method, in recent years, has been well established as the preferred method in value measurement techniques to overcome the inherent biases and shortfalls of traditional rating scales. BWS method is getting more acceptability in consumer behavior research by asking respondents to make trade-offs among the value dimensions. Regardless of its growing acceptance in research, the scoring procedure of BWS method produces ipsative (a common test score for all respondents) data problems that have not been well understood as yet and it remains as an overlooked issue. Therefore, this study theoretically assesses the usefulness of BWS method along with its hidden data problem and it discovers the use of item response modeling for future research to tackle the problem.*

Keywords*: Best-Worst Scaling Method, Multi-dimensional Perceived Value, Ipsative Problem, Item Response Modeling.*

INTRODUCTION

Measurement of 'consumer value' construct with traditional self-report rating method is more common in consumer value research literature although response style of rating generates social desirability bias, acquiescence bias, and extreme response bias. In this regard, the Best- Worst Scaling method (BWS) offers the chance of being a new theoretically valid method of data collection which has also been confirmed as it is easy for respondents to understand in comparison with other methods, such as rating scales and ranking calculations (Louviere, Lings, Islam, Gudergan, & Flynn, 2013; Marley & Louviere, 2005). Basically, the BWS method forces respondents to discriminate among the items or options by selecting 'the most or best' and 'the least or worst' from the sets of a larger master set of items (Lee, Soutar, & Louviere, 2008). In spite of the growing use of the BWS method, the scoring procedure for this type of forced-choice questionnaire produces ipsative data (a common total test score for all respondents) that is still vague in the literature.

Ipsative data problems violate the basic assumption of classical test theory (CTT) even though a meaningful intra-individual comparison is possible (Brown & Maydeu-Olivares, 2012). Ipsative scoring misleads individual profiles and

[1] Associate Professor, Department of Marketing, University of Dhaka.

distorts construct validity, criterion-related validity and reliability estimates (Brown & Maydeu-Olivares, 2011). According to Brown and Maydeu-Olivares (2013), classical test theory works well with rating scales; rating scales can produce appropriate results of factor, regression and SEM analyses. However, it performs poorly with forced-choice questionnaire formats due to the ipsative data problem. On the other hand, Lee et al. (2008) claimed that the square root of the best count divided by the worst count Sqrt(B/W) scoring procedure is free from the ipsative data problem and factor analysis could be performed well with the BWS method. Moreover, Davidson (2013) applied Best-Minus Worst (BMW) scored data and dropped one item to test the measurement model via classical test theory to go around the ipsatization problem of BMW scores. However, to the best of the researcher's knowledge, no concrete evidence has been presented to date to support this claim.

Furthermore, with regard to factor analysis, prior researches claimed that the ipsative data problem was not a serious one when a large number of ipsative variables were factorized because the extent of the ipsative data problem tends to decrease (Baron, 1996). However, Chan (2003) stated that there is a paucity of solid evidence available in the literature in favor of this argument. Therefore, more investigation is still needed to understand the ipsative data problem with the BWS method to expedite methodological enhancement in the academic arena.

LITERATURE REVIEW

Prior studies pointed out that BWS method is easier for respondents to understand in comparison with other methods, such as rating and ranking scales (Louviere, Flynn, & Marley, 2015). In spite of its many advantages and growing use in consumer research, the ipsative data problem associated with BWS is not well understood. Therefore, this paper discusses the unique advantages of BWS method and then it discourses upon the ipsative data problem associated with this method.

Advantages of BWS Method

The Best-Worst Scaling (BWS) method, also known as 'maximum difference scaling' (Cohen, 2003), was originally proposed by Louviere and Woodworth (1990), and then the statistical and measurement procedures were also demonstrated by Marley and Louviere (2005). The BWS method is a choice modeling experimental procedure that requires a list of attributes that need to be expressed as having a particular magnitude along some kind of continuum, such as 'importance' (Finn & Louviere, 1992). The BWS method effectively permits respondents to evaluate all pairwise combinations of alternatives presented in a particular subset leading to the assumption that their 'best' and 'worst' choices represent the maximum difference in utility among all attributes. By choosing the best/most and worst/least attributes repeatedly across a number of similar

subsets, it forces respondents to make trade-offs among the items being evaluated that lead researchers to yield comparatively more accurate and reliable data with greater level of discrimination amongst variables more precisely and ensures a higher level of predictive validity (Cohen, 2003).

Prior research pointed out that BWS method creates a uni-dimensional interval-level estimate of the attribute levels based on nominal-level choice data (Massey, Wang, Waller, & Lanasier, 2013). So, the BWS technique is a better solution to solve the problems of 'end-piling' related to rating scale measurements. Moreover, the BWS method asks the same thing multiple times in comparison to the rating scale method, thus increasing the reliability of the test: it takes considerably less time for the respondents to complete the questionnaire than the rating task (Lee et al., 2008). Acquiescence and extremity response biases are also reduced compared to traditional rating scales as the construction of the best–worst 'subset' does not allow respondents the opportunity to distort their true choices (Lee, Soutar, & Louviere, 2007).

Prior studies indicated that cross-cultural equivalence using other methods, mostly rating scales, is very difficult to achieve (Lee et al., 2007). In contrast, the BWS method permits the selection of the best/most important items and the worst/least important items. Therefore, it can reduce biases due to the differences in cultural response styles (Wang & Parvin, 2014). In terms of predictive validity, BWS method outperformed compared to other five methods, such as importance ratings, constant sum, Q-sort, unbounded rating scale and magnitude estimation (Chrzan & Golovashkina, 2006).

In exploring the techniques for value measurement, Lee et al. (2007) compared the BWS method with rating scales in the study of personal values which is known as Kahle's (1983) List of Values (LOV). Their findings confirmed that rating scales lead to greater skewness in the data than the BWS method resulting in a positive bias in which respondents rate all the personal values as significant. Similarly, the BWS method has been applied to another well-known personal values instrument which was named the Schwartz Values Survey (Schwartz, 1992; Schwartz & Bilsky, 1987) by Lee et al. (2008) and it was found that the BWS method produced a far better fit compared to rating scales to the theoretical quasi-circular structure of values proposed by Schwartz (1992). In fact, the BWS questions have been proven to be simple and easy to complete and do not require too much thought or knowledge to undertake them (Flynn, Louviere, Peters, & Coast, 2007). So, the BWS method has been applied in a wide range of contexts to investigate diversified problems.

The BWS method was first introduced by Finn and Louviere (1992) to assess the relative importance of food safety against other areas of public concern. Marley and Louviere (2005) later offered formal mathematical proof relating to its measurement properties. The BWS method has since been applied in various contexts including studies in marketing and consumer behaviour (Auger et al.,

2007; Louviere & Islam, 2008; Massey et al., 2013); personality research (Lee et al. 2008); health economics (Lancsar, Louviere, & Flynn, 2007); and education (Burke, Schuck, Aubusson, Buchanan, Louviere, & Prescott, 2013).

Consumer preference measurement using BWS method was revolutionary in the marketing literature (Mueller & Rungie, 2009). Auger et al. (2007) used Ward's linkage clustering method on individual BMW scores to reveal consistent patterns in ethical beliefs across various countries. Mueller and Rungie (2009) applied a quite powerful analysis of the variance-covariance matrix on individual BMW scores to find which attributes were influential in value components and used the latent clustering method to identify distinct consumer segments in wine purchase behavior. Cohen and Neira (2003) also applied latent class modeling with the BWS method to discover clusters to reveal analogous utility components related to drinking coffee.

Additionally, the BWS method is an easier task for respondents than ranking. Respondents frequently find it problematic to rank more than seven items in a ranking task; as a result, the test-retest reliability of long lists of ranked items tends to be low (Chapman & Staelin, 1982; Lee et al., 2007). BWS method has been proven to have relatively low financial costs in its administration that, in turn, can boost managerial practicalities for the use of this scaling method in any situation (Finn & Louviere, 1992). Therefore, with an appropriate experimental design, such as a balanced incomplete block design (BIBD) where items within the experiment are balanced, orthogonal and adequately randomized under the assumption of random utility theory (RUT) (Green, 1974), the choice set can be estimated.

Disadvantages of BWS Method

Even though the BWS method has been proven in the extant literature to be a preferred method to rating and ranking, it is one kind of forced-choice method in which respondents have only one way to select the best or the worst item as it has no option for using the middle, the end point or one end of the scale (Cohen & Markowitz, 2002). Forced-choice questionnaire format, such as the BWS method also forces respondents to choose between similarly attractive options. As with the BWS method, forced-choice formats present items in blocks of two, three, four or more items at a time, and respondents are asked to rank the items within each block or sometimes respondents are requested to select one item that best describes them and one that least describes them (Brown & Maydeu-Olivares, 2013). The only difference between the forced-choice questionnaire format and the BWS method is that the latter asks one item or attribute multiple times across subsets whereas the former asks one item only once in a set. Although both types of comparative judgement can lessen the impact of various response biases that are common in single-stimulus items (e.g. Likert scale, etc.), classical or traditional scoring procedures for these forced-choice formats or the BWS

method can produce ipsative data problems, whereby all respondents have a common total test score (Brown & Maydeu-Olivares, 2013).

Let us explain it with an example with the BWS format (**Table 1**). The BWS method asks about one item multiple times across subsets due to the design requirement for this choice experiment. Suppose in a block of seven, seven features have been measured where each item has been shown three times across the subset. If BMW scoring procedure is used, the results of two respondents are given below:

Table1: Ipsative Data Problem with BWS Questionnaire Format

Feature Number	Respondent One			Respondent Two		
	Most	**Least**	**M-L**	**Most**	**Least**	**M-L**
1	3	0	3	1	0	1
2	2	0	2	0	3	-3
3	1	1	0	0	2	-2
4	0	2	-2	1	1	0
5	0	3	-3	3	0	3
6	1	1	0	2	0	2
7	0	0	0	0	1	-1
Total Score	**7**	**7**	**0**	**7**	**7**	**0**

Whilst the two respondents' answers are different in their choices, the total test score produces the same result (i.e. the ipsative data problem). Brown and Maydeu-Olivares (2013) pointed out that this type of forced-choice format produces relative scores rather than absolute. As a consequence, the comparison between individuals can be troublesome whereas meaningful intra-individual explanations are possible. Owing to the ipsative data problem, the correlation matrix produces one zero eigenvalue that restricts the use of factor analysis and violates the basic assumption of classical test theory (Brown & Maydeu-Olivares, 2013).

Furthermore, the covariance between a questionnaire's scales and any external criterion must sum to zero because the zero variance of the total score and reliability coefficients are misleading in forced-choice methods as the ipsative data problem disrupts the underlying assumption of classical test theory (Brown & Maydeu-Olivares, 2013). On the other hand, Lee et al. (2008) claimed that Sqrt(B/W) scoring procedure is not ipsatized. It does not create the same results for two respondents; thus, it can be used for numerous statistical procedures including factor analysis. However, no concrete evidence has been presented to date to support his claim.

RESEARCH OBJECTIVE

Given the limited and incomplete research to deal with the ipsative data problem with BMW scores, this study attempts to fill this research gap through undertaking an empirical investigation in measuring seven consumption-related value constructs.

METHODOLOGY

This section focuses on research context, survey method, measurement and research instrument, data collection and scoring method of BWS data.

Research Context

The Australian economy is currently controlled by the services sector and around 67.4% in GDP contribution comes from this sector (CIA The World Factbook, 2015). Along with this economic perspective and considering the equal importance of tangible and intangible features in the restaurant environment, the Australian restaurant services sector has been considered an ideal research setting for addressing the research gap.

Survey Method

The current research adopted a cross-sectional survey design that has some benefits over longitudinal studies, such as higher feasibility, minimum response bias and proper use of time and resources (Dabholkar, Shepherd, & Thorpe, 2000). Online survey method is used to collect data that saves time and ensures wide coverage.

Measurement and Research Instrument

Unlike most prior studies, a cognitive-affective approach has been adopted to conceptualize the construct of perceived value that originated in consumer-behavior psychology (Sanchez-Fernandez & Iniesta-Bonillo, 2007) and applied the theories of consumption value proposed by Sheth, Newman and Gross (1991), and Holbrook (1994, 1999). A balanced incomplete block design (BIBD) is used for the measurement of the seven value dimensions. Items for measuring the functional (quality), functional (price), social, emotional, epistemic, aesthetic and altruistic value were adopted from the relevant previous studies (sources). The set number, value dimensions along with measurement items and sources are presented in **Table 2.**

Table 2: Measurement Items of Perceived Value Construct

Set No	Value Dimensions	Measurement Items	Studies (Sources)
1	Functional value (quality)	High quality, tasty food, healthy option	Kivela, Inbakaran and Reece (1999); Ryu, Lee and Kim (2012)
2	Functional value (price)	Reasonable price, economical, value for money	Sweeney and Soutar (2001)
3	Emotional value	Happiness, sense of joy, gives pleasure	Petrick (2002)
4	Epistemic value	Satisfy curiosity, variety of menu, new and different experience	Raajpoot (2002)
5	Social value	Feeling acceptable, good impression, social approval	Sweeney and Soutar (2001)
6	Aesthetic value	Design and decoration, the appearance of staff, table arrangement	Sánchez-Fernández et al. (2009)
7	Altruistic value	Ecologically produced, coherent with your ethics and moral values, spiritual atmosphere	Sánchez-Fernández et al. (2009)

The research instrument is founded on the BIBD of seven perceived value dimensions, consisting of seven sets. The respondents were asked to select the most important and the least important attributes in each set of items based on the recent experiences during the past 30 days in their respective consumption situations. In this experimental design, each value dimension was shown an equal number of times (three times in the questionnaire) with every other item to control context effects; respondents saw each attribute in a chronological order across the subsets (Lee et al., 2007). The design and a sample choice set are shown in **Table 3** and **Table 4** respectively.

Table 3: BIBD Design Card with 7 Dimensions of Perceived Value Construct

Choice Set	Item No	Item No	Item No
1	2	6	4
2	1	4	5

Choice Set	Item No	Item No	Item No
3	4	7	3
4	3	2	1
5	7	5	2
6	6	1	7
7	5	3	6

Source: Adopted from Massey et al. (2013)

Table 4: Sample Choice Set 1

Feature	Item No 2 Functional Value Reasonable price, economical, value for money	Item No 6 Aesthetic Value Design & decoration, the appearance of staff, table arrangement	Item No 4 Epistemic Value Happiness, sense of joy, give pleasure
Most important			
Least important			

Data Collection

An online survey was carried out by a marketing research company, named Survey Gizmo in Australia. Its nationwide online panel members are comprised of regular restaurant visitors, who are 18 years of age or more and the male-female proportions are 48.7% and 51.3% respectively. The questionnaire was sent online to 610 Australian consumers (respondents) and finally 317 complete filled-in questionnaires were retained for analysis that exceeds 50% response rate. Exploratory Factor Analysis (EFA) is adopted to analyze the data as it is the basic foundation of classical test theory (Chan, 2003).

Scoring Method of BWS Data

The prior literature indicates that the score of the design can be calculated in many ways (Burke et al., 2013). Among them, one simple way is to calculate the total of best counts and the total of worst counts and then check the difference between the two sums for each item (Massey et al., 2013) or to calculate the square root of the ratio of the two scores (Marley & Louviere, 2005). In this study, both are done.

RESULTS AND DISCUSSION

This study used best minus worst (BMW) scored data counts to conceptualize how factor analysis results could be affected by the ipsative data problem. **Table 5** demonstrates that the correlation matrix has a zero determinant and the matrix is not a positive definite. Most of the off-diagonal correlations have negative values due to the ipsative data problem. Moreover, in **Table 6,** the seventh item possesses negative eigenvalues, thus precluding the use of factor analysis and conforming that the BMW scoring procedure is affected by the ipsative data problem, which violates the basic underlying assumption of classical test theory.

Table 5: Correlation Matrix for Perceived Value with Best Minus Worst Score

Items	1	2	3	4	5	6	7
1. Functional, High quality	1						
2. Functional, Reasonable price	-0.167	1					
3. Social, Feeling acceptable	-0.241	-0.079	1				
4. Emotional, Happiness	-0.051	-0.227	-0.226	1			
5. Epistemic, Satisfy curiosity	-0.161	-0.209	-0.176	-0.186	1		
6. Aesthetic, Design and decoration	-0.255	-0.294	-0.074	-0.061	0.027	1	
7. Altruistic, Ecologically produced	0.001	-0.141	-0.237	-0.236	-0.212	-0.274	1

a. Determinant = .000, b. The matrix is not positive definite

Table 6: Initial and Rotated Eigenvalues

Component	Initial Eigenvalues			Rotated Eigenvalues		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.533	21.906	21.906	1.622	23.174	23.174
2	1.377	19.675	41.581	1.389	19.845	43.019
3	1.193	17.037	58.618	1.194	17.064	60.083
4	1.069	15.27	73.888	1.036	14.801	74.884
5	0.975	13.928	87.816	0.932	13.319	88.203
6	0.853	12.184	100	0.826	11.797	100
7	-3.77E-16	-5.38E-15	100	-9.49E-16	-1.36E-14	100

In addition, data are calculated by taking Sqrt(B/W) to test whether this scoring procedure is really free from the ipsative data problem as claimed (Lee et al., 2008). Hair, Black, Babin and Anderson (2010) recommended examining the Kaiser-Meyer-Olkin (KMO) value and Bartlett's test of sphericity for the overall measure of sampling adequacy (MSA) and anti-image matrices for individual MSA to determine the appropriateness of factor analysis. These values must exceed 0.50 for both the overall test and individual variables and those with an individual value of less than 0.50 should be omitted from the factor analysis.

However, from **Table 7,** it appears that the value of the KMO statistic is .041, which is far less than 0.50 implying that factor analysis is inappropriate. However, Bartlett's test of sphericity is highly significant (p=.000), which indicates only the presence of multicollinearity among the variables. Furthermore, it reveals from the anti-image covariance matrix (**Table 8**) that all KMO values for individual measure of sampling adequacy are also less than 0.5 (diagonal) implying that the factor analysis is not appropriate. Therefore, the results contradict the claim posed by Lee et al. (2008) and thus demonstrate that Sqrt(B/W) scored data still suffer from the ipsative data problem violating the underlying assumption of classical test theory.

Table 7: KMO and Bartlett's Test for Perceived Value with Sqrt(B/W) Score

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.041
Bartlett's Test of Sphericity	Approx. Chi-Square	1025.872
	Degrees of Freedom	21
	Significance	.000

Table 8: Anti-image Covariance Matrix for Perceived Value with Sqrt (B/W) Score

Items	1	2	3	4	5	6	7
1. Functional, High quality	**0.095**	0.072	0.087	0.083	0.089	0.098	0.083
2. Functional, Reasonable price	0.072	**0.063**	0.071	0.07	0.074	0.082	0.07
3. Social, Feeling acceptable	0.087	0.071	**0.094**	0.085	0.089	0.096	0.084
4. Emotional, Happiness	0.083	0.07	0.085	**0.089**	0.087	0.094	0.082
5. Epistemic, Satisfy curiosity	0.089	0.074	0.089	0.087	**0.100**	0.098	0.087
6. Aesthetic, Design & decoration	0.098	0.082	0.096	0.094	0.098	**0.125**	0.096
7. Altruistic, Ecologically produced	0.083	0.07	0.084	0.082	0.087	0.096	**0.089**

Instead of Sqrt(B/W) scored data, Davidson (2013) applied BMW scored data in structural equation modeling (SEM) and claimed that his study was a pioneer in advancing the method of using BWS scored data in SEM. Davidson (2013) dropped one item to test the measurement model via classical test theory to address the ipsatization problem. He predicted that BMW scores based on the remaining items would not be a constant zero for each individual; the correlation matrix would have a non-zero determinant and the scores would no longer be linearly dependent. However, the 'dropping one item' approach seemed, on the surface, to have solved the ipsatization problem and initially it was mentioned that factor analysis could be conducted although no evidence was provided to support his claim.

However, this study still found a low KMO value for the construct, i.e. 0.98, which is below 0.50 and highly significant Bartlett's test of sphericity as shown in **Table 9.** Therefore, dropping one item is not a solution to the ipsative data problem.

Table 9: KMO and Bartlett's Test for Perceived Value after Dropping One Item

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.098
Bartlett's Test of Sphericity	Approx. Chi-Square	414.506
	Degrees of Freedom	15
	Significance	.000

CONCLUSION

Empirical findings confirmed that the BMW scoring procedure produces ipsative problem that preclude the use of factor analysis and structural equation modeling (SEM) and that neither the Sqrt(B/W) scoring procedure suggested by Lee et al. (2008) nor Davidson's (2013) 'dropping one item' approach solves the ipsative data problem. This study has attempted at measuring the multi-dimensional perceived value construct with the BWS method whereas most methods primarily centered on traditional binary or rating scales. BWS can provide better data analysis if the research objective is to obtain a clear-cut indicator of the relative importance of consumer value items. Such data can also be used to compare mean differences among different demographic and/or attitudinal segments. However, consumer value researchers should be aware of the hidden data problem in using BWS method.

Cluster analysis of the BMW scores allows a researcher to examine heterogeneity across the individual respondents and uncover meaningful segments. One can also undertake cluster analysis across the BMW items to identify meaningful factor structure. Cluster analysis approach to be a good substitute for factor

analysis is to explore the factor structure applying the BMW scores (Parvin & Wang, 2014).

Some issues as well as opportunities prevail for conducting further consumer value research. One avenue is to compare the effectiveness of different clustering algorithms in finding the underlying consumer value structure. Another avenue is to explore the use of item response modeling based on Thurstone's law of comparative judgment (Thurstone, 1927) to solve the ipsative data problem. Furthermore, although Brown and Maydeu-Olivares (2013) claimed their success in using this approach to solve ipsative personality data problem via use of Mplus software (Muthén & Muthén, 1998-2010), their claim are yet to be replicated in consumer value research (Parvin & Wang, 2014).

REFERENCES

Auger, P., Devinney, T. M., & Louviere, J. J. (2007). Using Best-Worst Scaling Methodology to Investigate Consumer Ethical Beliefs Across Countries. *Journal of Business Ethics, 7* (3), 299-326.

Baron, H. (1996). Strengths and Limitations of Ipsative Measurement. *Journal of Occupational and Organizational Psychology, 69*(1), 49-56.

Brown, A., & Maydeu-Olivares, A. (2011). Item Response Modeling of Forced-choice Questionnaires. Educational and Psychological Measurement, *71*(3), 460-502.

Brown, A., & Maydeu-Olivares, A. (2012). Fitting a Thurstonian IRT Model to Forced-Choice Data Using Mplus. *Behavior research methods*, *44*(4), 1135-1147.

Brown, A., & Maydeu-Olivares, A. (2013). How IRT can Solve Problems of Ipsative Data in Forced-choice Questionnaires. *Psychological Methods, 18* (1), 36.

Burke, P. F., Schuck, S., Aubusson, P., Buchanan, J., Louviere, J. J., & Prescott, A. (2013). Why do Early Career Teachers Choose to Remain in the Profession? The Use of Best–Worst Scaling to Quantify Key Factors. *International Journal of Educational Research, 62*, 259-268.

Chan, W. (2003). Analyzing Ipsative Data in Psychological Research. *Behaviormetrika, 30* (1), 99-121.

Chapman, R. G., & Staelin, R. (1982). Exploiting Rank Ordered Choice Set Data within the Stochastic Utility Model. *Journal of Marketing Research, 19*(3), 288-301.

CIA The World Factbook. (2015, September). Retrieved from, https://www.cia.gov/ library/publications/the-worldfactbook/ fields/2012.html> [Acccessed 16 september, 2016].

Chrzan, K., & Golovashkina, N. (2006). An Empirical Test of Six Stated Importance Measures. *International Journal of Market Research, 48*(6), 717-740.

Cohen, S. (2003). Maximum Difference Scaling: Improved Measures of Importance and Preference for Segmentation. Paper presented at *the Sawtooth Software Conference Proceedings*. Retrieved from, http://www.sawtooths oftware.com/ download/techpap [Accessed 02 October, 2016].

Cohen, S., & Neira, L. (2003). Measuring preference for product benefits across countries: overcoming scale usage bias with maximum difference scaling. Paper presented in the *ESOMAR Latin America Conference Proceedings*. Amsterdam, The Netherlands.

Cohen, S., & Markowitz, P. (2002). Renewing market segmentation: Some new tools to correct old problems. Paper presented in the *ESOMAR 2002 Congress Proceedings* . Amsterdam, The Netherlands.595-612.

Davidson, A. W. (2013). *Consumer Preference for Sustainability*. (Unpublished doctoral thesis), University of Queensland, Australia.

Dabholkar, P.A., Shepherd, C.D., & Thorpe, D.I. (2000). A comprehensive framework for service quality: an investigation of critical conceptual and measurement issues through a longitudinal study. *Journal of Retailing*, *76*(2), 139-173.

Finn, A., & Louviere, J. J. (1992). Determining the Appropriate Response to Evidence of Public Concern: the Case of Food Safety. *Journal of Public Policy & Marketing*, *11*, 19-25.

Flynn, T. N., Louviere, J. J., Peters, T. J., & Coast, J. (2007). Best-Worst Scaling: What it can do for Health Care Research and How to do it. *Journal of Health Economics*, *26*(1), 171-189.

Green, P. E. (1974). On the Design of Choice Experiments Involving Multifactor Alternatives. *Journal of consumer research, 1*, 61-68.

Hair Jr, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate Data Analysis: A Global Perspective.* (7th ed.). Pearson Prentice Hall.

Holbrook, M. B. (1994). The Nature of Customer Value: An Axiology of Services in the Consumption Experience. In R. T. a. O. in Rust, R.L. (Ed.), *Service quality: New directions in theory and practice* (21-78). Sage Thousand Oaks, CA.

Holbrook, M. B. (1999). Introduction to Consumer Value. In M. B. in Holbrook (Ed.), *Consumer value: A framework for analysis and research* (1-28). Routledge, London.

Kahle, L. R. (1983). *Social Values and Social Change: Adaptation to Life in America*. Praeger Publishers.

Kivela, J., Inbakaran, R., & Reece, J. (1999). Consumer Research in the Restaurant Environment: A Conceptual Model of Dining Satisfaction and Return Patronage. *International Journal of Contemporary Hospitality Management*, *11*(5), 205-222.

Lancsar, E., Louviere, J., & Flynn, T. (2007). Several Methods to Investigate Relative Attribute Impact in Stated Preference Experiments. *Social Science & Medicine*, *64*(8), 1738-1753.

Lee, J. A., Soutar, G., & Louviere, J. (2008). The Best–Worst Scaling Approach: An Alternative to Schwartz's Values Survey. *Journal of personality assessment*, *90*(4), 335-347.

Lee, J. A., Soutar, G. N., & Louviere, J. (2007). Measuring Values Using Best-Worst Scaling: The LOV example. *Psychology & Marketing*, *24*(12), 1043-1058.

Long, M. M., & Schiffman, L. G. (2000). Consumption values and relationships: segmenting the market for frequency programs. *Journal of consumer marketing*, *17*(3), 214-232.

Louviere, J., Flynn, T.N., & Marley, A.A.J. (2015). *Best-worst scaling: Theory, methods, and applications*. Cambridge University Press.

Louviere, J., Lings, I., Islam, T., Gudergan, S., & Flynn, T. (2013). An Introduction to the Application of (Case 1) Best-Worst Scaling in Marketing Research. *International journal of research in marketing, 30*, 292-303.

Louviere, J. J., & Islam, T. (2008). A Comparison of Importance Weights and Willingness-to-pay Measures Derived from Choice-based Conjoint, Constant sum scales and Best-worst scaling. *Journal of Business Research, 61*(9), 903-911.

Louviere, J., & Woodworth, G. (1990). *Best-worst Scaling: A Model for the Largest Difference Judgments*. Working paper. The University of Alberta.

Marley, A. A. J., & Louviere, J. (2005). Some Probabilistic Models of Best, Worst, and Best–Worst Choices. *Journal of Mathematical Psychology, 49*(6), 464-480.

Massey, G. R., Wang, P. Z., Waller, D. S., & Lanasier, E. V. (2013). Best–Worst Scaling: A New Method for Advertisement Evaluation. *Journal of Marketing Communications, 21*(6), 425-449.

Mueller, S., & Rungie, C. (2009). Is there More Information in Best-Worst Choice Data? Using the Attitude Heterogeneity Structure to Identify Consumer Segments. *International Journal of Wine Business Research*, *21*(1), 24-40.

Muthén, L., & Muthén, B. (1998-2010). *Mplus User's Guide for Author* (6th ed.). Los Angeles, CA.

Parvin, S., & Wang, P.Z. (2014). Assessing Best-Worst Scaling in Consumer Value Research. *Proceedings of 2014 ANZMAC Conference, ANZMAC Conference*, ANZMAC, Brisbane, Australia, 780-786. Retrieved from, opus.lib.uts.edu.au [Accessed 02 September 2016].

Petrick, J. F. (2002). Development of a Multi-dimensional Scale for Measuring the Perceived Value of a Service. *Journal of Leisure Research, 34*(2), 119-134.

Raajpoot, N. A. (2002). TANGSERV: A Multiple-Item Scale for Measuring Tangible Quality in the Foodservice Industry. *Journal of Foodservice Business Research, 5*(2), 109-127.

Ryu, K., Lee, H.-R., & Kim, W. G. (2012). The Influence of the Quality of the Physical Environment, Food, and Service on Restaurant Image, Customer Perceived Value, Customer Satisfaction, and Behavioral Intentions. *International Journal of Contemporary Hospitality Management, 24*(2), 200-223.

Sánchez-Fernández, R., & Iniesta-Bonillo, M. A. (2007). The Concept of Perceived Value: a Systematic Review of the Research. *Marketing Theory, 7*(4), 427.

Sánchez-Fernández, R., Iniesta-Bonillo, M., & Holbrook, M. B. (2009). The Conceptualisation and Measurement of Consumer Value in Services. *International Journal of Market Research, 51*(1), 93-113.

Schwartz, S. H. (1992). Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries. *Advances in experimental social psychology, 25*, 1-62.

Schwartz, S. H., & Bilsky, W. (1987). Toward a Universal Psychological Structure of Human Values. *Journal of Personality and Social Psychology, 53*(3), 550.

Sheth, J. N., Newman, B. I., & Gross, B. L. (1991). Why We Buy What We Buy: A Theory of Consumption Values. *Journal of Business Research*, *22*(2), 159-170.

Sweeney, J. C., & Soutar, G. N. (2001). Consumer Perceived Value: The Development of a Multiple Item Scale. *Journal of Retailing*, *77*(2), 203-220.

Thurstone, L. L. (1927). A Law of Comparative Judgment. *Psychological Review*, *34*(4), 273-286.

Wang, P., & Parvin, S. (2014). *Exploring Ipsative Data Problems in Best-Worst Scaling Method*. Paper presented at the 36th Annual ISMS Marketing Science Conference, Emory University, Atlanta, USA.

D.U. Journal of Marketing, Vol. 18, June, 2015 and Vol. 19, June, 2016

MARKETING PERFORMANCE-BASED BRAND VALUATION: AN APPLICATION OF MARKETING PROFITABILITY AND CAPITALIZATION FACTOR

Mahamudul Hasan[1]
Safia Shahin Khan[2]

Abstract: *The core purpose of this research is to closely look at the brand value (BV) on the basis of marketing profitability and capitalization factor (CF). This study employed a financially focused model in order to determine* a *brand's economic value and to determine the relative position of a brand. For assessing the brand value, seventeen second generation private commercial banks of Bangladesh are considered. The data collected from banks' annual reports are systematically analyzed for brand valuation following the perpetual net present value (PNPV) of continuous discounting approach. A quantitative approach towards measuring brand value for commercial banks is developed based on interest income (II), marketing* r*eturn on investment (MROI), net marketing contribution (NMC) and capitalization factor (CF). This valuation approach may be useful to track the brand strength of a bank, investment in banking products, namely loan and deposit compared to the investment in non-banking products, such as government securities and shares and may also help in marketing valuation along with financial valuation of a brand.*

Keywords: *Brand Value, Marketing Return on Investment, Net Marketing contribution, Interest Income, Capitalization Factor.*

INTRODUCTION

Thirty-nine private commercial banks (PCBs) are now operating in the banking sector of Bangladesh. All banks are facing intense competition either for depositors, who provide funds, or for borrowers, who purchase the bank's products and services or for both. Nowadays, the only way of measuring financial profitability is not good enough for brand valuation. In fact, there is no empirical evidence to support the assumed functional relationship between growth in brand value and that in revenues (Majerova & Kliestik, 2015). Measuring marketing profitability can create some value for understanding the contribution and response of customer to products or services. Financial profitability in terms of return on sales, return on assets, return on equity and return on capital, is helpful to gauge the relative financial performance of a business. The same issue is relevant for comparing the marketing profitability

[1] Associate Professor, Department of Business Administration, Uttara University, Bangladesh.
[2] M. Phil Student, Department of Marketing, University of Dhaka, Bangladesh.

across businesses, product lines, or markets that are drastically different in sales (Best, 2012).

Customer response usually comes from what brand is actually in their mind. This response is generated by the brand value along with other expected services. Keller (1993) said that customer response to marketing is defined in terms of consumer perceptions, preferences, and behavior arising from marketing mix activity. However, valuing a brand through customer response is relatively subjective. There are debates on the usage of subjective measurement, which are difficult to interpret because they are often expressed in ordinal scales (Rose-Ackerman & Palifka 1999, quoted in Jahedi & Méndez, 2014). Therefore, the study focuses on ratio data, such as audited financial data for measuring brand value. Such valuation will lead to the objective measurement of brand performance in banking sector.

The core objective of marketing operations of a bank is surrounded by two types of financial products. One is deposit product and the other is loan product from where net interest income is derived. Previous research indicates that many private commercial banks in Bangladesh have less interest income than investment income. The US found non-interest income being associated with higher profitability in 2014 according to the study of Saunders, Schmid and Walter (2014), and non-interest income activities may adversely affect banks' performance (Mndeme, 2015). Income from different bills, bonds and shares is included in investment income, where major marketing activities are almost absent. The less involvement of marketing function may lead to less involvement of the customer. As a result, the declining trend in brand value can occur. One of the important considerations in this study is capitalization factor, which is commonly used for incorporating expected income into brand valuation. The BV of a bank will be more accurate when it results from the income of marketing function, return on marketing investment and capitalization factor.

There are multiple reasons for developing procedures to facilitate the quantification of brand value. A brand's value may be useful for merger and acquisition, brand licensing, fund raising and brand portfolio decisions (Keller, Parameswaran, & Jacob, 2011). Other reasons include buying and selling the brand, justification of investment, developing new product and taking advantage to the valuation of trademark. Some authors emphasize the positive link established between the commercial subsystem of the firm and the financial subsystem (Blackett, 1989). As a result, interest in the quantification of brand value by managers and researchers of knowledge management has been increasing (Tekan, Far, Hajipoormashaiee, & Heshi, 2012).

Many authors consider that efficient brand management starts with a good measure of its value (Crimmins, 1992). Measuring the brand value can facilitate better performance of strategic brand management through internal analyses, which, in turn, enables to increase economic value of the brand. In order to increase the performance, marketing managers need to understand the customer

involvement and marketing contribution for making appropriate strategic brand decisions.

This valuation can make some clear understanding about the marketing or brand related performance of a bank taking into account the business risk. The quantification of brand value ensures that resources will be appropriately linked to marketing contributions from where brand value could be more accelerated.

OBJECTIVES

1. To measure marketing profitability of commercial banks in terms of net marketing contribution and marketing return on investment.
2. To measure brand value of commercial banks using marketing profitability and capitalization factor.
3. To make a rank order of the commercial banks.

LITERATURE REVIEW

The evaluation method of brand value has become an increasingly important topic as the concern of practical and theoretical circles in the 1980s (Huang, 2015). The members of International Accounting Standard Board (as cited by Eriksson & Ekman, 2006) believe that an international valuation method is a good way to increase the comparability of brand assets. Organizations must also focus on bridging functional gaps between marketing and finance for measuring and improving brands and marketing performance (Hinshaw, 2005).

Many quantitative methods are currently used to value brands. For example, the brand valuation using historic costs based on all the expenses that are necessary to build or form a brand. Some of the valuation models have been developed based on behavioral perspectives. Such studies (models), however, are skeptical of having one or other problems or shortcomings.

First, Virvilaite and Jucaityte (2008) quoted in their study that the link between economic and psycho-graphical indicators was articulated in composite economic and behaviorally-oriented brand valuation models which were studied by Interbrand consultancy, also by Schulz & Brandmeyer (1989), Semion (1998), Sattler (1997), and Bekmeier-Feuerhahn (1998). However, more economic, financial and behaviorally-oriented factors were still demanded.

Second, an integrated model of brand valuation was developed by Virvilaite and Jucaityte (2008) following the concept of market-oriented brand valuation models by Aaker (1991) and Simon and Sullivan (1993). This model includes the brand value in points constructed by a combination of three categories of factors: brand strength factors, financial brand value factors, and financial brand strength factors. Firstly, brand strength factors (brand loyalty, brand awareness, perceived quality, brand associations and brand asset) are based on customer perceptions,

which may or may not be reliable in the long run. Secondly, financial brand value factors are determined by the difference between the "capitalization of the company" and the "assets of the company". The capitalization of the company is calculated by multiplying the market price of each stock with the number of stocks. For the purpose of valuing a brand, the market price of the companies' stocks should not be relied upon as the stock market can fluctuate dramatically. Thirdly, financial brand strength factors refer to the market-oriented brand valuation model, where financial strength of brand value factors is determined by comparing market price with accounting price. Again, market price can be volatile, which is a shortcoming for measuring brand strength factor.

Third, with regard to CAPM (Capital Asset Pricing Model), brand value is calculated using the variation in the incremental required cost of capital and incremental firm value when the reputation index varies in one unit (Srivastava, McInish, Wood, & Capraro, 1997). The main shortcoming of this model is that it only considers total incremental values of firms; not marketing functions.

Fourth, Brand Finance measured the brand value by the multiplication of brand strength Index (BSI) with the attributes of emotional aspects, financial performance and sustainability, brand royalty rate, and brand revenues. In this valuation technique, the missing element is marketing profitability, functioned by marketing performance, which is necessary for measuring the marketing value of a brand. Total brand value should be estimated not only based on financial parameters but also based on marketing functions.

Fifth, Abratt and Bick (2003) estimated brand value based on discounted cash flow, which was determined by summation of discounted cash flows attributable to the brand. However, cash flow gives only the cash gain but not the marketing gain.

Many academics and professionals have researched in many ways to quantify the brand value for products, especially in the context of manufacturing organizations. However, much research is yet to be done regarding brand value for financial services organizations, such as bank. Our study focuses on brand valuation of commercial banks in Bangladesh. For measuring brand value (BV), we apply "Kern's x-times-model", known as Earning capacity-oriented brand valuation model (Excellence, 2001) that follows:

$$BV = \sqrt[3]{(R)^2} \times L \times CF \text{..... ....} \quad (1)$$

Where, R = Expected annual revenue

L = License fee rate

CF = Capitalized factor

For estimation of brand value, the relevant variables/concepts associated with Equation (1) deserve discussions that include the following:

Interest Income as Sales Revenue: Sales revenue is the income received by a company from its sales of goods or the provision of services (Corporate Finance Institute, 2017). Firms earn revenue through selling products and services, which indicate their fundamental activity and help them grow and survive, and banks are not an exception to this. Most banks generate revenues through earning interest income, which is incidental to their primary activities, such as receiving deposits and disbursing loans. Thus interest income (II) represents the revenue (R) of a bank in this study.

Net Marketing Contribution (NMC): Marketing contribution in financing and banking institutions is given the top priority to the decision makers. The NMC for products is calculated by the subtraction of "Cost of goods sold" and "Marketing expenses" from "Net sales" (Kotler & Armstrong, 2014). For financial institutions, NMC is the difference between net interest income (i.e. Interest income/profit on investment–Interest/Profit paid on deposits and borrowings) and marketing expense (Hasan, Ullah, & Bhattacharjee, 2015). Revell (1980) utilized the interest margin as a performance measure for the US commercial banks and defined it as the difference between interest income and interest expense. Accordingly, we propose to measure NMC as the difference between net interest income (NII) and marketing expense (ME).

Marketing Return on Investment (MROI): It is an important tool for measuring marketing profitability, which must be an inherently financial construct (Stewart, 2008). MROI is the only measure that can be linked to financial results which will be credible as the firm is required to report its results in financial terms (Hasan et al., 2015). Return, risk, time value of money and cost of capital are reflected especially in MROI which contributes in sound decision making, accountability, continuous improvement, and transparency for all stakeholders. It also has the ability to recognize the short–term effect of marketing actions and the resulting long-term outcomes.

Marketing Expense (ME): Marketing Expense does not include general administration expenses, research and development expenses or other expenses unrelated to the marketing and sales of company's products and services. Therefore, MROI can be very high even with less investment in advertising and publicity. For example, Hinshaw (2006) found that MROI is about 709%.

Capitalization Factor (CF): It is used as a measure of the risk for converting expected income (revenue) into valuation. The capitalization factor is valued by capitalization rate, which is considered as the 'risk free rate'. Kern (1962) used the capitalization factor for measuring the brand value, which is the function of revenue, assuming that it will grow along with revenue but on a decelerating upward curve (using a cube root function). We use his capitalization factor (CF), which follows:

$$CF = \frac{q^n - 1}{q^n \times (q-1)} \text{ ....(2)}$$

Where, q = 1+ (P/100)

P = Normal imputed interest rate for the country concerned

n = Number of years for the expected revenue strem

METHODOLOGY

The methodology of the study includes the description of the data set and the measurement of brand value of the selected second generation commercial banks of Bangladesh.

Data Set

For conducting the empirical work, the selection of data set is based on the criteria that include (1) the data are collected from the annual reports of banks, (2) the second-generation banks (established during the period 1991-1999) is considered, (3) subsidiaries of banks are not considered, (4) interest income is considered as sales revenue of a bank from the marketing perspective, (5) advertising and publicity are considered as the only marketing-related investment for a bank, and (6) brand value is assessed at the year ending 2013. Accordingly, annual audited reports (2009 to 2013) of seventeen second-generation private commercial banks in Bangladesh are considered for this study, with the exception of the ICB (Islamic Bank Limited), which is known to be inconsistent in terms of the determination of profitability compared to other banks.

Measurement of Brand Value

In order to measure BV specified in Equation (1), first we gather the interest income (II) from financial statements of banks, estimate net marketing contribution (NMC) and marketing return on investment (MROI). Then we calculate the continiously discounted interest income (CDII), continuously discounted marketing return on investment (CDMROI), and capitalization factor (CF).

Estimation of Interest Income: For banks, as discussed in the literature review, revenue is represented by interest income (II), which will be gatherd from audited financial statements.

Estimation of Net Marketing Contribution: As pointed out in the literature review (Hasan et al., 2015), the net marketing contribution (NMC) is estimated as the net interest income (NII) minus marketing expense (ME); that is,

$$NMC_{bt} = NII_{bt} - ME_{bt} \text{..... ....} (3)$$

Where, b = Different banks

t = Time (Year)

Note that while estimating NMC, it is taken into effect that advertising and publicity are considered as the marketing expense (ME) for the purpose of measuring a bank's marketing contribution and that ME excludes expenses relating to general administration, research and development (Best, 2012). The estimates of NMC are presented in **Table 1** in the forthcoming section (i.e. Findings and Analysis).

Estimation of Marketing Return on Investment: Following the literature review, marketing return on investment **(**MROI) can be estimated as follows:

$$MROI_{bt} = NMC_{bt} / ME_{bt} \text{..... ....} (4)$$

Where, NMC = Net marketing contribution

ME = Marketing expense

b = Different banks

t = Time (Year)

While estimating MROI, the administrative, research and development expenses are excluded from the marketing expenses (ME). The estimates of MROI are shown in **Table 2** in the Findings and Analysis section.

Estimation of Continuously Discounted Interest Income: Given the historic data on interest income (II) available from bank's financial statements, the future values can be forecasted by linear regression. Then continuously discounted interest income (CDII) can be obtained by discounting future values back to NPV (net present value) with appropriate discount factor. Thus we have,

$$CDII = \int_{t=0}^{t} II_b(t) e^{-tr} dt \text{..... ....} (5)$$

Where, b = Different banks

t = Time (Year)

r = Risk free rate

Estimation of Continuously Discounted Marketing Return on Investment: In the determination of value to pay for a bank's brand, an investor ultimately looks at the return of reputation from the brand that will be received from the investment. Such a valuation approach demands continuously discounted future values being forecasted by linear regression using historical data. The

continuously discounted marketing return on investment (CDMORI) can be estimated using an appropriate perpetual NPV (net present value) discount factor as follows:

$$CDMROI_b = \frac{CDNMC_b}{CDME_b} \quad \ldots\ldots(6)$$

$$Where,\ CDNMC_b = \int_0^t NMC_b(t)\, e^{-tr}\, dt \quad \ldots\ldots(7)$$

$$CDME_b = \int_0^t ME_b(t)\, e^{-tr}\, dt \quad \ldots\ldots(8)$$

Where, b = Different banks

t = Time (Year)

r = Risk free rate

We used data to forecast for five years (2009 - 2013). Forecasts are usually for five to seven years during the rapid growth phase with a convergence in the final years of the forecast to a long-term stable growth rate (Hawkins, 2001). Accordingly, the future values for the years 2014 – 2018 have been continuously discounted back to 2013 using an appropriate discount rate and definite integration, where the lower and upper limits are set at t = 5 for 2013 and t = 10 for 2018 respectively.

The appropriate discount rate is considered to be the 'risk free rate' as it is usually viewed as the theoretical rate of return for an investment. This rate is determined as the geometric mean of the cut off yield percentage of 91-day Treasury Bill. The data were gathered from the website of Bangladesh Bank in 2016 for the year 2009 to 2013 and the risk free rate (r) is found to be 6.60%.The estimates of CDMROI are demonstrated in **Table 3** in the Findings and Results section.

Estimation of Capitalization Factor: The normal imputed interest rate for the country concerned (p) in Kern's Equation 2 can be replaced by risk free rate (r) in our case as determined in the foregoing and thus the capitalization factor (CF) can be estimated as:

$$CF = \frac{q^n - 1}{q^n \times (q - 1)}$$

Where, q = 1+ (r/100)

r = Risk free rate

n = Number of years for the expected Interest Income

Given that r = 6.6 and n = 5, we have, q = (1+ r/100) = 1.066 and q^n = 1.376531. Hence, CF = 4.1448.

Estimation of Brand Value: Now, we consider the continuously discounted interest income (CDII) and marketing return on investment (CDMROI) of a bank using 'perpetual NPV continuous discount factor', which are taken as proxies for Kern's (1962) revenue (R) and license fee (L) respectively. So, Equation (1) turns into the following one.

$$BV_b = \sqrt[3]{(CDII_b)^2} \times CDMROI_b \times CF \quad \text{..... ....(9)}$$

Finally, using Equations (2) and (5) to (8) in Equation (9), the brand value for a given bank (b) is estimated by the following equation:

$$BV_b = \sqrt[3]{\left(\int_{t=5}^{10} II_b(t)e^{-tr}dt\right)^2} \times \frac{\int_{t=5}^{10} NMC_b(t)e^{-tr}dt}{\int_{t=5}^{10} ME_b(t)e^{-tr}dt} \times \frac{q^n - 1}{q^n \times (q-1)} \quad \text{..... ..... (10)}$$

Where, t = 5 for 2013

t = 10 for 2018

r = Risk free rate

e = Exponent

The results of brand value and ranking of brands (banks) are furnished in **Table 4** in the following section.

FINDINGS AND ANALYSIS

This section highlights the key findings pertaining to **y**ear-wise net marketing contribution (NMC), marketing return on investment (MROI), continuously discounted marketing return on investment (CDMROI), and finally brand valuation of the banks (17) at the year ending 2013 along with rank order of these banks.

Net Marketing Contribution

Table 1 demonstrates year-wise net marketing contribution (NMC) of the banks. In the table, the 'bold' figures indicate the highest or the lowest NMC values in a given year. Over the study period (2009–2013), there is continuous increase in NMC for only five banks, namely EBL, SIBL, DBBL, FSIBL and OBL while other banks are observed to experience fluctuations in their NMCs.

Table 1: Year-wise Net Marketing Contribution (NMC) for the Banks (in Million Taka)

Banks	2009	2010	2011	2012	2013
1. Eastern Bank Ltd. (EBL)	2,193	2,857	3,177	4,666	4,736
2. National Credit & Commerce Bank Ltd. (NCC)	1,511	2,453	2,341	2,210	1,999
3. Prime Bank Ltd. (PRIBL)	**2,270**	**4,118**	3,932	5,276	4,085
4. Dhaka Bank Ltd. (DBL)	2,020	2,405	2,293	2,587	3,252
5. Al-ArafahIslami Bank Ltd. (AAIBL)	1,330	**1,094**	3,418	4,525	4,914
6. Southeast Bank Ltd. (SEBL)	1,376	2,640	2,046	2,028	1,945
7. Social Islami Bank Ltd. (SIBL)	1,000	1,428	2,354	3,733	3,873
8. Dutch Bangla Bank Ltd. (DBBL)	2,014	3,687	**4,882**	**6,896**	**6,974**
9. Trust Bank Ltd. (TBL)	895	1,448	845	1,222	1,086
10. Bank Asia Ltd. (BAL)	1,724	2,915	2,673	3,652	3,150
11. Exim Bank Ltd. (EXIM)	2,178	3,560	3,765	4,950	4,896
12. First Security Islami Bank Ltd. (FSIBL)	990	1,396	2,043	2,989	3,625
13. Mutual Trust Bank Ltd. (MTBL)	**856**	1,138	**588**	**592**	**651**
14. Mercantile Bank Ltd. (MBL)	1,261	1,706	1,640	1,907	1,473
15. One Bank Ltd. (OBL)	1,017	1,834	1,915	2,689	2,981
16. Premier Bank Ltd. (PREBL)	858	1,350	1,550	1,555	1,300
17. Standard Bank Ltd. (SBL)	1,058	1,699	2,028	2,235	2,076

Marketing Return on Investment (MROI)

Year-wise marketing return on investment (MROI) of the banks are presented in **Table 2**., wherein 'bold' figures indicate either the highest or the lowest value in a given year.

Table 2: Year-wise Marketing Return on Investment (MROI) of the Banks (in Million Taka)

Banks	2009	2010	2011	2012	2013
1. Eastern Bank Ltd. (EBL)	1761.81	2462.45	2308.27	3145.25	3036.12
2. National Credit & Commerce Bank Ltd.(NCC)	9370.12	7366.09	5393.73	6940.03	4,962.58
3. Prime Bank Ltd. (PRIBL)	1420.12	3567.53	3063.21	3654.99	1653.29
4. Dhaka Bank Ltd. (DBL)	5128.05	4324.51	5454.58	6053.86	5804.51
5. Al-ArafahIslami Bank Ltd. (AAIBL)	18153.23	6636.68	26143.54	24129.77	22242.31
6. Southeast Bank Ltd. (SEBL)	4553.88	7251.67	4577.31	5347.21	5769.17
7. Social Islami Bank Ltd. (SIBL)	6712.55	6153.41	8706.99	8429.18	7781.54
8. Dutch Bangla Bank Ltd. (DBBL)	3824.98	9530.39	6416.05	6608.84	2016.99
9. Trust Bank Ltd. (TBL)	4518.13	5796.70	2079.61	1789.67	4309.25
10. Bank Asia Ltd. (BAL)	6819.33	6,382.67	9438.96	13138.21	10486.87
11. Exim Bank Ltd. (EXIM)	8146.85	**13642.75**	10299.18	10489.81	7766.20
12. First Security Islami Bank Ltd. (FSIBL)	3977.72	5508.71	6040.23	7288.23	6571.28
13. Mutual Trust Bank Ltd. (MTBL)	6220.90	3139.20	**1133.47**	2302.13	2419.32
14. Mercantile Bank Ltd. (MBL)	2541.67	2853.41	2337.67	2343.25	1922.76
15. One Bank Ltd. (OBL)	5681.10	6557.69	4432.50	4855.21	4434.17
16. Premier Bank Ltd. (PREBL)	**1127.09**	**875.38**	1164.42	**1190.91**	**545.74**
17. Standard Bank Ltd. (SBL)	4373.60	6739.99	4325.69	4409.17	3926.03

Continuously Discounted Marketing Return on Investment

Table 3 presents the year-wise CDNMC (continuously discounted net marketing contribution), CDME (continuously discounted marketing expense) and CDMROI (continuously discounted MROI) of the banks. Bold figures in the table indicate either the highest or the lowest value in a given year.

Table 3: CDNMC, CDME and CDMROI of Banks for the Projected Year (2014 - 2018)

Banks	CDNMC (in Million Taka)	CDME (in Million Taka)	CDMROI
1. Eastern Bank Ltd. (EBL)	9,400	396	23.74
2. National Credit & Commerce Bank Ltd. (NCC)	6,236	91	68.33
3. Prime Bank Ltd. (PRIBL)	11,033	**444**	24.85
4. Dhaka Bank Ltd. (DBL)	7,119	139	51.17
5. Al-ArafahIslami Bank Ltd. (AAIBL)	7,289	**41**	**176.95**
6. Southeast Bank Ltd. (SEBL)	5,984	109	54.75
7. Social Islami Bank Ltd. (SIBL)	6,010	80	75.52
8. Dutch Bangla Bank Ltd. (DBBL)	**12,378**	253	48.94
9. Trust Bank Ltd. (TBL)	3,301	98	33.58
10. Bank Asia Ltd. (BAL)	7,886	97	81.49
11. Exim Bank Ltd. (EXIM)	10,456	104	100.99
12. First Security Islami Bank Ltd. (FSIBL)	5,415	95	56.98
13. Mutual Trust Bank Ltd. (MTBL)	**2,495**	91	27.52
14. Mercantile Bank Ltd. (MBL)	4,724	191	24.80
15. One Bank Ltd. (OBL)	5,435	105	51.83
16. Premier Bank Ltd. (PREBL)	3,805	388	**9.81**
17. Standard Bank Ltd. (SBL)	5,034	106	47.63

Brand Valuation and Rank Order of Banks

In **Table 4**, the values of $CDII_b$ in Column (1) have been estimated by taking continuously discounted interest income (II) as stated earlier. The values of CDMROI in Column (3) are obtained from the last column of **Table 3**. Following Equation (10), the estimated brand values of the banks are presented in Column (5) and accordingly their rank orders are shown in Column (6) of this

table, wherein bold figures in columns of **Table 4** in a given year indicate either the highest or the lowest value whichever is appropriate.

Column (6) indicates the rank order of the banks in terms of brand value. As shown in this table, the top three positions are held by AAIBL, EXIM and BAL with brand values (in million taka) of 5,866, 4,527 and 3,136 respectively.

Table 4: Brand Value (in Million Taka) and Rank Order of Banks (Year Ending 2013)

Banks	$CDII_b$ (1)	$\sqrt[3]{(CDII_b)^2}$ (2)	CDMROI (3)	CF (4)	Brand Value (5)	Rank Order (6)
1. Eastern Bank Ltd (EBL)	26,707	8934764.47	23.74	4.14448	879	15th
2. National Credit Commerce Bank Ltd. (NCC)	25,481	8659166.53	68.33	4.14448	2,452	5th
3. Prime Bank Ltd. (PRIBL)	**45,099**	12670054.71	24.85	4.14448	1,305	12th
4. Dhaka Bank Ltd (DBL)	28,288	9284085.35	51.17	4.14448	1,969	7th
5. Al-Arafah Islami Bank Ltd. (AAIBL)	22,618	7997869.96	**176.95**	4.14448	**5,866**	**1st**
6. Southeast Bank Ltd (SEBL)	37,087	11121189.78	54.75	4.14448	2,524	4th
7. Social Islami Bank Ltd. (SIBL)	18,224	6925189.70	75.52	4.14448	2,167	6th
8. Dutch Bangla Bank Ltd. (DBBL)	27,034	9007491.10	48.94	4.14448	1,827	9th
9. Trust Bank Ltd. (TBL)	17,265	6680124.65	33.58	4.14448	930	13th
10. Bank Asia Ltd. (BAL)	28,296	9285713.91	81.49	4.14448	3,136	**3rd**
11. Exim Bank Ltd.(EXIM)	35,576	10816985.9	100.99	4.14448	4,527	**2nd**
12. First Security Islami Bank Ltd. (FSIBL)	23,826	8280179.35	56.98	4.14448	1,955	8th
13. Mutual Trust Bank Ltd. (MTBL)	**16,476**	6475046.91	27.52	4.14448	738	16th
14. Mercantile Bank Ltd. (MBL)	25,636	8694245.79	24.80	4.14448	894	14th
15. One Bank Ltd. (OBL)	18,040	6878564.61	51.83	4.14448	1,478	10th
16. Premier Bank Ltd. (PREBL)	17,886	6839135.36	**9.81**	4.14448	**278**	17th
17. Standard Bank Ltd. (SBL)	20,431	7473420.52	47.63	4.14448	1,475	11th

CONCLUSION

The main purpose of this study is to measure the brand value (BV) and to determine relative positions of the selected seventeen private commercial banks of Bangladesh. Interest income is more functional with marketing activities rather than investment income of a bank as it deals with mainly loan and deposit products, where customer involvement is very high. It is observed that the interest income has enormous effect on brand value and thus rank order of the banks. So, the measure of brand value is influenced by the ratio of interest income and total operating income.

For measuring BV, we considered the financial data instead of perception-based data. Owing to the inherent link between marketing and finance, the extent of marketing performance of commercial banks is determined by the revenue from marketing efforts known as interest income, marketing contribution and marketing return on investment. We included capitalization factor to reduce business risk for measuring marketing performance-based BV. Although BV can be measured based on brand image and brand assets (Dress, 1999), it is a challenging task to measure the BV and the usage of BV may also be questioned partly because of relying on estimating future values based on the previous performance.

The brand value based on non-financial measures (e.g. market share, customer satisfaction, brand loyalty, brand equity, etc.) may change, even in a very short period of time due to the change in customers' perception and preference. However, our study of brand valuation will be meaningful for justification of marketing investment.

The computation of brand value and the resulting findings of this study may entail new opportunity to track the marketing related input and output for the banks. The brand values can also be used to control marketing budgets for different marketing initiatives (e.g. new financial product development, etc.) and performance assessment of marketing personnel in banks. It is recommended that banks should determine their brand values by using formulary approach, which relies on market situation of brands to make forecast in order to generate more sales volume as indicated by Seetharaman, Nadzir and Gunalan (2001). Banks may therefore focus on the quantitative measurement of brand value in order to track the marketing performance which is based on financial data.

We considered only marketing profitability and capitalization factor, which leaves a missing point in this valuation, namely corporate social responsibility (CSR). The one and only social responsibility of a business is to use its resources and engage in activities designed to increase its profit (Friedman, 2002). Nowadays, many organizations are giving importance to connect CSR with marketing for increasing perceived value of the brand in the mind set of stakeholders. So, CSR is potentially a 'viable vehicle' to generate marketing

related profit. Therefore, future research may include CSR while measuring brand value.

REFERENCES

Aaker, D. A. (1991). *Managing Brand Equity*. New York: Maxweel Macmillan-Canada.

Abratt, R., & Bick, G. (2003). Valuing brands and brand equity: Methods and processes. *Journal of applied management and entrepreneurship*, *8*(1), 21.

Bangladesh Bank, (2016). *Treasury bill/bond auctions*: *2016*. Retrieved from, https://www.bb.org.bd/monetaryactivity/treasury.php. [Accessed 15 July, 2016].

Beckmeier-Feuerhahn, S. (1998). Marktorientierte Markenbewertung. *Eine Konsumenten und unternehmensbezogene Betrachtung. Wiesbaden: Gabler*.

Best, R. J. (2012). *Market-Based Management*. Retrieved from, http://www.rogerjbest. com/ [Accessed 17 July, 2018].

Blackett, T. (1989). The role of brand valuation in marketing strategy. *Marketing and Research Today*, *17*(November), 245-248.

Corporate Finance Institute, (2017). *Sales Revenue*. Retrieved from, https://corp oratefinanceinstitute.com/resources/knowledge/accounting/sales-revenue/ [Accessed 17 Dec, 2017].

Crimmins, J. C. (1992). Better measurement and management of brand value. *Journal of Advertising Research*, *32*(4), 11-19.

Drees, N. (1999). Markenbewertung und Markenberatung in Deutschland– ErgebnisseeinerempirischenStudie und Begriff des Markenwertes und Modellezur Markenwertermittlung. *ErfurterHeftezumangewandten Marketing*, (6).

Eriksson, A., & Ekman, O. (2006). In a New Brand World-Why is an asset not an asset? *rapport nr.: Externredovisningochföretagsanalys*.

Excellence, B. E. (2001). Brand Equity Review. *BBDO Group Germany*,*6*, *November*.

Friedman, M. (2002). The social responsibility of business is to increase its profits. *Applied Ethics: Critical Concepts in Philosophy*, *5*, 57.

Hasan, M. (2012). Measuring marketing profitability metrics of first generation private commercial banks in Bangladesh. *DU Journal of Marketing*, *15*, 267-286.

Hasan, M., Ullah, K. T., & Bhattacharjee, H. (2015). Brand valuation of commercial banks in Bangladesh: An application of marketing profitability. *Journal of Business Theory and Practice*, *3*(2), 159.

Hawkins, G.B. (2001). Understanding the income valuation approach- A primer for judges who must hear valuation cases. *Judges & Lawyers Business Valuation Update*, *Vol. 3*, No. 3, p.1-4. Retrieved from, https://www.businessvalue.com/ resources/ [Accessed 02 July, 2017].

Hinshaw, M. (2006). A survey of key success factors in financial services marketing and brand management. *Journal of Financial Services Marketing*, *10*(1), 37-48.

Huang, J. (2015). A review of brand valuation method. *Journal of Service Science and Management*, *8*(01), 71.

Jahedi, S., & Méndez, F. (2014). On the advantages and disadvantages of subjective measures. *Journal of Economic Behavior & Organization*, *98*, 97-114.

Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. *The Journal of Marketing*, 1-22.

Keller, K. L., Parameswaran, M. G., & Jacob, I. (2011). *Strategic brand management: Building, measuring, and managing brand equity*. Pearson Education India.

Kern, W. (1962). Bewertung von Warenzeichen. *Betriebswirtschaftliche Forschung und Praxis*, *14*(1), 17-31.

Kotler, P., & Armstrong, G. (2014). *Principles of Marketing: Marketing by Numbers* (15th ed.). New Jersey, USA: Pearson Education.

Majerova, J., & Kliestik, T. (2015). Brand valuation as an immanent component of brand value building and managing. *Procedia Economics and Finance*, *26*, 546-552.

Mndeme, R. K. (2015). Impact of non-interest income on banking performance in Tanzania. *International Journal of Economics, Commerce and Management*, *3*(5), 75-92.

Revell, J. (1980). *Costs and Margins in Banking: An International Survey*. Paris, France: Organisation for Economic Co-operation and Development; [Washington, DC: sold by OECD Publications and Information Center].

Rose-Ackerman, S., & Palifka, B. J. (2016). *Corruption and government: Causes, consequences, and reform*. Cambridge university press.

Saunders, A., Schmid, M., & Walter, I. (2014). Non-interest income and bank performance: Does Ring-Fencing Reduce Bank Risk? *University of St. Gallen, School of Finance research paper*, (2014/17).

Schulz, R., & Brandmeyer, K. (1989). Die Marken-Bilanz: Ein Instrument zurBestimmung und Steuerung von Markenwerten. *Markenartikel*, *51*(7), 364-370.

Seetharaman, A., Azlan Bin Mohd Nadzir, Z., & Gunalan, S. (2001). A conceptual study on brand valuation. *Journal of product & brand Management*, *10*(4), 243-256.

Simon, C. J., & Sullivan, M. W. (1993). The measurement and determinants of brand equity: A financial approach. *Marketing science*, *12*(1), 28-52.

Srivastava, R. K., McInish, T. H., Wood, R. A., & Capraro, A. J. (1997). Part IV: How do reputations affect corporate performance?: The value of corporate reputation: Evidence from the equity markets. *Corporate Reputation Review*, *1*(1), 61-68.

Stewart, D. W. (2008). How marketing contributes to the bottom line. *Journal of Advertising Research*, *48*(1), 94-105.

Tekan, M. E. G., Far, M. E., Hajipoormashaiee, M., & Heshi, A. T. (2012). The special value assessment of bank's brand name on basis of CBBE model (case study: bank Saderat). *Advances in Environmental Biology*, 2069-2082.

Virvilaitė, R., & Jucaitytė, I. (2008). Brand valuation: viewpoint of customer and company. *Engineering Economics*, *56*(1).

D.U. Journal of Marketing, Vol. 18, June, 2015 and Vol. 19, June, 2016

PATIENT SUPPORT PROGRAM: CRAFTING EFFICIENT SERVICE DESIGN TO MANAGE DIABETES

Imranul Hoque[1]
Sajal Kanti Ghosh[2]

Abstract: *The aim of this study is to craft a strategic framework for managing diabetes and to develop a service blueprint to achieve treatment efficiency through Patient Support Program (PSP). Secondary data were collected from different published sources, and the primary data were collected through focus group discussions (FGDs) and in-depth interviews (key informant techniques). The PSP is designed in the context of Bangladesh and the ultimate objective of PSP is to aid the patients by educating and assisting them to manage the disease as well as to assure better lifestyle by ensuring treatment adherence.*

Keywords: *Patient Support Program, Diabetes Management, Service Blueprint, Strategic Framework.*

INTRODUCTION

Diabetes mellitus is a major non-communicable disease, ranking as a leading cause of death and disability worldwide (Lozano, Naghavi, & Foreman, 2012). Diabetes is an important risk factor for cardiovascular disease, as well as a leading cause of adult blindness. Other long-term complications include kidney failure, nerve damage and lower limb amputation due to impaired circulation (Weininger, 2014).

According to a report in 2013 by IDF (International Diabetes Federation), in every six seconds, a person dies of diabetes, about 5.1 million people die due to diabetes, 46% of patients having Type 2 diabetes are undiagnosed, the total number of diabetes patients is projected to rise to 592 million (at 55% growth rate) and the urban population in developing countries is projected to be double in 2035. IDF data also show that 80% of the population with diabetes lives in low and middle-income countries. Definitely, these statistics indicate that an alarming situation is waiting for Bangladesh as it is a lower income country. By considering the severity of the disease, Bangladesh should cater strategy to tackle the problem in future.

[1] Associate Professor, Department of Marketing, Jagannath University.
[2] Lecturer, School of Business, Fareast International University.

Khan and Anderson (2011) mentioned that there is an increasing tendency of chronic diseases and impacts of such diseases on economic development in Asian countries including Bangladesh. As diabetes is a self-managed disease, strategically it will be effective, if any patient-centric caring system is developed to educate patients so that the patients themselves can manage diabetes. Unfortunately, there is no study on the strategic framework and service blueprint for increasing treatment effectiveness by managing diabetes. This gap creates a ground to develop a strategic framework for better patient service. To educate diabetic patients about the disease and to change the lifestyle of patients, Patient Support Program (PSP) can be an effective initiative in countries like Bangladesh, Turkey, and India and most importantly for all diabetes patients in general. This paper crafts a strategic framework for developing a PSP to manage diabetic patients, achieving treatment efficiency and ensuring good health for the patients.

LITERATURE REVIEW

"Diabetes mellitus, often simply referred to as diabetes, is a group of diseases in which a person has excessively high blood sugar, either because cells do not produce enough insulin or because cells do not respond to insulin" (Novo Nordisk, 2012). American Diabetes Association defined "Diabetes mellitus is a group of metabolic diseases characterized by elevated blood glucose levels (hyperglycemia) resulting from the defects in insulin secretion, insulin action or both" (ADA, 2008). According to Imam (2012), "Diabetes is a chronic disease, known to some but unknown to many in Bangladesh that occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces". Insulin is a hormone, manufactured by the beta cells of the pancreas, which is required to utilize glucose from digested food as an energy source. Chronic hyperglycemia is associated with microvascular and macrovascular complications that can lead to visual impairment, blindness, kidney disease, nerve damage, amputations, heart disease and stroke (Loghmani, 2005).

Diabetes, a self-managed disease, is affected by psychosocial and educational factors (Standiford, Greenberg, & Harrison, 2013). Reasons behind the increasing tendency of diabetes are population growth, aging, urbanization, obesity, and physical inactivity, carelessness about a balanced diet, and overall the lifestyle of people.

Two most common diabetes types are Type 1 and Type 2. Type 1 diabetes occurs when the body does not produce insulin and Type 2 diabetes is the result of failure to produce sufficient insulin and insulin resistance. Marx (2002) identified the reasons underlying the development of Type 2 diabetes, which are both

environmental particularly by such lifestyle factors like smoking, diet, and exercise level and genetics specifically the combined effects of what may be subtle alterations in several genes.

For the last 30 years, obesity has increased the prevalence of Type 2 diabetes dramatically. There are 382 million people, who are having diabetes around the world. The prediction says, by 2035 this number will rise at the rate of 55% which will be 592 million approximately (IDF, 2013). Bangladesh is also affected by the same trend of diabetes. 51% of the total population of Bangladesh is unaware of diabetic existence (Imam, 2012). Khan and Anderson (2011) mentioned that the existing health system is not sufficient to manage the diabetic disease. Diabetes is considered as a global health challenge for the 21st century and is expected that the total diabetic population will rise to 11.1 million. Bangladesh will be placed among the top seven countries in 2030 in terms of diabetic patients (Hussain, 2011). It is estimated that by 2030 the total number of people with diabetes in Bangladesh will be 11.1 million (Wild, Roglic, Green Sicref, & King, 2004). Khan (2012) stated, "Changing diabetes in a developing country requires empowered patients, improved awareness, availability, affordability, accessibility and quality of care". In a country like Bangladesh, the major barriers of diabetes care are the lack of education, awareness, complicated characteristics of the disease, fear of injection, remembering medication, following schedule, cost of medicine, treatment services, and lack of necessary resources (Novo Nordisk, 2012).

A healthy population is a foundation for sustainable development. Without a fully functional healthcare system, poverty reduction in the world's poorest countries is elusive and sustainable economic growth is unrealistic (WEHAB, 2002). In any country, lacking a cohesive healthcare delivery system, a high burden of illness threatens the sustainable development (Novo Nordisk, 2012). Several reasons behind diabetes (obesity, physical inactivity, overall lifestyle, carelessness about a balanced diet, etc.), can be managed if a patient-centric caring approach can be taken.

Different frameworks like Chronic Care Model (CCM), Diabetes Self-Management Support (DSMS), and Interactive Behavior Change Technology (IBCT) have been already proposed in the literature to manage chronic diseases e.g. diabetes. CCM is an organizational initiative to manage chronic diseases that create a practical, evidence-based supportive interaction between an activated patient and proactive practice team (Strickland Hudson, Piasccki, Hahn, Cohen, Orzano, Parchman, & Crabtree, 2010). Effective CCM requires six major areas to develop, namely self-management support, delivery system design, decision support, clinical information systems, organization of health care and community (Wagner, Austin, & Korff, 1996). DSMS refers to an ongoing system aiming to assist patients with diabetes or pre-diabetes in implementing sustainable behaviors that are necessary to manage their conditions beyond or outside of

formal self-management training. These supports can be educational, behavioral, and or clinical (Haas et al., 2012). IBCTs include the use of hardware and software to promote and sustain behavioral changes (Glasgow, Bull, Piette, & Steiner, 2004). Different IBCTs, like clinic-based CD-ROMs, Internet, and Interactive Voice-response telephone calls have been shown to be feasible and potentially valuable adjuncts to clinic-based behavioral counseling. These technologies can both increase the effectiveness of behavioral counseling and extend the reach of these services to patients with barriers to face-to-face interactions (Glasgow et al., 2004).

Patient Support Program (PSP) is a framework like the ones mentioned above. PSP is an organization-wide patient-centric initiative with the motivation of achieving treatment efficiency by ensuring treatment adherence, patient education, and dose optimization for the patients. Different renowned national and multinational pharmaceuticals like Novo Nordisk (The Blueprint for Change Programme), Novartis (Time 2 Do More in Diabetes), Roche (Roche Diabetes Care), and Johnson & Johnson (Johnson & Johnson Diabetes Institute) have already started patient caring activities, especially for diabetes management. Novo Nordisk initiated a project in Bangladesh for taking care of the diabetes patients. It has been working with local partners in Bangladesh, Turkey, India, Indonesia, the USA, and China to improve health for millions of people. As a result, the efforts to strengthen healthcare quality, diagnosis and treatment rates are being improved gradually. Initiative taken by Novo Nordisk gives an important clue i.e. there are some gaps to be filled up for managing diabetes to ensure good health for the patients.

OBJECTIVES

The core objective of this study is to develop a framework of patient support program (PSP) for the diabetic patients in Bangladesh. The specific objectives include the following:

1. To identify the existing service gaps for the diabetic patients in the context of Bangladesh.
2. To comprehend the scope of PSP from the perspectives of the diabetic patients and the organization intending to provide the service.
3. To develop an efficient service design for the proposed patient support program (PSP).

METHODOLOGY

This study is qualitative in nature. The prime focus of the study is to offer a service design to deliver caring service to diabetic patients to ensure good health and achieve diabetic treatment target. To assess the scenario and prevalence of

diabetes from global and Bangladesh perspectives, secondary data were collected from different sources: browsing websites of relevant organizations; searching scholarly journal articles on diabetic in Google Scholar; and collecting news and reports from online newspapers.

To design the service blueprint, primary data were collected through in-depth interviews with key informants and focus group discussions (FGDs) with relevant stakeholders including doctors, patients and managers from national and multinational pharmaceuticals, responsible persons from different institutions, and students with business and medical background.

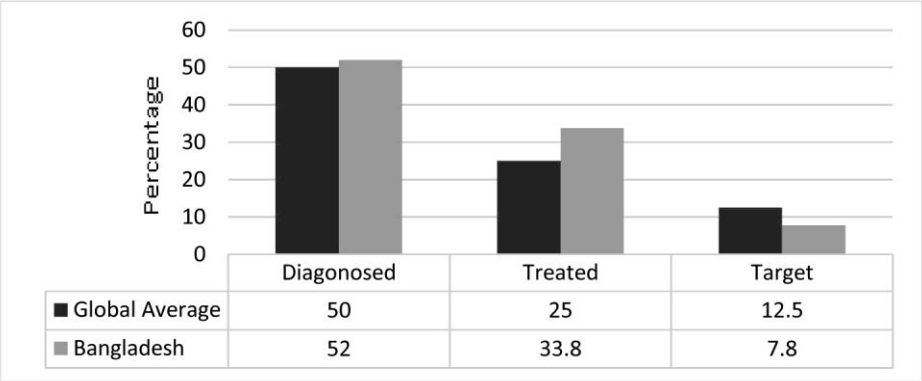
We followed convenient sampling method for collecting data from 10 diabetic doctors, 30 diabetic patients, 5 managers of national and multinational pharmaceuticals, 3 responsible representatives from BIRDEM through personal interview. The FGDs comprised of 10 business students in the first group, 10 medical students in the second group, and 12 diabetic patients in the third group. A semi-structured questionnaire including ten guiding points was used to conduct the FGDs.

Some of the in-depth interviews and two FGDs were conducted earlier in 2014, and one FGD and other interviews with diabetic patients were conducted in the last half of 2016. Each FGD took one and a half to two hours, and that of in-depth interview took ten to forty-five minutes. Some data were analyzed to develop a preliminary understanding of diabetic patient caring practices and diabetic service design. Other data analyses are shown in tables and figures followed by graphical presentation of a strategic service design framework for diabetic patients.

PROBLEMS TOWARD MANAGING DIABETES: THE GAPS

Bangladesh has more than 12% adult population affected by diabetes or pre-diabetes (Novo Nordisk, 2012). Nearly half of the population (382 million or 46% people) with diabetes is undiagnosed (IDF, 2013). Only 1 out of 3 diabetes patients is treated so far (Novo Nordisk, 2012), and about 1 out of 13 achieves treatment targets. The data are presented in **Figure 1**.

Figure 1: Achieving Treatment Target (In Percentage)



Source: The Blue Print for Change Programme, June 2012, Page 3

From the **Figure 1**, it is evident, in Bangladesh only 33.8% (1 out of 3) of the diabetes patients are treated, and the rest 66.2% are left untreated. Regarding the treatment target, it is evident, only 7.8% (1 out of 13) of the diabetes patients eventually achieve the treatment target. Brown, Conner and Nichols (2010) demonstrate similar results: 42% of the treated people with Type 2 Diabetes do not reach the blood sugar level.

In most of the cases, people in general, are not much aware of diabetes. As stated earlier, 46% (approx.) of the world population having diabetes is undiagnosed (IDF, 2013), and 51% (approx.) of Bangladeshi population is unaware of diabetes (Imam, 2012). These indicate that there is a serious knowledge gap. **Figure 1** also shows those who are diagnosed with diabetes, only 25% of them are covered under treatment. The situation is even worse in terms of achieving the treatment targets. Data indicate that globally 12.5% of the patients achieve the treatment target. In poor countries like Bangladesh, the success rate is even lower; only 7.8% achieves the treatment target.

The reasons behind the failure of achieving treatment target include education, awareness, complicated characteristics of the disease, fear of injection, remembering medication, following schedule, cost of medicine, treatment services, and lack of necessary resources (Novo Nordisk, 2012). Furthermore, the data analyses of FGDs, key informant interviews and personal interviews imply that such reasons can be classified into three major types, namely knowledge, treatment adherence and resource gaps that create problems to manage diabetes as shown in **Table 1.** About 85% of the respondents mentioned that they expect solutions to such problems. As the number of diabetic patients is increasing gradually, they are scared and looking for some prescriptions to tackle the problem.

Table 1: Gaps to Manage Diabetes

Major Gaps	Reasons for Gaps
Knowledge gap	1. Awareness 2. Education 3. Motivation and emotional support
Treatment Adherence Gap	1. Complicated characteristics of the disease 2. Fear of injection 3. Remembering medicine 4. Following schedule 5. Doctor availability 6. Doctor service quality
Resource Gap	1. Cost of the medicine and treatment 2. Other necessary resources

Source: Developed by Authors

PATIENT SUPPORT PROGRAM AS A SOLUTION TO GAPS

In order to manage diabetes efficiently, we propose a patient support program (PSP) to fill up three gaps identified in the foregoing section (i.e. knowledge, treatment adherence, and resource gaps). This initiative may help patients in learning diabetes and maintaining good health condition through dose optimization, patient cure, and patient retention by enhancing treatment efficiency. The scope of PSP can be viewed from the perspectives of organization as well as patients.

Organizational Perspective

An organization intending to initiate a PSP for the first time may start a project on pilot basis. Based on the experiences gathered from field investigation, the scope of the proposed guidelines from the organizational perspective is presented in **Table 2**.

Table 2: Scope of PSP from Organizational Perspective

Program Criteria	Specification	Description
Project Duration	1 Year	The project may be continued based on its effectiveness.
Number of Physicians to be Involved	50	Physicians will refer diabetic patients to the PSP center.

Program Criteria	Specification	Description
Target Number of Patients to be Served	2000	Patients will be enrolled for 8 months of the 12-month project.
Patient Classification	New	New patients are those who will be within 4 months after their enrollment.
	Old	Old patients are those who will cross 4 months after enrollment.

Source: Developed by Authors

Patients' Perspective

From the perspective of the patients, the scope of PSP is proposed as shown in **Table 3**, which includes the services that might be offered to new patients, follow-up services to old patients and arranging meetings with patients.

Table 3: Scope of PSP from Patients' Perspective

Services to New Patients	Follow-up Services to Old Patients	Patient Meeting
1. Education about diabetes in a group. 2. Individual counseling services. 3. Demonstration on how to use insulin device or injection. 4. Educate how to optimize dose. 5. Monitoring 'glycemic status'.	1. Outbound call (calling patients to review progress from PSP center). 2. Inbound call (answering calls from patients).	1. Scheduled (to motivate patients and to know patients' progress). 2. Emergency (as and when needed).

Source: Developed by Authors

Objectives of Patient Support Program

Introducing PSP will require involvement of three parties in the process to deliver the service: the patients to whom the service will be delivered, the doctors who will assist the patients in the process from enrollment to patient improvement monitoring phase, and the organization that will take the initiative for such arrangement. The objectives of PSP from the perspectives of the concerned parties are illustrated in **Table 4**.

Table 4: Objectives of PSP, Roles of Doctors and Responsibilities of Organization

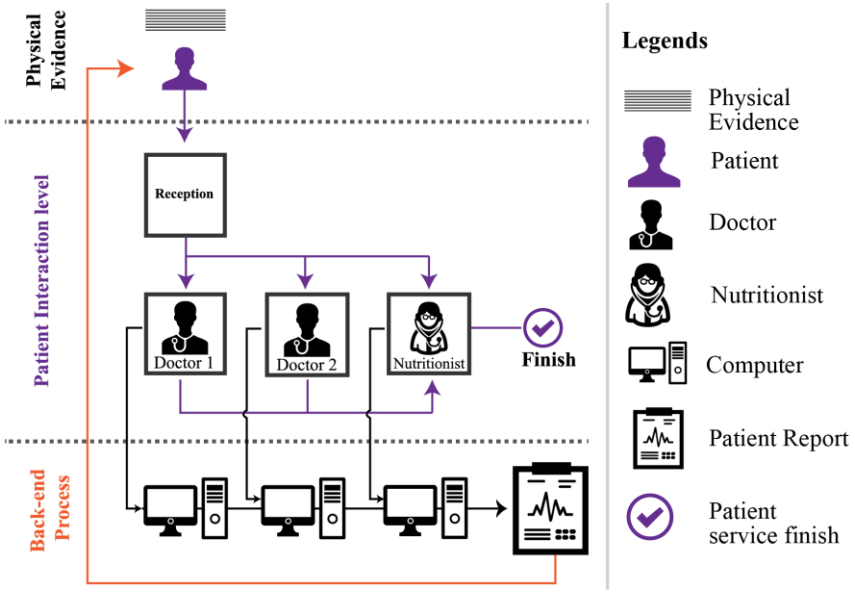
Objectives	Doctor's Roles	Organization's Responsibilities
1. Making patients aware of diabetes. 2. Informing patients about the severity and the complicacy of diabetes. 3. Educating patients through demonstration on how to use insulin devices. 4. Increasing patients' faith and confidence in using devices. 5. Educating patients on how to optimize dose. 6. Educating about the products that a particular company offers as treatment tool of diabetes. 7. Promoting the products as options for diabetes treatment. 8. Increasing adherence to the patients with the products that a company offers.	1. The doctor will encourage the patients to follow a healthy life style through undertaking diet and physical activities. 2. Ensuring patients' quality of life through controling diabetes. 3. Checking regular SMBG (Self-Monitoring of Blood Glucose) for better glycemic control. 4. Educating patients through demonstration on how to use insulin devices. 5. Increasing patients' faith and confidence in using devices. 6. Educating patients how to optimize dose. 7. Promoting particular products. 8. Increasing adherence to the patients with particular products.	1. Increasing strong connection of a 'particular organization with physicians. 2. Developing word of mouth/peer advocates about diabetes in favor of that organization. 3. Creating a distinctive position of that organization compared with competitors through patient centric approach. 4. Promoting the organization as 'Patient Support Center' as a destination of diabetes solution.

Source: Developed by Authors

Service Design

At this point, it is essential to design a service blueprint to achieve the stated objectives in **Table 4**. Service design (blueprint) is a tool that simultaneously depicts service process, customer contact points, and service delivery evidence from the customer's point of view (Shostack, 1984). This emphasizes on different systemic layers that overlap in delivering the service from the layer of customer interaction and physical evidence to the layer of internal interaction within the service production process. **Figure 2** illustrates the proposed service design for the PSP that involves three levels: physical evidence, patient interaction, and back-end process.

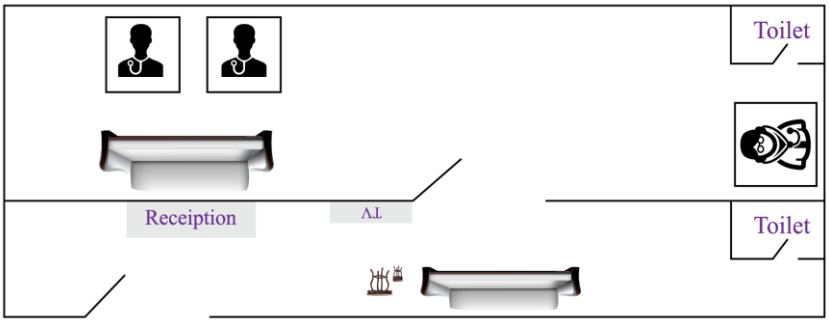
Figure 2: Service Design for PSP



Source: Developed by Authors

Physical Evidence: Of the service design, the first level is the physical evidence (tangible cues), which is important for a patient to assess the kind of service he/she might receive. It is tangibly surrounding the service, including everything from business cards to reports, signage, internet presence, equipment, and facilities used to deliver the service. The proposed physical evidence of the PSP is illustrated in detail specifying the room infrastructure and the design depicting the overall setup of all the elements, people involved in the service, and the whole process that can be visualized in **Figure 3**.

Figure 3: Proposed Physical Evidence of PSP Program

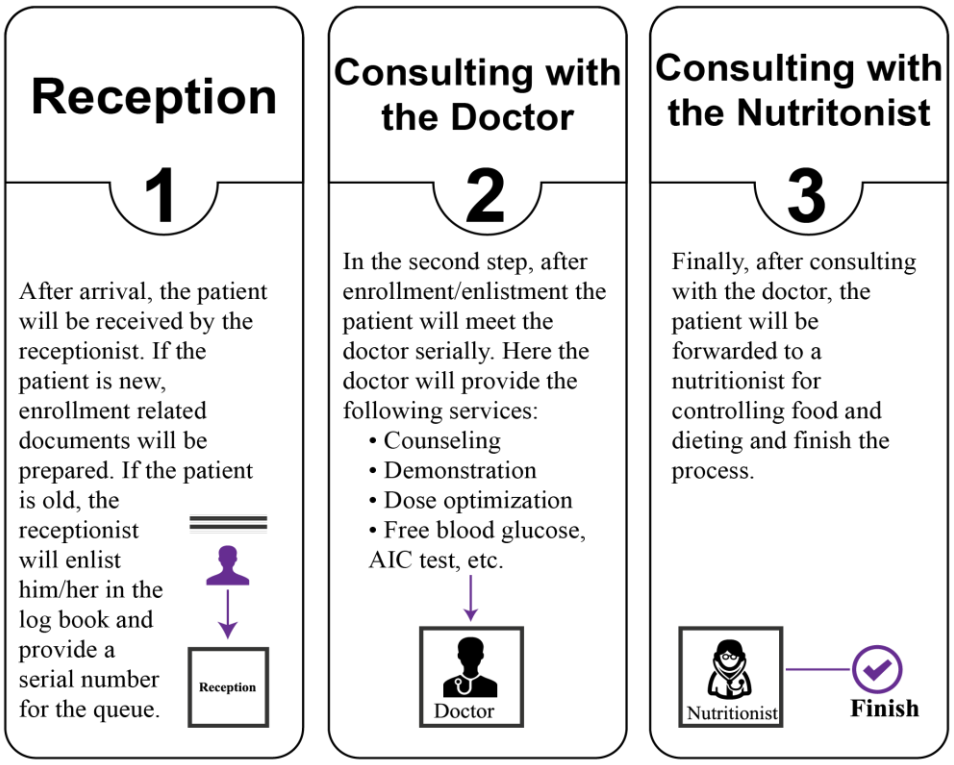


Source: Developed by Authors

Patient Interaction Level: This level is very important from the patient's point of view because bulk of the 'services package' will be provided at this level and the patients are the ultimate beneficiaries of the PSP. While designing the patient interaction level, "KISS" principle is followed to ensure a high level of patient satisfaction and to minimize time, psychic and resource costs; KISS stands for "Keep it Short and Simple" (Rich, 1995; Dalzell, 2009). It includes a three-step service delivery design: reception, consulting with the doctor and then with the nutritionist, which is illustrated in **Figure 4**.

First, in the reception phase, the new patients will be enrolled with appropriate documentation and the old patients will be assigned a serial number (if needed). Thereafter, they will be forwarded to the doctor for consultation. Second, the patient in consulting with the doctor phase, the doctor will provide necessary services to the patients (e.g. counseling, device (insulin pen) demonstration, instruction on dose optimization, and free blood glucose, A1C test, etc.). Third, in consulting with the nutritionist phase, which is the last step of the patient service delivery process, the patient will receive advice on dieting, etc. This is how the service delivery will be completed.

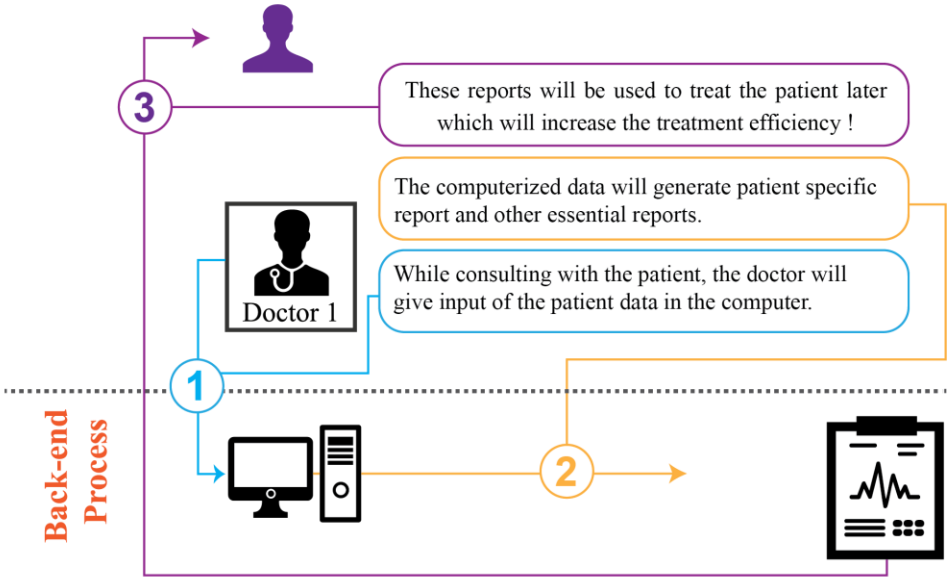
Figure 4: Service Delivery Steps



Source: Developed by Authors

Back-end Process: To provide sound patient service and maintain efficiency in service delivery, several activities are performed at the 'back-end-process' although these activities remain invisible to the patients. In this step, appointed doctors and officials will keep patients' data with their consents, which will be computerized with assistive technology and software, with the ultimate purpose to assist doctors in future for monitoring patients' progress, ensuring effective treatment and achieving the treatment targets. The back-end-process is demonstrated in **Figure 5.**

Figure 5: Back-end Process



Source: Developed by Authors

CONCLUSION

Although diabetes is a self-managed disease there are three gaps, namely knowledge gap, treatment adherence gap and resource gap, which create problems towards managing diabetes resulting in treatment inefficiency and poor health condition of the patients. PSP (Patient Support Program) can be a prospective approach to fill up these gaps.

First, through the PSP framework, the patients can be given education on diabetes, individual counseling services on medicine, diet, exercise, etc., insulin device usage, and dosage optimization. These initiatives might help in solving the knowledge gap. Second, the treatment adherence gap can be addressed through making inbound and outbound phone calls with patients regarding their

health status, holding meetings with patients (individual and group), and monitoring the patients' *glycemic* status. Third, the resource gap can be reduced, to some extent, by taking proactive initiatives of the patients, doctors, and the concerned organization responsible for carrying out the PSP. Filling these gaps may entail enormous effects at least in the short run.

The PSP may lead to result in benefits for the patients, doctors and the organization taking the initiative. By making patients aware of diabetes, educating them regarding disease management and adhering them to the treatment will ensure a better lifestyle for them, which, in turn, may help the patients to get rid of the diabetes-related curses like visual impairment, kidney disease, nerve damage, stroke and heart disease. In addition, a PSP initiative may also lead to improving the doctors' treatment efficiency by ensuring efficient diabetes management with the help of efficient service design. Moreover, the organization carrying out a PSP, as it appears, is likely to bring benefits for itself in terms of receiving patients' attention.

Finally, policy makers dealing with the diabetic patient management may adopt a project following PSP framework on a trial/pilot basis, which may be extended on a larger scale to entail the intended impacts for the country in the long run. However, if an extensive project is undertaken, the control and management integration will be needed. Such a research initiative might be carried out in future to test the proposed PSP framework empirically.

REFERENCES

American Diabetes Association (ADA), (2008). Diagnosis and classification of diabetes mellitus. *Diabetes Care, Vol. 31*, No.1, pp.55-60.

Brown, J. B., Conner, C. C., & Nichols, G. A. (2010). Secondary failure of metformin monotherapy in clinical practice. *Diabetes Care*, *33*(3), 501-506.

Dalzell, T. (2009). *The routledge dictionary of modern American slang and unconventional English*. Taylor & Francis Australia, 11 Queens Rd, Melbourne VIC, 3004, Australia.

Glasgow, R. E., Bull, S. S., Piette, J. D., & Steiner, J. F. (2004). Interactive behavior change technology: a partial solution to the competing demands of primary care. *American Journal of Preventive Medicine, 27*(2), 80-87.

Hussain, A. (2011). *Diabetes prevention in Bangladesh*. Faculty of Medicine UiO: Institute of Health and Society. Retrieved from, http://www.med.uio.no/helsam/english/research/news-and-events/news/2011/diabetes.html. [Accessed 28 November, 2013].

Haas, L., Maryniuk, M., & Beck, J. (2012). Standards Revision Task Force. National Standards for diabetes self-management education and support. *Diabetes Care, 35*, 2393-2401.

Imam, T. (2012). Diabetic prevalence in Bangladesh: the role of some associated demographic and socio-economic characteristics. *International Journal of Advancements in Research & Technology, Vol. 1*, No. 7, pp. 61-70.

International Diabetes Federation (IDF), (2013). *IDF Diabetes Atlas, Sixth edition*. Retrieved from, https://www.idf.org/e-library/epidemiology-research/diabetes-atlas/19-atlas-6th-edition.html. [Accessed 28 November, 2013].

Khan, P. (2012). Changing diabetes in Bangladesh through sustainable partnerships. *The Blueprint for change programme*. Retrieved from, http://www.novonordisk.com/ sustainability/how-we-manage/blueprints.asp. [Accessed 27 October, 2014].

Khan, S. H., & Anderson, G. F. (2011). *Burden of diabetes in Bangladesh: analysis and hope*, Paper presented at the 13th ASCON conference, Bangladesh, 236-253.

Loghmani, E. (2005). Diabetes mellitis: type 1 and type 2, In: S. J., & S. M., *Guidelines for Adolescent Nutrition Services*, pp. 167-182.

Lozano, R., Naghavi, M., & Foreman, K. (2012). Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the global burden of disease study. *The Lancet, Vol. 380*, No. 9859, pp. 2095–2128.

Marx, J. (2002). Unraveling the causes of diabetes. *The puzzle of complex diseases science, 296*(5568), 686-689.

Novo Nordisk (2012). *The Blueprint for Change Programme*. Novo Nordisk: Dhaka. Retrieved from, http://www.novonordisk.com/sustainability/how-we-manage/ blueprints.asp . [Accessed 19 October, 2014].

Rich, B. R. (1995). *Clarence Leonard (Kelly) Johnson 1910-1990: A Biographical Memoir*. National Academies Press, Washington (DC).

Shostack, G. L. (1984). Designing services that deliver. *Harvard Business Review, 62*(1), 133-139.

Strickland, P. A. O., Hudson, S. V., Piasecki, A., Hahn, K., Cohen, D., Orzano, A. J., Parchman, M. L., & Crabtree, B. F. (2010). Features of the chronic care model (CCM) associated with behavioral counseling and diabetes care in community primary care. *Journal of the American Board of Family Medicine, 23*, 295-305.

Standiford, C. J., Greenberg, G., & Harrison, R. V. (2013). UMHS management of type 2 diabetes mellitus. *Michigan Medicine*, University of Michigan.

Wagner, E. H., Austin, B. T., & Korff, M. V. (1996). Organizing Care for Patients with Chronic Illness. *The Milbank Quarterly, 74*(4), 511-544.

WEHAB Working Group, (2002). *A Framework for action on health and the environment*, Paper presented at the World summit on sustainable development, Johannesburg, South Africa 26 August - 4 September. Retrieved from, http://www.who.int/wssd/whocontrib/whoprep/en/. [Accessed 28 October, 2014].

Weininger, J. (2014). Nutritional Diseases. *Encyclopedia Britanica*, Retrieved from, https://www.britannica.com/science/nutritional-disease. [Accessed 27 October, 2014].

Wild, S., Roglic, G., Green, A., Sicref, R., & King, H. (2004). Global prevalence of diabetes: estimates for the year 2000 and projections for 2030, *Diabetes Care, 27*(5), 1047-1053.

D.U. Journal of Marketing, Vol. 18, June, 2015 and Vol. 19, June, 2016

INFLUENCE OF POLITICAL MARKETING ON VOTING INTENTION: AN EMPIRICAL INVESTIGATION

Muhammad Intisar Alam[1]
Farzana Riva[2]

Abstract**:** *When a discussion is going on whether marketing should be broadened to new areas, the present study focuses on one such area, namely aspects of political marketing in the context of Bangladesh. Given that every politician wants to win votes in the election, the concepts of marketing, such as leadership, media, media campaign, promotional strategy, celebrity endorsement, etc. can be applied in order to meet the voters' political needs, and thus creating their favorable voting intention. Following a survey of the students of the Faculty of Business Studies, University Dhaka, it is found that the political marketing factors are determinants of voting intention, as supported by the coefficient of multiple determination, which is .686, implying that such factors explain 68.6% of variability in the voting intention. Intelligent application of political marketing may help a lot to maintain sound politics for both the political parties and the electorate.*

Keywords: *Political Marketing, Voting Intention, Political Leader, Media Campaign, Celebrity Endorsement, Opinion Leader.*

INTRODUCTION

The businesses that are using marketing wisely have a substantial lead in terms of profitability. They are able to get their needed resources to utilize the resources and to predict the outcome of their activities. The success of business organizations due to the proper application of marketing has led the politicians to think about the intelligent application of marketing in politics as well (Jones, 1995). Political marketing process perhaps can help the politicians to get their desired result in the election. However, different difficulties, such as distrust from the voters, not to go to cast their votes, etc. are being faced by the politicians. It is a new phenomenon for which political parties are in great trouble.

---

[1] Assistant Professor, Department of Marketing, Faculty of Business Studies, University of Dhaka.

[2] Lecturer, Department of Marketing, Faculty of Business Studies, Bangladesh University of Professionals.

Political polls found that political marketing can systematically deal with the problem of the politicians. In most of the political surveys, a substantial number of voters report that they did not form any clear voting preference for candidates. Even a few months prior to the election, 20% or more voters in France remain uncertain about their voting decision (Mannheimer, 2003). For example, even 7 days before the general election of 2001, ten percent of the voters in Italy were uncertain regarding their voting decision (La Repubblica, 2006). Political marketing can help politicians to get votes even from such undecided voters.

The success of the politicians now largely depends on the application of political marketing and proper planning of campaigns. If marketing communication tools are not effectively applied by politicians, their messages may not reach the target voters. An intelligent application of political marketing may bring the success of politicians through influencing voters' intention. The ultimate success of politicians depends on information gathering, organization of the parties, selection of the policies, competition, voting group determination, party positioning, voter group targeting, and post-election analysis (Lees-Marshment, 2001; Wring, 1997). The best experiences of political marketing practiced across countries can be adopted in Bangladesh. Owing to the absence of substantial research in the area of political marketing in Bangladesh led us to conduct this study aiming at achieving the following objectives:

OBJECTIVES

1. To identify the factors of political marketing that is relevant in the present political scenario of Bangladesh.
2. To assess the relative importance of the factors of political marketing in influencing the voting intention.

LITERATURE REVIEW

Whether or not the significance of political marketing has been acknowledged in academic literature, it is undeniable that marketing strategies and tactics play a fundamental role in the field of politics across the developed world (Savingy, 2011). Marketing that is designed to influence voters about political issues, particular candidates for public office or public issues is known as political marketing (Shama, 1975). The success of political parties depends on party organization, political communication and marketing approaches used by the politicians (Chrysa, 2008). Marketing may help political parties to address diverse voters' concerns and needs through marketing analysis, planning, implementation and control of political and electoral campaigns (O'Cass, 1996). Now it is attempted to identify the dependent and independent variables to serve the purpose of the study following the existing literature.

Identification of the Dependent Variable

Elections are in many ways marketing contests with outcomes heavily influenced by the marketing efforts of candidates and the associated political parties; that is, the voting behavior or voting intention of the voters (Brattonet, Bhavnani, & Chen, 2012). Nowadays politicians are becoming more concerned about the decision of the voters and are interested to know their voting intention (Shiveshivkaner, 2014). Recent studies of political marketing are giving more focus on studying the voting intention of the voters, which is the proxy of voting behavior (Milewicz, 2014; Hobolt, 2016). Furthermore, the justification of selecting the voting intention as the dependent variable will be clearer from the identification of the independent variables as below:

Identification of Independent Variables

Now it remains to find the appropriate independent variables to explain the dependent variable stipulated in the foregoing. In fact, fifteen such variables have been identified based on the existing literature, specifically ten studies, the discussions of which follow:

1. Dey and Eric found in 1997 that there were three main sources of influence that shaped political orientation for the voters which created long-term effects. First, the primary influence originates from the family. Children often adopt their parents' ideological values. Second, teachers and other educational authority figures have significant impact on political orientation. Third, peers also affect political orientation. Generally, voters like to take suggestions from these three groups while taking voting decision. Accordingly 'suggestion from others' is selected as the first independent variable.
2. When Africans think about their voting choices, they consider many factors, such as public policy proposed by the politicians prior to the next election and whether there is a consistency between past performance of the party and accepted public policy (Brattonet, Bhavnani, & Chen, 2012). As such, 'future public policy' is taken as the second independent variable.
3. Nownes (2012) postulates that political activities carried out by the family members and celebrities, are very likely to influence citizens' views of political parties. He further adds that it is possible that voters can take suggestions in casting votes from their family members, which, in turn, depends on their family ideology and the celebrity, who is preferred to the voters, can be used as endorser for a party and candidate to draw votes. These lead us to consider the third and fourth predictors: 'family ideology' and 'celebrity endorsement'.
4. In his study, Shann (2013) concluded that certain variables have significant effects on voting intention, such as consistent public policy, positive

impression about candidate and party, political communication, perceived usefulness of voting, response involvement, and perceived difference between the parties and political trust. From these variables, the first two are considered: 'consistent public policy' and 'party impression'.

5. The complexity of building a political brand leads to think about a proper combination of leadership, image, logo and values that can contribute to a compelling brand narrative and leads to voting decision (Ormrod, Henneberg, & O'Shaughnessy, 2013). From this study, 'leader preference' has been taken as a predictor.

6. The success of a political candidate largely depends on the support from the entire party and party leaders. Party leaders communicate future performance of the party (Krupnikov, 2014). In this regard, 'party support' and 'party performance' both are selected as explanatory variables.

7. Faragg and Shamma (2014) found that many aspects are considered by a political party or candidate which can have influence on voting decision of the electorate. Voters who are interested to cast vote for a particular party or candidate often seek information about the past performance of the candidate, party image and proposed public policy for the next election. Based on this study 'seeking information' has been taken as another predictor of voting intention.

8. In political marketing theory, a political candidate is viewed as a political brand that needs to be repositioned when it is no longer working and the branding of candidates and parties are all interdependent (Milewicz, 2014). This induces to comprehend that the relevant explanatory variable is likely to be 'candidate's personality' in this case.

9. According to Durante and Gutierrez (2014), appropriate selection of media campaigning and effective promotional strategy can result in increased positive attitude of voters towards the political party and candidates. The brand image of a political party or candidate may provide a consistent narrative where voters feel a sense of warmth and belongingness that can be achieved by 'two way communications' between the political parties and the voters. Therefore, three predictors, namely 'media campaigning', 'promotional strategy' and 'two way communication' have been taken as predictors in view of this study.

10. If the proposed public policy is accepted by the voters and if it can give indication about what is going to be done by the party, it can influence the voting behavior of the electorate. Since voters take suggestions from near and dear ones before taking voting decision, appropriate 'public policy propagation' can influence the voters' attitude leading to create voting intention (Hobolt, 2016).

Overall fifteen independent variables have been identified: suggestion from others, future public policy, family ideology, celebrity endorsement, consistent public policy, party impression, leader preference, party support, party performance, seeking information, candidate's personality, media campaigning, promotional strategy, two-way communication, and public policy propagation.

METHODOLOGY

A descriptive research design is adopted in this study. The methodology focuses on survey questionnaire, sample design and statistical analysis.

First, the variables are measured by using the 5-point Likert scale anchored by: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. A structured questionnaire was developed and pretested based on a sample of respondents drawn from the target population. The target population comprises of about 11025 students of the Faculty of Business Studies (FBS), University of Dhaka belonging to nine departments, which are considered as the sampling units. The samples are drawn following stratified random sampling.

Second, considering 95% significance level ($z = 1.96$), 5% sampling error ($e = \pm .5$), and equal proportion in population ($p = q = .5$), the sample size turns out to be 385. The questionnaire was administered to the selected samples through personal interview. After screening out the incomplete and inconsistent questionnaires, 330 were retained for analysis.

Third, initially a multiple regression analysis was planned considering fifteen independent variables to explain the dependent variable (voting intention) identified in the literature review. Owing to the presence of multicollinearity among the independent variables, factor analysis was undertaken succeeded by conducting multiple regression analysis using the extracted factors as explanatory variables.

DATA ANALYSIS AND FINDINGS

The data analyses focus on the tests of multicollinearity, factor analysis succeeded by multiple regression analysis.

Multicollinearity Tests

The multicollinearity tests include analyses of correlation matrix, variance inflation factor (VIF), KMO statistic and Bartlett's test of sphericity.

Correlation Matrix: The matrix containing the correlation coefficients among the pairs of fifteen independent variables, along with their levels of significance is presented in **Table 1**. Out of 115 unique correlation coefficients, 9 are significant within 5% level (marked by superscript 2), which also include 86

coefficients that are significant within 1% level (marked by superscript 1) implying the existence of multicollinearity.

Table 1: Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Seeking Information	1														
2. Future Public Policy	.222[1]	1													
3. Family Ideology	.334[1]	.371[1]	1												
4. Celebrity Endorsement	.298[1]	-.012	.280[1]	1											
5. Consistent Public Policy	.184[1]	.491[1]	.421[1]	-.006	1										
6. Party Impression	.359[1]	.507[1]	.406[1]	.124[2]	.477[1]	1									
7. Leader Preference	.226[1]	.298[1]	.208[1]	-.038	.403[1]	.408[1]	1								
8. Party Support	.270[1]	.305[1]	.348[1]	.136[2]	.378[1]	.277[1]	.357[1]	1							
9. Party Performance	.134[2]	.181[1]	.243[1]	-.124[2]	.281[1]	.381[1]	.583[1]	.218[1]	1						
10. Seeking Information	.289[1]	.582[1]	.308[1]	.032	.552[1]	.374[1]	.275[1]	.287[1]	.186[1]	1					
11. Candidate's Personality	.191[1]	.226[1]	.213[1]	-.060	.259[1]	.374[1]	.323[1]	.218[1]	.385[1]	.074	1				
12. Media Campaigning	.249[1]	.328[1]	.348[1]	.253[1]	.537[1]	.409[1]	.335[1]	.361[1]	.223[1]	.273[1]	.322[1]	1			
13. Promotional Strategy	.106	.230[1]	.313[1]	.350[1]	.321[1]	.116[2]	-.076	.105	-.133[2]	.208[1]	.010	.528[1]	1		
14. Two-way Communication	.248[1]	.253[1]	.527[1]	.436[1]	.454[1]	.207[1]	.164[1]	.202[1]	.128[2]	.351[1]	.148[1]	.425[1]	.492[1]	1	
15. Public Policy Propagation	.403[1]	.425[1]	.443[1]	.238[1]	.429[1]	.414[1]	.186[1]	.226[1]	.137[2]	.556[1]	.069	.294[1]	.323[1]	.406[1]	1

Source: SPSS Output

Variance Inflation Factor: A VIF value of 10 has been recommended as the maximum level of VIF (Hair et al., 1995). However, a recommended maximum value of 5 (Rogerson, 2001) and even 4 (Pan & Jackson, 2008) for multicollinearity is acceptable. Therefore, according to **Table 2**, the maximum value of VIF is 2.447 in case of consistent public policy, which is within the

accepted level of collinearity, unlike the results following multicollinearity test based on correlation matrix.

Table 2: Variance Inflation Factor

Variables	VIF
1. Suggestion from others	1.444
2. Future public policy	1.949
3. Family ideology	1.826
4. Celebrity endorsement	1.676
5. Consistent public policy	2.447
6. Party impression	2.026
7. Leader preference	1.900
8. Party support	1.410
9. Party performance	1.797
10. Seeking information	2.168
11. Candidate's personality	1.412
12. Media campaigning	2.221
13. Promotional strategy	2.001
14. Two-way communication	2.161
15. Public policy propagation	1.902

KMO Statistic and Bartlett's Test of Sphericity: From **Table 3**, it appears that the value of the KMO statistic is .821, which is far below the threshold value of .6 (i.e. >.6). Furthermore, the null hypothesis that the population correlation matrix is an identity matrix is rejected by the Bartlett's test of sphericity. So, multicollinearity problem exists and factor analysis appears to be an appropriate technique for analyzing the data.

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.821
Bartlett's Test of Sphericity	Approx. Chi-Square	1901.105
	Degrees of Freedom	105
	Significance	.000

Source: SPSS Output

Factor Analysis

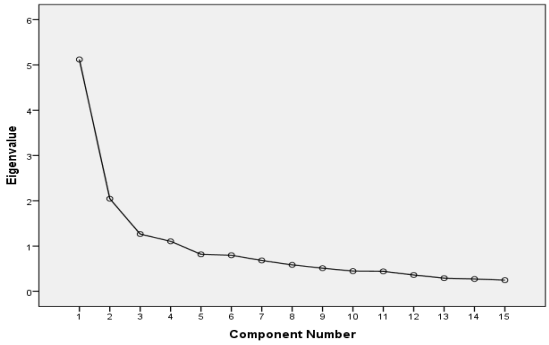
In this study, since the purpose of factor analysis is to extract the factors that will account for maximum variance in the data for use in the subsequent multiple regression analysis, the method of principal component analysis (PCA) is carried out. Now we focus on the determination of appropriate number and interpretation of the extracted factors.

Determination of Appropriate Number of Factors: The appropriate number of factors is determined based on eigenvalue criterion, percentage of variance explained and scree plot. First, as shown in **Table 4**, following the eigenvalue criterion, four factors can be retained because their eigenvalues are greater than one. Second, 4-factor solution explains 63.588% of the total variance, which is more than 60%. Third, the scree plot presented in **Figure 1** also supports that the number of factors will be four. So, 4-factor solution appears appropriate.

Table 4: Rotation Sums of Squared Loadings

Factors	Eigenvalues	% of Variance	Cumulative %
1	2.752	18.350	18.350
2	2.680	17.869	36.218
3	2.389	15.930	52.148
4	1.716	11.440	63.588

Figure 1: Scree Plot



Source: SPSS Output

Interpretation of the Factors: In this study, orthogonal rotation with varimax procedure has been utilized to transforming the complex factor matrix into a simpler one, which facilitates easy interpretation of the factors and use them in subsequent regression analysis as they are uncorrelated. The interpretation of the factors is facilitated by identifying the variables that have large loadings on the same factor.

In terms of **Table 5**, the first factor can be named as **public policy**, which is associated with four variables, viz. seeking information, future public policy, public policy propagation, and consistent public policy. Second factor can be termed **party and candidate attributes** relating to five variables: party performance, leader preference, candidate's personality, party impression, and party support. Third factor can be termed **election campaign** for the next election, which is associated with three variables, namely promotional strategy, media campaigning and two-way communications. Fourth factor can be labeled **opinion leaders** consisting of three control variables: suggestion from others, celebrity endorsement and family ideology.

Table 5: Rotated Component Matrix

Variables	Component/Factor			
	1 Public Policy	**2 Party and Candidate Attributes**	**3 Election Campaign**	**4 Opinion Leaders**
Seeking information	**.851**	.075	.109	.103
Future public policy	**.762**	.219	.153	.002
Public policy propagation	**.667**	.005	.197	.435
Consistent public policy	**.611**	.378	.448	.100
Party performance	.104	**.782**	.084	.018
Leader preference	.224	**.754**	.020	.060
Candidate's personality	.042	**.710**	.153	.002
Party impression	.460	**.523**	.099	.263
Party support	.242	**.428**	.185	.231
Promotional strategy	.166	.174	**.841**	.054
Media campaigning	.173	.414	**.713**	.051
Two- way communication	.221	.087	**.681**	.326
Suggestion from others	.236	.214	.035	**.768**
Celebrity endorsement	.169	.139	.447	**.700**
Family ideology	.322	.258	.399	**.434**

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Regression Analysis

From the forgoing section, it follows that conducting factor analysis is appropriate. Therefore, considering the extracted factors as the independent variables, a multiple regression can be run to explain the dependent variable (voting intention), which is specified as bellow:

$$Y= \beta 0 + \beta_1 F_1 + \beta_2 F_2 + \beta_3 F_3 + \beta_4 F_4 + e$$

Where, Y = Voting Intention
F_1 = Public policy
F_2 = Party and candidate attributes
F_3 = Election campaign
F_4 = Opinion leaders
e = Residual

Table 6 shows the results of multiple regression. The value of R^2 is .471, which is highly significant (p = .000), implying that about 47 percent variation in the dependent variable has been explained by the independent variables.

Table 6: Regression Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.
.686	.471	.464	.895	72.34	.000

a. Dependent Variable: Voting intention.
b. Predictors: (Constant), public policy, party and candidate attributes, election campaign and Opinion leaders.

Table 7 shows that all the multiple regression coefficients are highly significant (p=.000) to explain the voting intention. In terms of both unstandardized and standardized coefficients (b and *B*), in descending order of magnitude, are the factors: public policy, election campaign, opinion leaders, and party and candidate attributes.

Table 7: Variables in the Equation

Variables	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
	b		*B*		
(Constant)	3.96	.049		80.36	.000
Public Policy	.58	.049	.47	11.69	.000
Election Campaign	.37	.049	.30	7.45	.000
Opinion Leaders	.36	.049	.29	7.22	.000
Party and Candidate Attributes	.33	.049	.27	6.72	.000

a. Dependent Variable: Voting intention

DISCUSSION

As a solution to multicollinearity problem, the PCA-type factor analysis with the aid of orthogonal-varimax rotation, resulted in four factors: public policy, party and candidate attributes, election campaign and opinion leaders that explain 18.35%, 17.87%, 15.93%, and 11.44% variance in data respectively and cumulatively 63.59%.

Then these factors are used as predictors in explaining the dependent variable: voting intention. The value of R^2 (.471) and all multiple regression coefficients are found to be highly significant (p = .000). The relative importance of factors, in terms of standardized coefficients **(***B*s**),** in descending order of magnitude, are public policy, election campaign, opinion leaders, and party and candidate attributes, which correspond to .471, .301, .291 and .271 respectively. The discussion of the factors will be useful for comprehending the influence of political marketing on voters' intention.

First, 'public policy' is associated with four variables, viz. seeking information, future public policy, public policy propagation, and consistent public policy. In fact, these variables altogether refer to ensuring the **value proposition** that marketers give in terms of market offerings and combination of benefits, which, in turn, customers get. For voters, therefore, public policy serves as the value proposition, i.e. proposing future public policy prior to election and implementing it thereafter.

Second**,** 'election campaign' associated with three variables, namely promotional strategy, media campaigning, and two-way communication fundamentally are, in fact, **marketing communication** - means by which a political party, the leader and candidates inform, persuade and remind the voters (political customers) directly or indirectly to draw their support and 'pull' votes in their favor - which calls for planning an **integrated marketing communication** to yield added value of the election campaign.

Third, **opinion leaders** consisting of three control variables, namely suggestion from others, celebrity endorsement and family ideology remind one the importance and application of **reference groups** in marketing. In many purchase decisions, customers take suggestion and feedback from the opinion leaders. Thus the political customers also take suggestion and feedback from their near and dear ones before casting their votes for a particular candidate or party. Though **reference group** and **celebrity endorsement** are very important in the developing world (McKernan, 2011; Erdogan, 1999) it is not so to that extent in this study.

Fourth, 'party and candidate attributes' relating to five variables include: party performance, leader preference, candidate's personality, party impression, and party support. This implies these this factor will be effective, if the political party including the candidates can apply appropriate **branding strategy** through

including different **brand elements**, such as logo, monogram, image and the like **(**Kotler & Pfoertsch, 2010) and if a political party can brand itself, it can acquire **competitive advantage** over other parties. Party and candidate attributes pave the way not only for the immediate success, such as to win in the next election but it can also pave the ways to have **sustainable competitive advantage**.

In terms of 'voting intention' (dependent variable) of the electorate, this study has far reaching implications for the political parties and the politicians (election candidates) as well: a political party (and its candidates) can well understand the 'voter behavior' by intelligent application of the concepts/theories of **consumer behavior** meaningfully and can reap the resulting benefits in terms of influencing their voting intention.

Hence, a political party can propose a consistent and believable **election manifesto** including issues like public policy (first factor**)** and organize the **election campaign** (second factor) through IMC (integrated marketing communication) to promote its candidates who possess credible personality with leadership quality and are liked by voters (fourth factor**)** endorsed by **opinion leaders** (third factor) to drive votes in their favor.

CONCLUSION

The nature of politics and behavior of political customers (voters) are continuously changing, in which political parties as well as politicians (election candidates) can cope with such changing circumstances by 'positioning' or even 'repositioning' through adopting the political marketing concepts and practices and implementing those effectively. Certainly, some limitations exist in this study like those prevailing in any other empirical works.

First, the survey was carried out based on a sample drawn from the students of the nine departments of Business Faculty, Dhaka University. In general, they are aware of the politics in Bangladesh. However, they possess certain level of education, belong to particular age group, and are exposed to urban locality/environment (Dhaka city). So, the results of this study may be negated and misrepresent the true political scenario in Bangladesh. Therefore, future research calls for covering different cross-sections of people (voters) in terms of age, education, locality (urban-rural), and region including gender representation and the like.

Second, this research is of descriptive (cross-sectional) nature in which data were gathered during a short period time just for one time. So, it suffers from not being able to tracking how the voting intention of the electorate may change due to changes in the underlying factors (e.g. implementation of the proposed public policy, etc.). So, a political party as an organization and/or a politician as an individual might undertake longitudinal research to visualize the vivid illustration of the situation. Furthermore, casual research may also be conducted to

determine the nature of relationship between possible causal variables (factors) and the effect variable (e.g. voting intention) to predict the latter under controlled condition.

REFERENCES

Brattonet, M., Bhavnani, R., & Chen, T.H. (2012). Voting intentions in Africa: ethnic, economic or partisan? *Commonwealth & Comparative Politics*, *50*(1), 27-52.

Chrysa, L. (2008). The Party Evolution Model: An Integrated Approach to Party Organization and Political Communication. *Journal of Politics, 28*(2),103-111.

Durante, R., & Gutierrez, E. (2014). Political advertising and voting intentions: Evidence from exogenous variation in ads viewership. *Working paper, Science Po*, Paris.

Dey & Eric, L. (1997). Undergraduate Political Attitudes: Peer Influences in Changing Social Contexts. *Journal of Higher Education,*68.

Erdogan, B.Z. (1999). Celebrity endorsement: a literature review. *Journal of Marketing Management*, *15*(4), 291-314.

Faragg, A. R., & Shamma, H. (2014). Factors influencing voting intentions for Egyptian parliament elections 2011. *Journal of Islamic Marketing,* Vol. *5* (1), 49 – 70.

Hair, J.F. et al., (1995). *Multivariate data analyses with readings*. Englewood Cliffs, New Jersey.

Hobolt, S.B. (2016). The Brexit vote: a divided nation, a divided continent. *Journal of European Public Policy*, *23*(9), 1259-1277.

Jones, N. (1995*). Soundbites and Spin Doctors: How politicians manipulate the media and vice versa*, London: Cassell.

Kotler, P., & Pfoertsch, W. (2010). Ingredient branding: making the invisible visible. *Springer Science & Business Media*.

Krupnikov, (2014). How Negativity Can Increase and Decrease Voter Turnout: The Effect of Timing. *Journal of Political Communication, 31*(3).

La Repubblica, P. (2006). Le intenzioni di voto ai Partiti Il trend di marzo. Retrieved from, http://www.repubblica.it/speciale/2006/elezioni_sondaggi/ index.html.

Lees-Marshment, J. (2001). The marriage of politics and marketing. *Political Studies*, *49*(4), 22-29.

Mannheimer, R. (2003). *Gli italiani e la politica. 2002–2003.* Consensi e delusioni. Milano: Bompiani.

McKernan, B. (2011). Politics and celebrity: A sociological understanding. *Sociology Compass*, *5*(3), 190–202.

Milewicz, C. M. (2014). The Branding of Candidates and Parties: The US News Media and the Legitimization of a New Political Term. *Journal of Political Marketing*, *13*(4), 233-263.

Nownes, J. (2012). An Experimental Investigation of the Effects of Celebrity Support for Political Parties in the United States. *American Politics Research, 40* (3), 476-500.

O'Cass, C. (1996). Political marketing and the marketing concept. *European Journal of Marketing*, 30(10/11), 37-53.

Ormrod, R.P., Henneberg, S., & O'Shaughnessy, N.J. (2013). POLITICAL MARKETING. THEORY AND CONCEPTS. *Politics*, *26*(2), 110-118.

Reed, A. (2011). Activating the self-importance of consumer selves: exploring identity salience effects on judgements. *Journal of Consumer Research*, *31*, 286-95.

Rogerson, P. A. (2001). Monitoring point patterns for the development of space-time clusters. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, *164*(1), 87-96.

Pan, Y., & Jackson, R. T. (2008). Ethnic difference in the relationship between acute inflammation and serum ferritin in US adult males. *Epidemiology & Infection*, *136*(3), 421-431.

Savigny, H. (2011). Focus groups and political marketing: Science and democracy as Axiomatic? *British Journal of Politics & International Relations*, *9*(1), 122.

Shama, A. (1975). The marketing of political candidates. *Journal of the Academy of Marketing Science*, *4* (4), 767-77.

Shann, A. (2013). The limited capacity model of mediated message processing by voters. *Journal of Communication*, *50*(1), 46-70.

Shiveshivankar, J. (2014). Political marketing and professionalized campaigning, A conceptual analysis. *Journal of Political Marketing*, *6* (2-3), 49-69.

Wring, D. (1997). Reconciling marketing with political science: theories of political marketing. *Proceedings from the Academy of Marketing Conference*, Manchester Metropolitan University, Manchester.

D.U. Journal of Marketing, Vol. 18, June, 2015 and Vol. 19, June, 2016

DETERMINANTS OF WORTHINESS OF MOBILE APPS USAGE

Shahidur Rahman Khan[1]

Abstract: *The worthiness of the use of mobile apps often varies according to the multifaceted value of its determinants. In the prevailing condition, it is necessary to understand the actual worthiness of mobile apps to its users. The study identifies the determinants and assesses their effects on the worthiness of mobile apps usage. Data were collected from 162 randomly selected samples. Based on the qualitative study (expert survey) and literature review, nine independent variables were identified to run a multiple regression considering the worthiness of the mobile apps usage as the dependent variable. Owing to the presence of multicollinearity among the independent variables, factor analysis is conducted and then the extracted factors are considered as the predictors. However, as factors could not be interpreted meaningfully, four surrogate variables are taken as determinants of the dependent variable to run the multiple regression. The findings suggest that entertainment and information are the key predictors to shape the worthiness of mobile apps' usage.*

Keywords: *Determinants of Worthiness of Apps, Social Influence, Entertainment, Social Media, Online Shopping, Reachability.*

INTRODUCTION

Mobile devices and apps have become an integral part of our life. One can use mobile apps to fulfill the immediate needs and access specific information (Forbes, 2010). Most people are different in life style, habit and engagement. A significant portion of our population has adapted themselves with the mobile technology from their positive perceptions (Rivera, Gregory, & Cobos, 2015). Particularly, the young generation is marked by the increased use and familiarity. They are interested in new and improved features of mobile apps as they use those in their way of life. Determinants of worthiness are the elements that identify or determine its outcome through many factors which may generate problems before reaching a result (Erasmus, Boshoff, & Roussea, 2001). In case of mobile apps, identifying the determinants is useful to assess the level of worthiness to its users.

This study first identifies the independent variables based on the existing literatures and expert surveys to develop the relationship with the dependent

[1] Assistant Professor, Department of Business Administration, Royal University of Dhaka.

variable, namely worthiness of mobile apps' usage. Accordingly multiple regression analysis was conducted. Owing to the presence of multicollinearity among the independent variables, factor analysis is conducted. However, the extracted factors could not be configured and interpreted meaningfully. So, finally a multiple regression analysis is carried out using surrogate variables as the determinants of the dependent variable.

LITERATURE REVIEW

This literature review focuses on mobile apps and their growth, the worthiness of mobile apps usage (dependent variable), and the identification of independent variables.

Mobile Apps and Growth: The word "app" is the abbreviation of 'application software'. Mobile apps are the applications developed for small handheld devices, such as mobile phones, smartphones, PDAs (Personal Digital Assistants) and so on (Viswanathan, 2016). Usually, such apps are downloaded from the platform to a target device (Siegler, 2008). As of June 2015, more than 100 billion mobile apps were downloaded from the Apple App Store (Statista, 2015). At present the most popular app categories include gaming, entertainment and education. Besides, many of the popular mobile properties are mainly accessed via mobile apps instead of mobile browsers. According to the Statista (2014), the number of mobile app buyers in the United States was projected to reach 85 million in 2019. However, in Bangladesh, a study identified that 89.6% of the users prefer to download the apps that are free of charge (Ahmed, Abdullah, Palit, & Rokonuzzaman, 2015).

In Bangladesh, it has been observed that people mostly use apps to get access to social media and email. Utility and productivity based apps like ride hailing services and food delivery services are also more frequently used (Rahman, 2017). Moreover, banks are using apps with advanced features in Bangladesh. Many people are using social apps to keep tight connection with others (Hsiao, Chang, & Tang, 2016). Besides, most of the organizations at this moment are spending on mobile apps to create customer engagement through online advertising, social media messaging, upgrade ratings and purchasing history (Dinner, Heerde, & Neslin, 2015). From the organizational point of view, Morosan and DeFranco (2016) advised to include personalization, privacy, and involvement in mobile apps as these are of great worth to the users.

Worthiness of Mobile Apps: Worthiness is the quality or state of having merit or value; in a word it is suitability. Psychologist Ellis (2014) says worthiness is directly connected with our future and ongoing success in the world and infinite conditions dictate worthiness depending on environment, culture, religion and society. Mobile apps are different applications software for smartphone. The worthiness has been used for identifying the value level of software in the past

(Tang & Kazman, 2011). For this study, the dependent variable is 'worthiness of mobile apps' usage'. Now it is attempted to identify the independent variables (predictors).

Identification of Independent Variables: The consumer makes a choice from more than one option of goods or services. Consumer decision making concerns how consumer makes the decision between those alternatives (Peter & Olson, 1999). Consumer decision making process can focus on cognitive process for mobile apps as it is stated by Penn State (2014). The characteristics of consumer cognitive behavior are understanding, experience, knowledge and studious decision making and these characteristics are the reasons as to why someone actually buys a particular product (Trandafilovic, Pasic, & Perunovic, 2013).

Table 1 presents a summary of literature review for identifying the independent variables for explaining the worthiness of mobile apps' usage. In this table, the first column indicates the title of the studies along with the names of the respective author(s) and the year of publication. The second and the third columns show the variables used in those studies and the corresponding selected variables for the present study respectively. Overall, the variables selected for this study include usefulness, online shopping, social media, reachability, information, entertainment, habit, social influence and convenience.

Table 1: Literature Review for Identifying Independent Variables

Title, Author(s), Year	Variables Used in the Study/Paper	Selected Variables
1. Bon Appétite for Apps: Young American Consumers' Acceptance of Mobile Applications (Yang, 2013).	Consumers' acceptance of mobile applications depends on usefulness, enjoyment, income, gender, etc. Among these, usefulness is found significant and relevant for this study. So, it is selected as an independent variable for this study.	1. Usefulness
2. Five Interesting Facts About Millennials' Mobile App Usage (The 2017 U.S. Mobile App Report) (Lipsman, 2017).	It is indicated that millennials want mobile apps for online shopping, using social media, reachability and price. Price is not found significant in that study while other variables are. So, first three variables are considered.	2. Online Shopping 3. Social Media 4. Reachability
3. Interactive Media Usage among Millennial Consumers (Moore, 2012).	Millennials use interactive media for information and entertainment and the organizations must be aware of it as they are more likely to purchase online than their previous generations.	5. Information 6. Entertainment

Title, Author(s), Year	Variables Used in the Study/Paper	Selected Variables
4. What Catalyzes Mobile Apps Usage Intention: an Empirical Analysis (Hew, Lee, Ooi, & Wei, 2011).	Customers' need and intention are impacted by effort expectancy, hedonic motivation, habit, etc.. Since habit is reported to have the strongest influence on customer purchase intention, it is taken as an independent variable.	7. Habit
5. Students' Dependence on Smartphones and its Effect on Purchasing Behavior (Arif, Aslam, & Ali, 2016).	Purchasing behavior of students are influenced by social need, social influence and convenience. The social influence and convenience are likely to be more relevant to shape the purchasing behavior of the students.	8. Social Influence 9. Convenience

OBJECTIVES

1. To identify the determinants of worthiness of mobile apps usage.
2. To measure the extent of influence of the determinants to increase the worthiness of mobile apps' usage.
3. To find implications of the results of the study for managerial decisions.

METHODOLOGY

This study has followed a 'mixed strategy' of conducting both qualitative (exploratory) and quantitative research (study).

Qualitative Study

The exploratory phase of the study is undertaken by conducting an expert survey following a semi-structured questionnaire (guidelines). In this phase, interviews with eight industry experts were carried out to get insights and understanding of the worthiness of mobile apps' usage (dependent variable) and its predictor variables. The experts that were interviewed personally by the researcher include marketing and IT professionals. The expert opinions were also drawn in for identifying the relevant predictor variables of the dependent variable in the context of Bangladesh.

Quantitative Study

The qualitative part of the research is descriptive in nature. The methodology for conducting quantitative research includes measurement of variables, survey instrument, and target population, sampling and sample size and statistical analysis.

Measurement of Variables: The dependent variable (worthiness of mobile apps's usage) and 9 independent variables (usefulness, online shopping, social media, reachability, information, entertainment, habit, social influence and convenience) are measured using 9-point Likert scale as adopted in a study (Cheung, Lee, & Jin, 2011) on online customers. The response categories for each statement relating to 12 variables (dependent and independent) are: 1 = Extremely Disagree, 2 = Strongly Disagree, 3 = Disagree, 4 = Somewhat Disagree, 5 = Neutral, 6 = Somewhat Agree, 7 = Agree, 8 = Strongly Agree, and 9 = Extremely Agree.

Survey Instrument: A draft questionnaire was pretested aimed at making it error free. Then it was finalized and administered personally to carry out the survey during a period of two weeks for collecting data.

Sampling and Sample Size: The target population is comprised of the students of the Faculty of Business, Royal University of Dhaka. Following (Cochran, 1963) and assuming an error of +/- 5%, (e = 0.05), confidence level of 95% (z = 1.96) and the proportion of mobile apps' users in the universe to be 10% (i.e. p = .10 and q= .90), the sample size turned out to be 139. However, the questionnaire was administered to 170 students through personal interview. After rejecting 10 questionnaires as they were incomplete and/or contained inconsistent data, 160 valid questionnaires were retained for carrying out the survey.

Statistical Analysis: Initially multiple regression analysis was planned. Owing to multicollinearity problem, however, factor analysis was conducted and then four extracted factors were considered as the determinants (predictors) of the dependent variable. Since all these factors could not be given appropriate meaning, surrogate variables were used as the determinants (predictors) of the dependent variable.

RESULTS AND FINDINGS

This section comprises of tests of multicollinearity succeeded by factor analysis and multiple regression analysis.

Tests for Multicollinearity

First, the regression of the worthiness of mobile apps (dependable variable) was run on the eleven independent variables identified in the literature review. Since multicollinearity (i.e. high inter-correlations among independent variables) makes the estimated multiple regression coefficients unstable and standard errors of the coefficients wildly inflated (Gregory, 2017), the results were subjected to tests for multicollinearity that include the analyses of correlation matrix, variance inflation factor (VIF), value of Kaiser Meyer Olkin (KMO) statistic and Bartlett's test of sphericity.

Correlation Matrix: The lower triangular correlation matrix (**Table 2**) contains 36 unique correlation coefficients between pairs of nine independent variables. Furthermore, the table indicates the values at which the coefficients are significant: five coefficients are significant within 1% level (marked with [1]) and four coefficients are significant between 1-5% levels (marked with [2]). These imply the presence of multicollinearity in 25% cases (i.e. 9 out of 36).

Table 2: Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9
1. Usefulness	1								
2. Online Shopping	.110	1							
3. Social Media	.206[1]	-.032	1						
4. Reachability	-.102	-.037	.050	1					
5. Information	-.190[2]	.143	-.156[2]	-.139	1				
6. Entertainment	-.086	-.053	.072	.752[1]	-.084	1			
7. Habit	-.020	-.075	.108	.771[1]	-.148	.917[1]	1		
8. Social Influence	.031	.040	.109	-.018	.332[1]	.099	.081	1	
9. Convenience	.001	.189[2]	-.186[2]	-.016	.024	.054	.008	.019	1

Source: SPSS Output

Variance Inflation Factor: A crucial disagreement exists in the literatures regarding the value of the Variance Inflation Factor (VIF) associated with a variable to be used as the threshold for its collinearity with other variables in a model. However, the commonly recommended threshold values are 3.0, 3.5 and 10 (Kock & Lynn, 2012). In other words, a VIF value less than 3.3 indicates no collinearity, a VIF value between 3.3 and less than 5 implies the minimum level of collinearity, a VIF value equaling to 5 but less than 10 means medium level of collinearity, and a VIF value equal to 10 and more indicates high level of collinearity. **Table 3** indicates that entertainment and habit have medium and high levels of collinearity but the remaining variables (seven) are not collinear with other variables. Overall, the VIF measure of collinearity is not very much indicative of the presence of multicollinearity.

Table 3: Variance Inflation Factor Test

Variables	Collinearity Statistics	Level of Collinearity
	VIF	
1. Usefulness	1.105	No
2. Online Shopping	1.095	No
3. Social Media	1.116	No
4. Reachability	2.537	No
5. Information	1.389	No
6. Entertainment	9.490	Medium
7. Habit	10.865	High
8. Social Influence	1.407	No
9. Convenience	1.089	No

Source: SPSS Output

KMO and Bartlett's Test: The KMO statistic measures the suitability of data for conducting factor analysis with the sampling adequacy for each variable in the model and for the complete model (Stephanie, 2016). Kaiser (1974) recommended KMO value of 0.5 or more as the minimum acceptable value for sampling adequacy. **Table 4** demonstrates that the KMO statistic is 0.645, which means sampling is adequate with lower proportion of variance and the model is suitable for conducting factor analysis. Furthermore, the table shows that Bartlett's statistic of sphericity, an indication of the strength of the relationship among the independent variables, is highly significant ($p = 0.000$) implying that correlation matrix is not an identity matrix, i.e. the presence of multicollinearity. Therefore, overall the factor analysis appears to be appropriate in our case.

Table 4: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.645
Bartlett's Test of Sphericity	Approx. Chi-Square	574.421
	Degrees of freedom	36
	Significance	.000

Source: SPSS Output

Factor Analysis

The method of principal component analysis (PCA) was utilized to conduct factor analysis for use in the subsequent multivariate analysis (i.e. regression in our case). Now the discussion follows to determine the appropriate number and interpretation of the extracted factors.

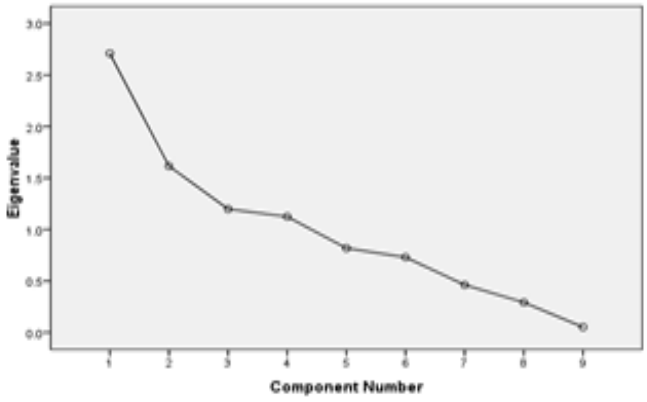
Determination of the Number of Factors

In order to determine the appropriate number of factors, the analyses of eigenvalues, percentage of variance explained and scree plot are undertaken. **Table 5** shows that the eigenvalue associated with the first four factors are greater than 1 (i.e. 2.709, 1.615, 1.198 and 1.124) and that these four factors explain more than 73% of the total variance cumulatively implying that the appropriate number of factors should be four. Furthermore, the scree plot (**Figure 1**) also reinforces that the 4-factor solution is appropriate.

Table 5: Extraction Sums of Squared Loadings

Factors	Eigenvalues	% of Variance	Cumulative %
1	2.709	30.104	30.104
2	1.615	17.950	48.054
3	1.198	13.310	61.364
4	1.124	12.489	73.853
5	.818	9.090	82.943
6	.730	8.111	91.054
7	.461	5.128	96.181
8	.292	3.240	99.421
9	.052	.579	100.000

Figure 1: Scree Plot



Interpretation of Factors

In view of the rotated factor matrix (**Table 6)**, it follows that the last two factors can be given meaningful configurations but not the first two. For example, Factor 3 is highly related to two variables, namely 'usefulness' and 'social media' with factor loadings .782 and .689 respectively, which can be labeled fulfilling **social need**. Factor 4 has high coefficients for 'convenience' and 'online shopping' (.798 and .673). So, it might be termed **easy shopping**. On the contrary, Factor 1 has high coefficients for variables, 'entertainment' 'habit' and 'reachability', each of which is different from others. So, unfortunately they cannot be given a name in a meaningful fashion. Similarly Factor 2 has high coefficients for two variables: 'information' and 'social influence' but they are quite different in nature, and therefore cannot be labeled.

However, a multiple regression was run considering these four factors as predictors and the R^2 was found to be 0.246, which is very low. Accordingly, it called for using surrogate variables as predictors in running the said regression as the 'last resort'.

Table 6: Rotated Factor Matrix

Variables	Principal Components (Factors)			
	1	**2**	**3**	**4**
Entertainment	**.965**	-.026	.071	-.010
Habit	**.957**	.018	.013	.023
Reachability	**.874**	-.074	-.036	-.036
Information	-.132	**.866**	-.123	.054
Social Influence	.061	**.821**	.224	.019
Usefulness	-.081	-.085	**.782**	.231
Social Media	.138	.198	**.689**	-.243
Convenience	.121	-.075	-.175	**.798**
Online Shopping	-.133	.169	.221	**.673**

Selection of Surrogate Variables

Selection of substitute or surrogate variables involves singling out some of the original variables for use in the multiple regression analysis, which helps interpretation of the results in terms of the original variables (Malhotra & Dash, 2011). The selection of surrogate variables is based on associated factor loadings and theory (prior knowledge).

In **Table 6**, 'entertainment', 'habit' and 'reachability' have factor loadings .965, .957 and .874 respectively on Factor 1. Since **entertainment** has the highest

loading and it appears to be more important variable than the other two (habit and reachability), as the determinant of worthiness of mobile apps, it can be selected as the surrogate variable for Factor 1.

Associated with Factor 2, 'information' possesses the higher loading than 'social influence' (.866 versus .821) and it appears to be more appropriate based on literature, **information** can be selected as a surrogate variable for Factor 2.

The choice of surrogate variable for Factor 3 is not straightforward. The variable 'usefulness' carries higher loading than does 'social media' (.782 versus .689). Therefore, the former is likely to be the candidate for surrogate variable but following the prior knowledge, 'social media' appears to be more important determinant than 'usefulness'. As such, **social media** can be selected as the surrogate for Factor 3.

Lastly, for Factor 4, 'convenience' has higher loading than 'online shopping' (.798 versus.673) and the former seems to be more important determinant of mobile apps usage based on literature. So, **convenience** is chosen as the surrogate variable for Factor 4.

Hence the four selected surrogate variables are entertainment, information, social media and convenience, which lead us to run the regression.

Regression Analysis

Now the multiple regression model can be specified involving four surrogate variables as the determinants of the dependent variable stipulated in the foregoing as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Where, Y = Worthiness of Mobile Apps Usage

X_1 = Entertainment

X_2 = Information

X_3 = Social Media

X_4 = Convenience

β_0 = Constant

β_i = Coefficient associated with i^{th} surrogate variable

e = Error term

Table 7 demonstrates the model summary of the multiple regression in explaining the worthiness of mobile apps usage. The value of R^2 is 0.268, which is highly significant (p = 0.000) indicating that the predictors explain 26.8% of the variability in the dependent variable.

Table 7: Multiple Regression Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig.
.517	.268	.249	2.281	.000

Source: SPSS Output

In **Table 8,** particularly in terms of standardized coefficients, it appears that only entertainment and information are highly significant (p = .000) while other two variables are not. Finally, it is noteworthy that there has been improvement in adjusted R^2 from .246 to .268 due to using surrogate variables instead of using factors as predictors.

Table 8: Multiple Regression Results

Variables	Unstandardized Coefficients	Standard Error	Standardized Coefficients	t	Sig.
	b		*B*		
(Constant)	-.881	1.355		-.650	.517
1. Entertainment	.524	.079	.466	6.653	.000
2. Information	.393	.104	.260	3.764	.000
3. Social Media	.064	.111	.040	.578	.564
4. Convenience	-.011	.118	-.006	-.089	.929

Dependent Variable: Worthiness of Mobile Apps Usage
Source: SPSS Output

CONCLUSION

The study identified nine independent variables to explain the worthiness of mobile apps usage (dependent variable) by undertaking a multiple regression analysis. Owing to the presence of multicollinearity problem, factor analysis is conducted. Four factors are extracted using PCA that explain 22.34% of the total

variance. These factors are used as independent variables of the dependent variable, which resulted in R^2 of only .246. Again the two factors could not be given meaningful names, which necessitated considering surrogate variables as the explanatory variables that yielded a relatively higher R^2 of .268, which, however, can be accepted given that R^2 is one of the several things one may pay attention to justify a model's fit with data and that R^2 value should be 0.10 or more in order for the variance explained of the dependent variable to be deemed adequate (Falk & Miller, 1992).

One limitation of this study, as the researcher perceives, is that the R^2 has turned out to be low, possibly due to the failure in identifying the underpinning determinants of worthiness of mobile apps usage. Such determinants have not been precisely measured, and/or the respondents may not have recognized the value of mobile apps for which their inputs in terms of providing information, while filling in survey questionnaire, has not been done correctly. Whatever might be the underlying reasons they entail opportunities for conducting further research.

Following the findings of the study, app developers, young entrepreneurs and digital marketers can emphasize increasing entertainment aspects and disseminating more information in order to increase the worthiness of mobile apps' usage, which might touch the lives of millions of people, particularly the young generation in the quest of developing mobile apps.

REFERENCES

Ahmed, S., Abdullah, Z., Palit, R., & Rokonuzzaman. (2015). A study of mobile application usage. *SSRG International Journal of Computer Science and Engineering*, *2* (4), 7-19.

Arif, I., Aslam, W., & Ali, M. (2016). Students' dependence on smartphones and its effect on purchasing behavior. *South Asian Journal of Global Business Research*, *5* (2), 285-302.

Cheung, C., Lee, M., & Jin, X. (2011). Customer engagement in an online social platform: A conceptual model and scale development. *Semantic Scholar*, 1-8. Retrieved from, https://pdfs.semanticscholar. org/2aae/ 7fddcf1e2f3e85d 2c526e73638ceca0a48f7.pdf [Accessed 13 May, 2016].

Cochran, W. G. (1963). *Sampling techniques* (2nd ed.). New York, NY: John Wiley and Sons, Inc.

Dinner, I. M., Heerde, H. J., & Neslin, S. (2015). *Creating customer engagement via mobile apps: how app usage drives purchase behavior* (Working paper, Tuck School of Business, USA). Retrieved from, https://ssrn.com/abstract=2669817.

Ellis, N. (2014). *Worthiness – a key to emotional healing*. Retrieved from, https://wakeup-world.com/2014/11/30/worthiness-a-key-to-emotional-healing/ [Accessed 12 September, 2016].

Erasmus, A. C., Boshoff, E., & Roussea, G. (2001). Consumer decision making models within the discipline of consumer science: a critical approach. *Journal of Family Ecology and Consumer Sciences, 29* (5), 82-90.

Falk, R. F., & Miller, N. B. (1992). *A primer for soft modelling*. Ohio, OH: The University of Akron Press.

Forbes (2010, September). *Why businesses need mobile apps*. Retrieved from**,** http://www.forbes.com /2010/09/08/ mobile-apps-internet-technology-masher [Accessed 11 May, 2016].

Gregory, D. N. S. (2017). Multicollinearity: what is it, why should we care, and how can it be controlled? *Statistical Analysis System, 1404,*1-12. Retrieved from, http://support.sas.com/resources/papers/proceedings17/1404-2017.pdf [Accessed 28 August, 2017].

Hew, J. J., Lee, V. H., Ooi, K. B., & Wei, J. (2011). What catalyses mobile apps usage intention: an empirical analysis. *Journal of Industrial Management & Data Systems, 115* (7), 1269-1291.

Hsiao, C. H., Chang, J. J., & Tang, K. Y. (2016). Exploring the influential factors in continuance usage of mobile social apps: satisfaction, habit, and customer Value Perspectives. *Journal of Telematics and Informatics, 33* (2), 342-355.

Kaiser, H. (1974). An index of factor simplicity. *Psychometrika, 39* (1), 31–36.

Kock, N., & Lynn, G.S. (2012). Lateral collinearity and misleading results in variance-based SEM: an illustration and recommendation. *Journal of the Association for Information Systems, 13* (7), 546-580.

Lipsman, A. (2017). *5 interesting facts about millennials' mobile app usage from the 2017 U.S. mobile app report*. Retrieved from, https://www.comscore.com/ Insights/Blog/5-Interesting-Facts-About-Millennials-Mobile-App-Usage-from-The-2017-US-Mobile-App-Report[Accessed 12 December, 2017].

Malhotra, N. K., & Dash, S. (2011). *Marketing research: an applied orientation* (6th ed.). New Delhi, India: Dorling Kindersley.

Moore, M. (2012).Interactive media usage among millennial consumers. *Journal of Consumer Marketing, 29* (6), 436-444.

Morosan, C., & Defranco, A. (2016). Modeling guests' intentions to use mobile apps in hotels: the roles of personalization, privacy, and involvement. *International Journal of Contemporary Hospitality Management, 28* (9), 1968-1991.

Penn State. (2014, May). *Penn State News*. Retrieved from, https://news.psu.edu/story/ 315436/2014/05/09/ science-and-technology/mobile-apps-may-hold-key-effective-cognitive [Accessed March 18, 2017].

Peter, J. P., & Olson, C. J. (1999). *Consumer behaviour and marketing strategy*. Massachusetts, MA: McGraw-Hill.

Rahman, S. (2017, April 17). *How mobile apps have changed our lives*. The Daily Star, p. 20 (B4).

Rivera, M., Gregory, A., & Cobos, L. (2015). Mobile application for the timeshare industry: the influence of technology experience, usefulness and atitude on behavioral intentions. *Journal of Hospitality and Tourism Technology, 6* (3), 242-257.

Siegler, M. (2008). *Analyst: there's a great future in iPhone apps*. Retrieved from, http:// venturebeat.com/2008/06/11/analyst-theres-a-great-future-in-iphone-apps/[Accessed 28 November, 2017].

Statista. (2014). *Statistics and Facts about Mobile App Usage: 2014*. Retrieved from, https:// www.statista.com/topics/1002/mobile-app-usage/ [Accessed 06 June, 2016].

Statista. (2015). *Statistics and Facts about Mobile App Usage: 2015*. Retrieved from, https:// www.statista.com/topics/1002/mobile-app-usage/[Accessed 07 June, 2016].

Stephanie. (2016, May). *Statistics how to.* Retrieved from, http://www.statistics howto.com/kaiser-meyer-olkin/[Accessed 05 November, 2017].

Tang, A., & Kazman, R. (2011). On the worthiness of software engineering research. *Research Gate*. Retrieved from, https://www.researchgate.net/publication/ 314093254/download[Accessed 25 March, 2017].

Trandafilovic, I., Pasic, V., & Perunovic, S. (2013). The research of cognitive and affective behavior during shopping. *Journal of Economics and Organization*, *10* (2), 147 – 164.

Viswanathan, P. (2018, October). *Lifewire*. Retrieved from, https://www.lifewire.com/ what-is-a-mobile-application-2373354[Accessed 03 November, 2018].

Yang, H. C. (2013). Bon appétit for apps: young american consumers' acceptance of mobile applications. *Journal of Computer Information Systems*, *53* (3), 85-96.

D.U. Journal of Marketing, Vol. 18, June, 2015 and Vol. 19, June, 2016

SOCIAL MEDIA: AN EFFECTIVE MARKETING COMMUNICATION TOOL

Sigma Islam[1]

Abstract: *Social media is a very common term in today's digital age. This mode of communication has been proved to possess diversified usage. This study identified eleven independent variables that people consider as to why they use social media as an effective marketing communication tool. Data were collected from 140 social media users. Owing to the presence of multicollinearity among the independent variables, factor analysis is conducted, which is succeeded by conducting regression analysis considering extracted factors as predictors to explain the dependent variable. These factors are the benefits of social media, sharing product information, ubiquitous with offer and product content; all of which are found to be significant within 3% level. The main reasons to join a particular brand page by users are brand loyalty, advertising and friend's invitation. The findings may help companies formulate appropriate marketing strategies and design their social media sites to be more attractive to draw customers' attention.*

Keywords: *Social Media, Marketing Communication Tool, Facebook, LinkedIn, Twitter, Word of Mouth.*

INTRODUCTION

'Social media' nowadays is the talk of the time and it has become part and parcel of our daily life. It acts as the online version of "word of mouth" communication. For many young adults, it has become more of an addiction. However, social media allow users to share their views with one another and with product or service providers, and it has become one spot solution for them. This reality has induced the companies to put their attention to social media marketing. As social media are used by both customers and companies, it is important to know how it can influence the customer as a media of marketing communication tool. However, only a few studies have been conducted in Bangladesh in this regard.

Considering the usage of social media as the dependent variable, a multiple regression analysis was conducted with eleven independent variables (predictors) based on the literature review. Owing to the presence of multicollinearity among these predictors, factor analysis is conducted followed by multiple regression analysis considering the extracted factors as the predictor variables.

[1] Assistant Professor, Department of Marketing, University of Dhaka.

OBJECTIVES OF THE STUDY

The broad objective of the study is to assess the effectiveness of social media as a marketing communication tool from the customers' perspective, wherein the specific objectives are as follows:

1. To find which social media consumers mostly use.
2. To know the purposes of using social media.
3. To identify the motivation of social media users to join a brand page.
4. To assess the relative importance of variables (factors) for using social media as an effective marketing communication tool.

LITERATURE REVIEW

This section presents some definitions and related concepts of social media marketing as well as it reviews the existing literature for identifying variables that customers consider in using social media (dependent variable).

Rouse (2014) defined social media as the collection of online communication channels dedicated to community-based input, interaction, content sharing and collaboration. Some prominent social media include Facebook, Twitter, LinkedIn, Google+, Wikipedia, and Reddit. Bradley (2010) identified that participation, collectiveness, transparency, independence, persistence, and emergence made these media different from other forms of communication. McKinsey Quarterly (2011) found that 78% companies ranked website the first, 60% companies ranked e-mail communication second, and 39% companies ranked social media platforms third as digital tools to reach the customers.

Michaelidou, Siamagka and Christodoulides (2011) found that over a quarter of B2B small and medium enterprises in the UK are using social networking sites (SNSs) to achieve the brand objectives, of which the most popular one is to attract new customers. Sarwar, Haque and Yasmin (2013) identified that interaction in the social network (i.e. time spent on social networking sites) and perception of security in purchasing goods online play the most significant role on the purchasing preferences for Muslim consumers. Harridge and Quinton (2012) showed that the consumers generated more than 500 billion impressions regarding products and services through social media in 2011, which is about one-quarter of the number of impressions created through all forms of online advertising. Moreover, Riegner (2011) reported that more than 50% Facebook users are likely to recall an ad when their friends are featured in it. Fisher (2009) concluded that among the 70% customers, who visited social networking sites, 49% make purchase decision and 60% share information with friends they found online.

Now it is necessary to identify the independent variables that customers consider in using social media based on the review of the existing literature as furnished in

Table 1. The first column of the table shows the studies along with the names of their author(s) while the second and the third columns indicate the variables used in the respective study and the selected variables for the present study respectively. For example, the first study conducted by Trusov, Bucklin and Pauwels (2009) is "Effects of Word-of-Mouth Versus Traditional Marketing: Findings from an Internet Social Networking Site" (first column). They found that the customers personally connect with one another through internet and exchange product and price information that help them make product and price comparisons (second column). So, product comparison and price comparison are considered relevant variables (third column) for the present study.

Thus, based on these seven studies, eleven independent variables have been selected to conduct this research that include product comparison, price comparison, product content, special offer, product query, product availability anytime (or simply availability anytime), search cost, customized service, free entertainment, ease of usage, and sharing views (**Table 1**). These variables have been chosen as they are found significant in those studies and appear to be appropriate that make social media as an effective mode of communication in the context of Bangladesh. However, certain variables used in the previous studies are not considered as they are not directly related or do not appear to be relevant for this study.

Table 1: Literature Review for Identifying Independent Variables

Study, Author(s)	Variables Used in the Study	Selected Variables
1. Effects of Word-of-Mouth Versus Traditional Marketing: Findings From an Internet Social Networking Site (Trusov, Bucklin, & Pauwels, 2009)	Customers interpersonally connect with one another through internet and exchange product and price information, which help them make product and price comparisons.	1. Product Comparison 2. Price Comparison
2. The Impact of Social Media Marketing on Brand Loyalty (Erdogmus & Cicek, 2012).	Customers' brand loyalty is positively influenced when the brand offers attractive campaigns on various platforms of social media that include relevant product contents of the brand and special offers (e.g. winning prizes by participating in a competition).	3. Product Content 4. Special Offer
3. 3. 11 Effective Ways to Use Social Media to Promote Your Content (Schaffer, 2014)	The effectiveness of social media is increased when manufacturers can help customers to make product query and the availability of the product anytime whenever they want with just a click.	5. Product Query 6. Product Availability Anytime

Study, Author(s)	Variables Used in the Study	Selected Variables
4. Social Media Marketing: A Powerful Tool to Grab Consumer Attention (Ahmed, Ali, & Tania, 2012)	Social media marketing can be used to draw consumer attention, among others, through the reduction of consumer search cost for products.	7. Search Cost
5. Impacts of Luxury Fashion Brand's Social Media Marketing (SMM) on Customer Relationship and Purchase Intention (Kim & Ko, 2010)	The luxury brands' social media marketing (SMM) is effective in building customer relationship and enhancing the purchase intention by providing customized services and free entertainment contents.	8. Customized Service 9. Free entertainment
6. Shopping on Social Networking Websites: Attitudes towards Real Versus Virtual Items (Cha, 2009)	Customers are more likely to shop on social networking websites the more they find it easy to use.	10. Ease of Usage
7. Enhancing Promotional Strategies within Social Marketing Programs: Use of Web 2.0 Social Media.(Thackeray, Neiger, Hanson, & McKenzie, 2008)	Promotional strategies can be enhanced within social marketing campaigns along with web 2.0 by engaging consumers in sharing views through collaborative writing, social networking, social bookmarking, and syndication.	11. Sharing Views

METHODOLOGY

The target population consists of customers who joined the brand pages of the top ten boutique houses, namely Aarong, Cats Eye, Richman, Yellow, Ecstasy, Rang, Kay Kraft, Dorjibari, Anjan's and Bibiana (Fashion apparel, 2017).

A well-pretested structured questionnaire was administered to all the members of Facebook pages of those ten boutique houses to collect primary data. Then by excluding the incomplete questionnaires, 140 samples (questionnaires) were retained to conduct the survey. Such a sample size can be justified according to Tabachnick and Fidell (1996): the sample size (n) should be more than 50 plus eight times the number of independent variables (m), i.e. $n > 50+8m$. Given that $m = 11$, the required sample size (n) turns out to be 138.

This research is descriptive in nature. A 7-point Likert scale was used to measure the variables. Initially, it was planned to conduct a multiple regression analysis considering the usage of social media as the dependent variable and eleven independent variables as identified based on the literature review. The existence of multicollinearity among the independent variables is determined based on the correlation matrix, VIF (Variance Inflation Factor), KMO statistic and Bartlett's Test of Sphericity. The presence of multicollinearity, however, led to conduct

factor analysis. Finally, multiple regression is run considering the extracted factors as predictors (independent variables) to explain the dependent variable.

DATA ANALYSIS AND FINDINGS

This section focuses on certain descriptive statistics, tests for multicollinearity, factor analysis followed by regression analysis.

Descriptive Statistics

To achieve the first three objectives of the study, certain descriptive statistics have been used as the modus operandi. **Table 2** shows that all respondents (social media users) browse only Facebook; none of the respondents are reported to use other social media (Twitter, LinkedIn, etc.). The key purpose of using Facebook is to connect with people as reported by 85.7% respondents. Besides, 77.1% of the respondents visit brand pages of various product categories every time they log in to their accounts. In response to the question as to why the social media users are motivated to join a particular brand page, 45.7% of them mentioned loyalty towards the brand followed by advertising (33.6%) and friends' invitation (15%).

Table 2: Type and Purpose of Usage of Social Media

Particulars	Frequency	Percentage
Usage of Social Media		
Facebook	140	100.0
Others (Twitter, LinkedIn, etc.)	0	0
Total	**140**	**100.0**
Purpose of Using Social Media		
Connecting with Friends	120	85.7
Playing Games	13	9.3
Exchanging News about Products	5	3.6
Other Activities	2	1.4
Total	**140**	**100.0**
Frequency of Visiting Brand Page		
Yes	108	77.1
No	32	22.9
Total	**140**	**100.0**

Particulars	Frequency	Percentage
Motivation to Join a Brand Page		
Loyalty towards Brand	64	45.7
Advertising	47	33.6
Friends' Invitation	21	15.0
Others	8	5.7
Total	**140**	**100.0**

Source: Survey Data

Tests for Multicollinearity

The determination of whether there is problem of multicollinearity and the appropriateness of conducting factor analysis is based on the analyses of correlation matrix, VIF (Variance Inflation Factor), KMO statistic, and Bartlett's Test of Sphericity.

Correlation Matrix: The upper triangular correlation matrix in **Table 3** shows that out of fifty-five meaningful correlation coefficients between pairs of eleven variables, twenty-six of them are significant within 1% level (marked by [1]) and eight are significant within 5% but more than 1% level (marked by [2]), which imply the presence of multicollinearity.

Table 3: Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Product Comparison	1										
2. Price Comparison	.635[1]	1									
3. Product Content	.318[1]	.162	1								
4. Special Offer	-.108	.356[1]	-.039	1							
5. Product Query	.065	-.143	.004	-.190	1						
6. Availability Anytime	.425[1]	.516[1]	.205[2]	.351[1]	.055	1					
7. Search Cost	-.118	-.348[1]	-.011	-.233[2]	.085	-.371[1]	1				
8. Customized Service	.185	.537[1]	-.042	.409[1]	-.245[2]	.295[1]	-.338[1]	1			
9. Free Entertainment	.462[1]	.536[1]	.074	.250[2]	-.019	.185	-.238[2]	.556[1]	1		
10. Ease of Usage	.216[2]	.330[1]	-.066	.362[1]	.253[2]	.438[1]	-.067	.077	.320[1]	1	
11. Sharing Views	.594[1]	.385[1]	.264[1]	-.155	.380[1]	.401[1]	-.205[2]	.044	.327[1]	.388[1]	1

Variance Inflation Factor: There is a rule of thumb of interpreting VIF as collinear statistics. A VIF value of 1 or less means not correlated, between 1 and 5 implies moderately correlated, and greater than 5 indicates highly correlated (Stephanie, 2017). **Table 4** shows that the VIF values corresponding to all variables are within the range of 1-5, which implies that each variable is moderately correlated (collinear) with the rest of the variables.

Table 4: Variance Inflation Factor

Independent Variables	Collinearity Statistics
	VIF
1. Product Comparison	3.02
2. Price Comparison	3.27
3. Product Content	1.21
4. Special Offer	1.99
5. Product Query	1.46
6. Availability Anytime	2.19
7. Search Cost	1.41
8. Customized Service	2.25
9. Free Entertainment	2.27
10. Ease of Usage	2.19
11. Sharing Views	2.42

Source: Survey Data

KMO Statistic and Bartlett's Test: The value of KMO measure of sampling adequacy is 0.637 (**Table 5)**, which is above 0.50 implying that there is the presence of multicollinearity. The null hypothesis that the population correlation matrix is an identity matrix is rejected by the Bartlett's Test of Sphericity; the approximate chi-square statistic is 416.069 with 55 degrees of freedom, which is highly significant (p=.000). So, it can be said that there exists multicollinearity and undertaking factor analysis is appropriate (Sriram, 2012).

Table 5: KMO Statistic and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.637
Bartlett's Test of Sphericity	Approx. Chi-Square	416.069
	Degrees of Freedom	55
	Significance	.000

Source: Survey Data

Factor Analysis

In order to determine the minimum and an appropriate number of factors for using them as the predictors in the regression analysis, the method of Principal Component Analysis (PCA) is utilized following the orthogonal-varimax procedure in this study. The PCA extracts the factors based on the information contained in the original variables in order to explain the total variance in the data, i.e. the first factor explains the largest portion of the total variance, the second factor explains the most of the remaining variance, and so on. Now it is necessary to determine the appropriate number of extracted factors and interpret them.

Appropriate Number of Factors: The appropriate number of factors is determined based on three approaches: eigenvalue criteria, amount of total variance explained and scree plot.

First, following the eigenvalue criteria, i.e. the factors that have eigenvalues greater than one, the appropriate number of factors is to be four **(Table 6)**.

Second, in terms of percentage variance explained, it appears that the first four factors explain 26.54%, 16.73%, 15.52% and 12.86%, respectively, and cumulatively 71.65% of the total variance, which is more than the threshold value of 60% **(Table 6)**. Accordingly four factors appear to be appropriate.

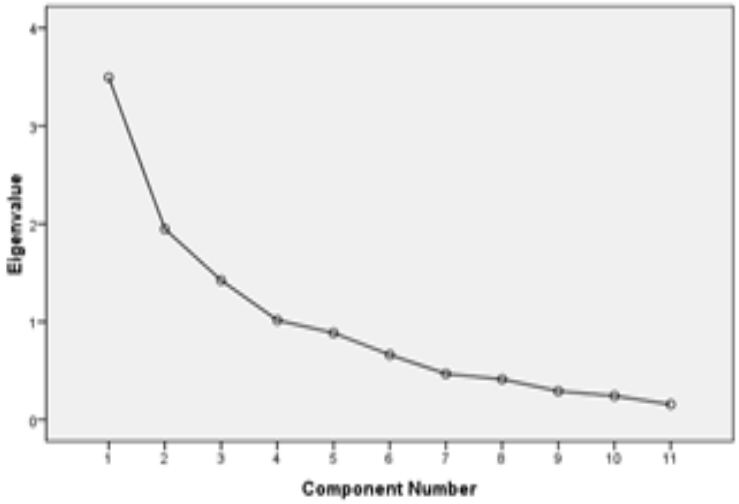
Table 6: Total Variance Explained

Factors	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Eigenvalue	% of Variance	Cumulative %	Eigenvalue	% of Variance	Cumulative %
1	3.50	31.78	31.78	2.92	26.54	26.54
2	1.95	17.70	49.48	1.84	16.73	43.28
3	1.42	12.94	62.42	1.71	15.52	58.80
4	1.02	9.24	71.65	1.41	12.86	71.65

Source: Survey Data

Third, the scree plot (**Figure 1)** indicates that the scree begins at Factor 5. So, five factors appear to be appropriate. However, since normally the number of factors determined based on scree plot becomes one or few more than that determined by the eigenvalue criteria (Malhotra & Dash, 2012), four factors can be considered to be the desired number, which is congruent with eigenvalue criterion and the percentage variance explained approach.

Figure 1: Scree Plot



Source: Survey Data

Interpretation of the Factors: From the rotated component matrix (**Table 7**), the factors can be interpreted as follows: Factor 1 has high coefficients for variables, namely price comparison, free entertainment, customized service, product comparison, and search cost. Therefore, it can be labeled ***benefits of social media***. Factor 2 has high coefficients for variables: product query and sharing views. So, it can be termed ***sharing product information***. Factor 3 possesses high coefficients for variables: special offer, ease of usage and availability anytime. So, it can be labeled ***ubiquitous with offer*** (which means easily available anytime and anywhere). The remaining variable, product content has high coefficient (.893) corresponding to just one factor (i.e. Factor 4), which is labeled ***product content.***

Table 7: Rotated Component Matrix

Variables	Principal Components/Factors			
	F_1 Benefits of Social Media	**F_2 Sharing Product Information**	**F_3 Ubiquitous with Offer**	**F_4 Product Content**
Price Comparison	**.827**	.042	.184	.240
Free Entertainment	**.765**	.187	.101	-.084
Customized Service	**.726**	-.246	.298	-.135
Product Comparison	**.681**	.282	-.308	.399
Search Cost	**-.548**	.117	-.129	.008
Product Query	-.223	**.816**	-.022	-.073
Sharing Views	.393	**.704**	-.119	.361
Special Offer	.228	-.211	**.845**	-.055
Ease of Usage	.075	.412	**.644**	.047
Availability Anytime	.305	.266	**.565**	.483
Product Content	-.063	-.003	.020	**.893**

Source: Survey Data

Regression Analysis

Given that the extracted four factors are appropriate following the factor analysis in the foregoing, the regression model can be specified as:

$$Y = \beta 0 + \beta_1 F_1 + \beta_2 F_2 + \beta_3 F_3 + \beta_4 F_4 + e$$

Where, Y = Effectiveness of social media

F_1 = Benefits of social media

F_2 = Sharing product information

F_3 = Ubiquitous with offer

F_4 = Product content

e = Residual

The summary of the estimation of the regression model is presented in **Table 8.** It shows that the value of R^2 is 0.283, which is highly significant (p = .000). This implies that the null hypothesis that the coefficient of multiple determination in the population is zero (i.e. $R^2_{pop} = 0$) has been rejected and that 28.3% of variance in the dependent variable is explained by four factors (predictors).

Table 8: Regression Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	p-value
.532	.283	.253	.71413	.000

Source: Survey Data

Table 9 shows that all multiple regression coefficients are significant within 3% level and in terms of standardized coefficients, in descending order of magnitude, four predictors (factors) are ubiquitous with offer, benefits of social media, product content and sharing product information.

Table 9: Multiple Regression Coefficients

Variables	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
	b		*B*		
(Constant)	5.620	.071		78.697	.000
Benefits of Social Media	.242	.072	.293	-3.370	.001
Sharing Product Information	.159	.072	.192	2.214	.029
Ubiquitous with Offer	.288	.072	.348	4.007	.000
Product Content	.163	.072	.197	2.271	.025

Source: Survey Data

CONCLUSION

The findings of the study might be useful to the marketers, who are either selling or promoting their products or services online or planning to do so. Given that people use only Facebook, marketers may consider opening their brand pages on Facebook rather than on other social media. Simultaneously, however, Tweeter, LinkedIn, and the like, in the absence of their usage by Bangladeshi customers,

may promote themselves. Since most of the respondents reported that every time they log in to the social media, they visit different brand pages, the marketers may therefore design their pages in such a manner that helps them stand out among the crowd. Since brand loyalty and advertising are found to be the key motivating stimuli (factors) for users to join a brand page, page owners can focus on these dimensions to retain their customers and promote their offerings. Given that social media offer such benefits as product and price comparison, a direct query regarding the product from the manufacturer, etc. marketers may capitalize on these benefits and design their brand pages accordingly to attract the users.

REFERENCES

Ahmed, R., Ali, M. M., & Tania, I. J. (2012). Social Media Marketing: A Powerful Tool to Grab Consumer Attention. *D.U. Journal of Marketing*,15, 84.

Bradley, A. J. (2010). *A New Definition of Social Media*. Retrieved from, http://blogs.gartner.com/anthony_bradley/2010/01/07 [Accessed 29 April, 2015].

Cha, J. (2009). Shopping on Social Networking Websites: Attitudes towards Real versus Virtual Items. *Journal of Interactive Advertising*, 10, 77-93.

Erdogmus, I. E., & Cicek, M. (2012). The Impact of Social Media Marketing on Brand Loyalty. *Procedia - Social and Behavioral Sciences*, *58*(12), 1353–1360.

Fisher, T. (2009). ROI in Social Media: A Look at the Arguments. *Database Marketing & Customer Strategy Management*, *16*(3), 189–195.

Harridge, M., & Quinton, S. (2012). Virtual Snakes and Ladders: Social Networks and the Relationship Marketing Loyalty Ladder. *The marketing review*, 3, 87-102.

Kim, A. J., & Ko, E. (2010). Impacts of Luxury Fashion Brand's Social Media Marketing on Customer Relationship and Purchase Intention. *Journal of Global Fashion Marketing: Bridging Fashion and Marketing,1*(3), 164-171.

Fashion Apparel (2017). *List of Top 10 Fashion House in Bangladesh.* Retrieved from, http://fashion2apparel.blogspot.com/2017/03/top-10-fashion-house-bangladesh.html [Accessed 01 April, 2018].

Michaelidou, N., Siamagka, N. T., & Christodoulides, G. (2011). Usage, Barriers and Measurement of Social Media Marketing: An Exploratory Investigation of Small and Medium B2b Brands. *Industrial Marketing Management, 40*(7), 1153–1159.

McKinsey Quarterly, (2011). *What marketers say about working online McKinsey Global Survey results*. Retrieved from, http://www.mckinseyquarterly.com/ What_marketers_say_about_working_online_McKinsey_Global_Survey_results_ 2892 [Accessed 29 April, 2015].

Riegner, C. (2011). Word of Mouth on the Web: The Impact of Web 2.0 on Consumer Purchase Decisions. *Journal of Advertising Research,* 12, 436-447.

Rouse, M. (2014). *Social Media*. Retrieved from, http://whatis.techtarget.com/ definition/social-media [Accessed 28 April, 2015].

Sarwar, A., Haque, A., & Yasmin, F. (2013). The Usage of Social Network as a Marketing Tool: Malaysian Muslim Consumers Perspective. *International Journal of Academic Research in Economics and Management Sciences, 2*(1), 93-102.

Schaffer, N. (2014). *11 Effective Ways to Use Social Media to Promote Your Content***.** Retrieved from, http://www.curata.com/blog/11-effective-ways-to-use-social-media-to-promote-your-content/ [Accessed 28 April, 2015].

Sriram, P. (2012). *Factor Analysis - KMO-Bartlett's Test & Rotated Component Matrix*. Retrievedfrom,http://badmforum.blogspot.com/2012/08/factor-analysis-kmo-bartletts-test.html [Accessed 16 May, 2018].

Stephanie (2017). *Variance Inflation Factor*. Retrieved from, http://www.statistic showto.com/variance-inflation-factor/ [Accessed 21 July, 2018].

Tabachnick, B. G., & Fidell, L. S. (1996). *Using Multivariate Statistics.* New York: Harper Collins.

Thackeray, R., Neiger, B. L., Hanson, C. L., & McKenzie, J. F. (2008). Enhancing Promotional Strategies within Social Marketing Programs: Use of Web 2.0 Social Media. *Health Promot Pract, 9*(4), 338-343.

Trusov, M., Bucklin, R., & Pauwels, K. (2009). Effects Of Word-Of-Mouth Versus Traditional Marketing: Findings From An Internet Social Networking Site. *Journal of Marketing*, *73*(5), 90-102.

D.U. Journal of Marketing, Vol. 18, June, 2015 and Vol. 19, June, 2016

ASSESSING THE COMPETITION AND CONCENTRATION LEVELS OF COMMERCIAL BANKS: EVIDENCE FROM BANGLADESH

Junnatun Naym[1]
Jeta Majumder[1]

Abstract: *Considering the significant impact of competition and concentration on pricing, efficiency, productivity and stability of banking sector, this study explores the competitive behavior and concentration level of commercial banks of Bangladesh. The data are gathered from the financial statements of 20 commercial banks for the period of 2004-2016. The findings point mainly to a non-concentrated market with monopolistic competition among the commercial banks. The findings exhibit policy implications for academics, business strategists, regulators and other stakeholders.*

Keywords: *Competition, Concentration, Commercial Banks, Panzar and Rosse Model, Concentration Indices.*

INTRODUCTION

Understanding the level of competition and concentration in the banking sector is essential in designing appropriate marketing strategy and overall business strategy. Achieving competitive advantage by applying the elements of marketing mix and to offer the right banking products and services requires a comprehensive analysis of market structure and level of competition. Besides, the level of competition affects performance, efficiency and stability of the banking system. Hence, analyzing the concentration and competition in the banking sector has meaningful implications for clients, bank management authorities, regulators and other stakeholders.

The present study investigates the competitive behavior and the extent of concentration in the commercial banks of Bangladesh, which is a developing country listed as one of the "Next 11" with high development potentials. The financial system of Bangladesh is heavily dominated by banking sector for capital formation and savings mobilization. Ongoing liberalization, internationalization and technological breakthroughs are inducing the banking sector more competitive. In Bangladesh, banks are offering homogenous

[1] Assistant Professor, Department of Finance, University of Dhaka, Dhaka, Bangladesh.
[1] Lecturer, Department of Marketing, University of Dhaka, Dhaka, Bangladesh.

products and services aimed at the same target market and customer base, with almost similar goals of profit and growth, and thus ending up with intense competition. Besides, banks are increasing the number of branches for their expansion. There are 57 scheduled banks and 6 non-scheduled banks (Bangladesh Bank, 2018). Since the level of competition and concentration in the banking sector can be a source of instability or crisis, which can profoundly affect the performance of the real economy, adequate attention is required therein (Dell'Ariccia, Igan, & Laeven, 2008; Kroszner, Laeven, & Klingebiel, 2007).

Despite the paramount importance of banking sector in the economic development, there is a paucity of research in analyzing the competition and concentration levels in the banking sector of Bangladesh. In this study, we attempt to fill up this gap, which might have useful policy implications.

OBJECTIVE

The main objective of this study is to appraise the nature of competitive behavior and the extent of concentration level among the commercial banks operating in Bangladesh.

LITERATURE REVIEW

This section reviews the existing literature on the extent of concentration and competition in the banking sector. Imperfect competition results in inferior service quality, higher fees and charges, and slowdown in innovation. On the other hand, intense competition in the banking sector may provoke banks to compromise with quality lending and take unnecessary risks that, in turn, may lead to strong disturbances and instability to the functioning of the whole financial system. Cuestas, Lucotte and Reigl (2017) assessed the relationship between competition and bank risk and found that low competition level is related to lower bank risk-taking and insolvency risk while the lack of competition is likely to increase the individual risk-taking behavior of banks that may adversely affect the stability in the banking sector. Liu, Molyneux and Wilson (2013) found an inverse U-shaped relationship between competition and stability in European banking sector during the period of 2000-2008.

Like competition, level of concentration also has significant implications and effects on functionality and performance of banks. A study by Berger and Hannan (1989) shows that the deposit rates fall as the banks get more concentrated. The financial sector is highly-regulated leaving less space to banks for taking the advantage of collusion. But in highly concentrated markets, banks may find more incentives to collude and enjoy higher interest rate spreads over other firms in the industry. Alley (1993) concluded that the degree of collusion is positively correlated with the concentration for markets where concentration ratio is greater than or equal to 0.4. Diallo and Koch (2017), using Schumpeterian

growth paradigm, found that high bank concentration leads to a decrease in the probability of entrepreneurial innovation. However, the banking market structure plays no such role in a credit-constrained country.

Applying the competition-fragility view, another stream of research focused on the relationship between competition and banking sector stability. Schaeck and Cihak (2014) found that the competition yields higher efficiency which, in turn, enhances stability though. Claessens (2009) stated that the relationship between competition and stability is not obvious. In the German banking sector, Kick and Prieto (2015) found the evidence that more competitive or less concentrated banking system may be more fragile. Leroy and Lucotte (2017) analyzed 97 European listed banks over the period of 2004-2013 and stated that high competition encourages banks in taking more risk, and reduces individual bank stability while decreasing systematic risk.

A close review of the literatures reveals that few studies addressed the concentration and competition level in the banking sector of Bangladesh. Using panel data for the period of 2006-2013, Repon and Islam (2016) found that there was fierce competition among banks operating in Bangladesh and the banking sector became less concentrated. They observed that the banks in Bangladesh were operating under monopolistic competition. In a similar study, Ahamed (2012) observed that the concentration of Bangladesh banking industry decreased during 1999-2011 and it could be considered as moderately concentrated market. Recognizing the crucial role played by the banking sector, we examined the extent of competition and concentration among the commercial banks of Bangladesh for the period of (2004-2016) and postulated the implications for bank management, academics, marketing managers and regulators.

METHODOLOGY

This section presents a description of data for undertaking the empirical exercise and the measurement of competitive behavior and the level of concentration among the commercial banks of Bangladesh.

Data Source

This study uses a ‘balanced panel data set’ that consists of information of twenty commercial banks including one state-owned bank and nineteen private banks for the period of 2004-2016. Data on the relevant variables have been gathered from the balance sheets and income statements available in the annual reports. The selection of the banks is based on the availability of data for at least 10 years.

Measurement of Competitive Behavior and Concentration Level

Following the existing literature, two structural measures, namely N-firm concentration ratios and Herfindahl-Hirschman Index (HHI) are used to measure

the degree of concentration level while Panzar and Rosse H-statistic is utilized to measure the competition level in the commercial banks of Bangladesh.

Concentration Ratios: Prior studies (Abbasoglu, Aysan, & Günes, 2007; Ahamed, 2012; Diallo & Koch, 2017) used various concentration ratios (CRs) that include CR3, CR5, CR8, CR10, etc. In this study, we calculated CR5 and CR10 relating to market shares of five and ten largest banks respectively for the period of 2004-2016. Concentration ratios range from 0 to 100 percent. We estimated the level of concentration in terms of asset, deposit, and loan. Though a shortcoming of N-firm concentration ratios is that these ratios neither use the market share of all firms in the sector nor they reflect the change in the size of the largest firms, they are widely used as a measure to estimate the extent of concentration.

Herfindahl-Hirschman Index: Herfindahl-Hirschman Index (HHI) is a commonly accepted measure of market concentration (The United States Department of Justice, 2015). In this document, HHI is estimated following earlier studies (Berger & Hannan, 1989; Bello & Isola, 2014; Diallo & Koch, 2017). HHI is a measure of the size of firms in relation to the industry, and is an indicator of the extent of concentration among them. It is defined as the sum of squares of the market shares of the 50 largest firms (or all firms, if there are fewer than 50) within the industry, where the market shares are expressed as fractions, which range from 0 to 1. Alternatively, the squared market shares can be expressed as percentages in which the index ranges from 0 to 10,000 points. For example, an index of .25 is the same as 2,500 points. The increase in the HHI generally indicates an increase in market power, i.e. decrease in competition and vice versa. The index is calculated using the following formula:

$$HHI = \sum_{i=1}^{n} s_i^2$$

Where, S_i = Market share of bank i

N = Number of banks

Table 1 shows that three ranges of HHI imply respectively three levels of market concentration: none, moderate and high.

Table 1: HHI and Implied Market Concentration

Value of HHI	Market Concentration
HHI < .10	Non-concentrated
.10 <HHI <.18	Moderately concentrated
HHI > .18	Highly concentrated

Source: Melnik, Shy and Stenbacka (2005);

DOJ and FTC, 1997

Panzar and Rosse H-statistic: H-statistic, a non-structural methodology developed by Panzar and Rosse (1987), is a popular and commonly used approach in empirical research to measure the level of competition in different contexts (Claessens & Laeven, 2004; Abbasoglu et al., 2007; Fosu, 2013; Repon & Islam, 2016). The H-statistic is the sum of factor price elasticity of a firm's total revenue with respect to input prices, i.e. H-statistic describes how interest revenues react to variations in the cost figures. In order to calculate the H-statistic, the following reduced form regression equation is estimated using firm-level panel data:

$$\text{Ln}(r_{i,t}) = \delta_0 + \sum \delta_j \text{Ln}(X_{j,i,t}) + \Theta \text{Ln}(Z_{i,t}) + \mu_{it} \quad \text{.....(1)}$$

Where, $r_{i,t}$ = Total revenue of firm i in year t (interest revenue)

$X_{j,i,t}$ = Price of input factor j of firm i in year t

j = Input factor (interest expense, personnel expense and other operating expenses)

$Z_{i,t}$ = A vector of exogenous control variables (equity and loan)

δ_0 = Intercept

δ_j = Coefficient

Θ = Coefficient

μ_{it} = Random disturbance term

All the variables ($r_{i,t}$, $X_{j,i,t}$ and $Z_{i,t}$) have been expressed in ratios applying the appropriate denominators and then transformed to natural log to control for the effect of bank size. Accordingly, Equation (1) can be expressed in the following form:

$$Ln(IRTL_{it}) = \alpha + \beta_1 Ln(INTD_{it}) + \beta_2 Ln(PPE_{it}) + \beta_3 Ln(PCE_{it}) + \beta_4 Ln(ETA_{it}) + \beta_5 Ln(NLTA_{it}) + \mu_{it} \quad \text{.....................................(2)}$$

Table 2 provides the description of the terms used in Equation (2). The dependent variable involves interest revenue while five independent variables pertain to interest expense, personnel expense, other operating expenses, equity and loan. All variables have been expressed in ratios applying the appropriate denominators. Note that the last two independent variables are exogenous control variables, which account for credit risk and leverage respectively (Shaffer & Spierdijk, 2013).

Table 2: Specification of Variables in Panzar and Rosse Model

Variables		Measurement	Indication
Dependent Variable	**IRTL**	Ratio of interest revenue to total loan	Revenue
Independent Variables	**INTD**	Ratio of Interest expense to total deposit	Price of capital
	PPE	Ratio of personnel expense to the number of employees	Price of labor
	PCE	Ratio of other operations and administrative expenses to total asset	Price of capital
	ETA	Ratio of equity to total asset	Exo. control variable
	NLTA	Ratio of net loans to total asset	Exo. control variable

Finally, the H-statistic is calculated as the sum of factor price elasticities, namely β_1, β_2 and β_3 as specified in Equation (2), that is,

$$\text{H-statistic} = \beta_1 + \beta_2 + \beta_3 \quad \text{...(3)}$$

Where, β_1 = Coefficient of interest expense to total deposit

β_2 = Coefficient of personnel expense to the total number of employees

β_3 = Coefficient of other operating expense to total asset

The H-statistic and the implied market structure are presented in **Table 3**. Under perfect competition, H-statistic equals to 1 when an increase in input prices results in an equal increase in both marginal cost and total revenue. Under a

monopoly or perfectly collusive oligopoly, H-statistic is less than or equal to 0 when an increase in input price leads to a rise in marginal cost and a decline in both output and revenue. However, when H lies between 0 and 1, the system functions under the monopolistic competition (Federal Reserve Bank of St. Louis, 2017).

Table 3: H-statistic and Implied Market Structure

Value of H-statistic	Implied Market Structure
H = 1	Perfect competition
H ≤ 0	Monopoly or perfectly collusive oligopoly
0 < H < 1	Monopolistic competition

Source: Hempell, 2000; Bikker, 2004

Table 3 indicates that the values of H-statistic are bounded within one (i.e. H ≤ 1). However, it is possible that it can exceed one (i.e. H >1) for a low-cost firm in a homogeneous "Cournot duopoly" with asymmetric costs and linear demand (Shaffer & Spierdijk, 2013), which is also known as the model of "imperfect competition" whereby two firms having identical cost functions compete with homogeneous products in a static setting (Policonomics, 2013). Furthermore, H-statistic, greater than 1, was evidenced in previous empirical studies (e.g. Shaffer & Spierdijk, 2013), nullifying the theoretical upper bound of H-statistic being one, as was previously thought.

FINDINGS

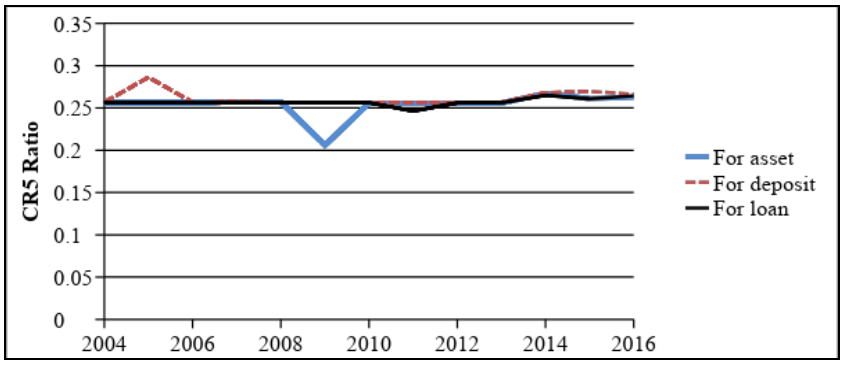
This section presents the analyses of results in terms of concentration ratio, HHI and H-statistic to conceptualize the competitive dynamics and level of concentration among the selected commercial banks in the context of Bangladesh.

Concentration Ratios

Figure 1 demonstrates the results obtained from CR5 ratio analysis. The CR5 ratios in terms of three parameters (asset, deposit and loan) are very low ranging from approximately 0.21 to 0.29 indicating the presence of low level of concentration among the banks during the study period.

The concentration level in terms of deposit shows steady upward movement from 2004–2005 and then it fell to the previous level in 2006. The concentration level in terms of asset shows quite steady downward movement from 2008 to 2009 and thereafter upward till 2010. Finally, the concentration level in terms of all parameters increased after 2012.

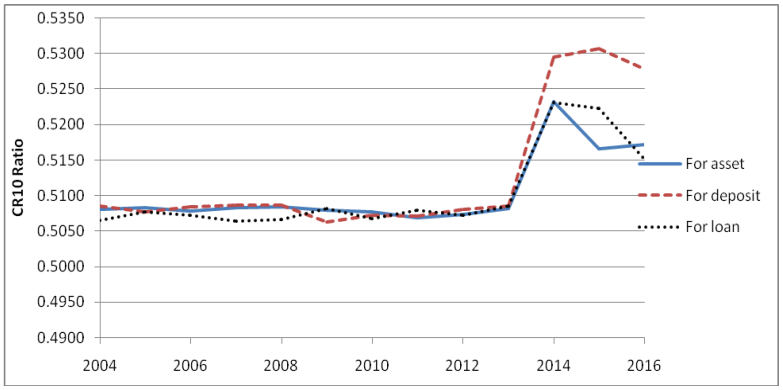
Figure 1: CR5 in Terms of Asset, Loan and Deposit



Source: Prepared by authors based on banks' financial statements

Figure 2 demonstrates the results obtained from CR10 analysis. The market shares of the largest ten banks pertaining to asset, deposit and loan moved almost together within the range of .5050–.5100 during the period of 2004–2013 implying low level of concentration thereof. Then there are increases in the CR ratios for all three parameters from 2013 to 2014. Afterwards, during 2014–2015, there is an upward movement for deposit but downward for both asset and loan. Thereafter (2014–2015), there are downward trends corresponding to deposit and loan while upward movement for asset.

Figure 2: CR10 in Terms of Asset, Loan and Deposit



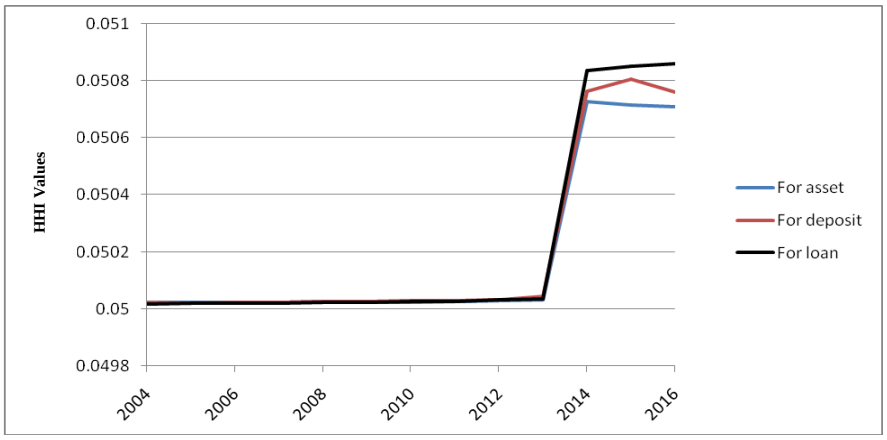
Source: Prepared by authors based on banks' financial statements

Herfindahl-Hirschman Index

HHI values yield a comprehensive picture of the level of concentration by giving more weight to larger commercial banks under the study. **Figure 3** shows the HHI values corresponding to asset, loan and deposit. Each of the HHI values is less than 0.10 in the **Figure 3**, pointing to a non-concentrated market. The levels

of concentration in terms of all parameters (i.e. asset, deposit and loan) remain almost same during the period of 2004–2013. However, the level of concentration increased all of a sudden during 2013–2014. Thereafter, during 2014–2015, the concentration level in terms of loan increased while that of asset decreased. However, the connection level corresponding to deposit increased from 2014 to 2015 but decreased afterward (2015–2016).

Figure 3: HHI for Asset, Loan, and Deposit During 2004-2016



Source: Prepared by authors based on banks' financial statements

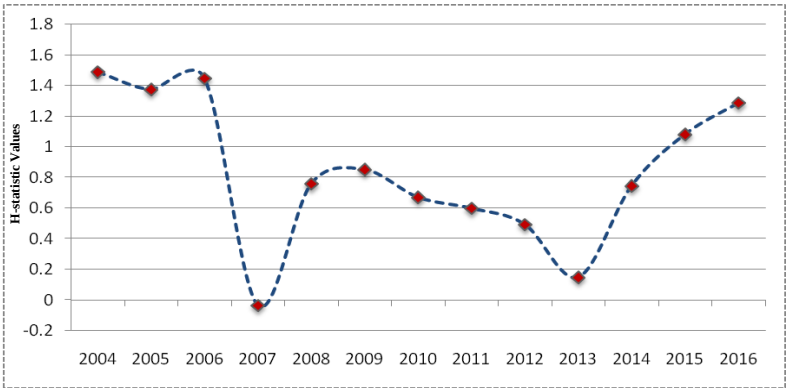
H-statistic

In order to assess the level of competition among the commercial banks, following the methodology, we calculated H-statistic in two steps. First, we estimated the multiple regression specified in Equation (2), the results of which are delegated in the **Appendix** showing that R^2 is .274, which is highly significant (p = .000) to explain the interest revenue (dependent variable). Finally, we calculated the H-statistic by summing the estimates of factor price elasticities (i.e. $\beta_1 + \beta_2 + \beta_3$) following Equation (3), which is found to be 0.5361 (= (0.4663) + (-0.0027) + (0.0725)).

During the study period (2004–2016), in terms of H-statistic, as revealed in **Figure 4**, four types of market structure prevailed in the commercial banking sector in Bangladesh. Owing to the competitive behavior of commercial banks, the findings have revealed divergent effects of competitive market characteristics (i.e. Cournot duopoly, monopolistic competition, monopoly market, and perfect competition). Predominantly, competition is monopolistic in nature among the commercial banks of Bangladesh. Cournot duopoly prevailed during 2004 to late-2006 (H >1) and then again after late-2014 (H > 1) but monopolistic competition during late-2006 to 2015 (0 < H <1), except the year 2007 when

H-statistic was negative (H= -.0335) meaning monopoly market structure. The existence of the situation of perfect competition can be traced sometime in the third quarter of 2006 (H = 1) and mid-2015 (H = 1).

Figure 4: H-statistic Values for the Period 2004- 2016



Source: Prepared by authors based on banks' financial statements

CONCLUSION

Recognizing the paramount importance of the commercial banks in the economic growth, this study analyzes the competitive behavior and concentration level in twenty commercial banks during the period of 2004–2016. Though an upward trend has been observed in the concentration level, the low concentration ratios and the HHI values (less than 0.10) point to a non-concentrated market for assets, loans, and deposits. Moreover, the study examines the competition level applying H-statistic. The decline in H-statistic values during 2004–2013 indicates that the competition among the commercial banks decreased slightly whereas the rise in H-statistic values during 2014–2016 shows that the competition increased.

The combined effects of low concentration and higher competition implying that the commercial banks operating in the country are less likely to have incentive for collusion and to exert monopoly power. The significant effects of predictor variables on interest revenue indicate that achieving cost efficiency can help the banks gain competitive advantage. The analysis of competition and concentration has significant implications for the central bank as well as the commercial bank's decision making bodies with respect to increasing access to banking services, improving banking sector's efficiency and so on. On the other hand, marketing experts can take the lesson to be vigilant in implementing new services considering level of competition and concentration of commercial banks. Future research initiatives can be taken to empirically examine how competition and concentration may play role in achieving efficiency, productivity and stability of the banking sector of the country. Furthermore, cross-country comparative

analysis might yield further insights to the understanding of competitive behavior and market power in the banking sector.

REFERENCES

Abbasoglu, O. F., Aysan, A. F., & Günes, A. (2007). Concentration, Competition, Efficiency and Profitability of the Turkish Banking Sector in the Post-Crises Period. *Banks and Bank Systems*, 2, 406-113.

Ahamed, M. (2012). Market Structure and Performance of Bangladesh Banking Industry: A Panel Data Analysis. *The Bangladesh Development Studies, 35* (30), 1-18.

Alley, W. A. (1993). Collusion versus Efficiency in The Japanese Regional Banking Industry. *The Economic Studies Quarterly, 44* (3), 206-215.

Bangladesh Bank. (2018). *Overview of Financial System of Bangladesh*. Retrieved from, https://www.bb.org.bd/fnansys/index.php. (Accessed 03 March, 2018).

Bello, M., & Isola, W. A. (2014). Empirical Analysis of Structure-Conduct-Performance Paradigm on Nigerian Banking Industry. *The Empirical Econometrics and Quantitative Economics Letters, 3* (3), 24-34.

Berger, A. N., & Hannan, T. H. (1989). The Price-Concentration Relationship in Banking. *The Review of Economics and Statistics, 71* (2), 291-299.

Claessens, S. (2009). Competition in the Financial Sector: Overview of Competition Policies. *The World Bank Research Observer, 24* (1), 83-118.

Claessens, S., & Laeven, L. (2004). What Drives Bank Competition? Some International Evidence. *Journal of Money, Credit, and Banking, 36* (3), 563-584.

Cuestas, J. C., Lucotte, Y., & Reigl, N. (2017). *Banking Sector Concentration, Competition and Financial Stability: The Case of The Baltic Countries* (No. wp2017-7). Bank of Estonia.

Dell'Ariccia, G., Igan, D., & Laeven, L. (2008). Credit Booms and Lending Standards: Evidence from the Subprime Mortgage Market, *IMF Working Paper*.

Diallo, B., & Koch, W. (2017). Bank Concentration and Schumpeterian Growth: Theory and International Evidence. *Review of Economics and Statistics, 100* (3), 489-501.

DOJ, Antitrust Division & The Federal Trade Commission, (1997). *Horizontal Merger Guidelines*. Department of Justice, Washington DC.

Fosu, S. (2013). Capital Structure, Product Market Competition and Firm Performance: Evidence from South Africa. *The quarterly review of economics and finance, 53* (2), 140-151.

Federal Reserve Bank of St. Louis, (2017). *H-Statistic in Banking Market for United States*. Retrieved from, https://fred.stlouisfed.org/series/DDOI03USA066NWDB, (Accessed 15 March, 2018).

Kick, T., & Prieto, E. (2015). Bank Risk and Competition: Evidence from Regional Banking Markets. *Review of Finance, 19* (3), 1185–1222.

Kroszner, R. S., Laeven, L., & Klingebiel, D. (2007). Banking crises, financial dependence, and growth. *Journal of Financial Economics, 84* (1), 187-228.

Leroy, A., & Lucotte, Y. (2017). Is There A Competition-Stability Trade-Off in European Banking? *Journal of International Financial Markets, Institutions, and Money*, *46*, 199-215.

Liu, H., Molyneux, P., & Wilson, J. O. S. (2013). Competition and Stability in European Banking: A Regional analysis. *The Manchester School, 81* (2), 176– 201.

Melnik, A., Shy, O., & Stenbacka R. (2005). Relative Market Share, Leadership and Competition in Concentrated Banking Markets. *International Centre for Economic Research*, Working Paper, 14.

Panzar, J. C., & Rosse, J. N. (1987). Testing for "Monopoly" Equilibrium. *Journal of Industrial Economics*, *35* (4), 443-56.

Policonomics (2013). *Cournot Duopoly Model*. Retrieved from: www.policonomics.com/ cournot-duopoly-model, (Accessed 15 March, 2018).

Repon, M. A. H., & Islam, K. M. Z. (2016). Competition and Concentration in Bangladeshi Banking Sector: An Application of Panzar-Rosse Model. *Journal of Finance & Banking Studies*, *5* (1), 16-29.

Schaeck, K., & Cihak, M. (2014). Competition, Efficiency, and Stability in Banking. *Financial Management, 43* (1), 215–241.

Shaffer, S., & Spierdijk, L. (2013). *Duopoly conduct and the panzar-rosse revenue test*. University of Wyoming and University of Groningen mimeograph.

The United States Department of Justice, (2015). *Herfindahl-Hirschman Index*. Retrieved from, www.justice.gov/atr/herfindahl-hirschman-index, (Accessed 15 March, 2018).

Appendix: Results of Multiple Regression Analysis

R Square	0.274
Adjusted R Square	0.255
Standard Error	0.020
Significance of F	0.000

Variables	Coefficients	Standard Error	t value	Significance of t
Constant	0.5425	0.283	1.915	0.057
Interest expense to deposit	0.4663	0.056	8.193	0.000
Personnel expense to number of employees	-0.0027	0.007	-0.372	0.710
Other operating expenses to total asset	0.0725	0.073	0.987	0.324
Equity to total asset	0.0349	0.059	0.597	0.551
Net loan to total asset	-0.1272	0.282	-0.452	0.651

Published by
Chairman, Department of Marketing
University of Dhaka, Dhaka 1000, Bangladesh
Contact: +880-2-9676422, www.dumarketing.ac.bd