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Use of big data in financial sector of Bangladesh – A review

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Abstract

The objective of the paper is to review the use of big data analytics (BDA) in banks and non-banks financial institutions (BNBFI) in Bangladesh. Since the advent of information technology (IT), data collection for BNBFI becomes easy through various channels. As BNBFI conduct business through information, data plays essential role to take an accurate decision. Besides, literature suggests use of big data helps BNBFI to reduce customer churn rate, enhance loyalty, manage risk and increase revenue. BNBFI are leveraging big data to transform their processes, their organizations and soon, the entire industry. For this, the study attempts to explore the effect of BDA on the efficiency of BNBFI in Bangladesh using an explorative study. Since no study has been conducted until now, collection of data becomes difficult. However, data has been collected from extensive literature review, company websites, annual reports and formal conversation with the bank employees. The primary observations suggests, some BNBFI use data analytics regarding customer through ATM transactions, debit and credit card use, online banking and generate the data from Internet and computer that has better performance than the banks which do not use it. But the performance, however, is not identified in which specific functions BNBFI can emphasize the most to promote efficiency and growth. Besides, the observation is preliminary in nature and needs further study to provide recommendation.

Key words: big data analytics, finance, efficiency, innovation

1. Introduction

Information plays essential role in financial sector. Large volume of scattered data are collected, filtered, modeled, evaluated and explained to take an accurate decision for financial industry. Two parties are involved in the decision, namely; investors and issuers. While the former indicates bank depositors, share market investors, borrowers, credit card holders and so on and the later indicates banks, non-banks financial institutions and financial markets. Both parties require large volume of data for their accurate decision making.

Big data, a new concept emerges in twenty-first century because of the information technology (IT) which represents the information assets characterized by such a high volume, velocity and variety to require specific technology and analytical methods for its transformation into value (Mauro, D. A., Marco, G., and Michele, G., 2016). Currently, the use of big data is potentially used in health, education, commerce, technology, research and financial industry. The

large volume of data can be converted into information and finally adds value for the company. The business of financial sectors is related to transactions, conducting hundreds of millions daily each adding large volume of data every day. 71 percent of these banking and financial markets firms report that the use of information (including big data) and analytics is creating a comparative advantage for their organizations, compared with 63 percent of cross-industry respondents (Turner, D., Schroeck, M., and Shockley, R., 2013). The purposes of big data analytics for banks are fraud risk management, customers spending patterns, channel usages, customer segmentation and profiling, sentiment and feedback analysis, customer retention analysis and so on (Chen, J., Tao, Y., Wang, H., and Chen, T., 2015 and Srivastava, U., and Gopalkrishnana, S., 2015). These data are collected from both traditional and modern approach using IT. Particularly, these data sources for financial sectors can include; ATMs, call centers, web-based and mobile sources, brokerage units, mortgage units, credit cards, debt including student and auto loans and the sector forecasts their business from various sources as; news, industry data, trading data, regulatory data, analyst reports (internal and competing banks), alerts about events (news, blogs, Twitter and other messaging feeds), social media and so on (Oracle, 2015).

Use of big data becomes a challenge for financial sectors in Bangladesh too. To get the best utilization of big data and to review the use of big data, this paper attempts to analyze big data in financial sector in Bangladesh. The concept is new and difficult to collect information regarding this.

Therefore, the paper is structured as; the first section describes background of Bangladesh financial system, second section describes the big data potentiality in the world, third section depicts the methodology of analysis, fourth section explains the results and fifth section discusses the results and final section provides conclusion.

2. Overview of Bangladesh financial system

Currently, there are 63 banks (57 scheduled and 6 non-scheduled), 31 non bank financial institutions (NBFIs), 18 life and 44 non-life insurance companies are operating in Bangladesh. These BNBFIs are regulated by Bangladesh Bank, the central bank of Bangladesh. 599 micro financial institutions (MFIs) are traded with the regulation of micro credit regulatory authority. Besides, two organized stock exchanges, namely, Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE) are operated with the regulatory body Bangladesh Security and Exchange Commission (BSEC). The overall financial system can be illustrated in figure 1 as follows:

3. Big data and the world

Big data is an essential issue in current business world. Everyday world creates 2.7 Zetabytes of data of data; 90% of the data in the world has been created in the last two years alone (Dijcks, J. P., 2012) while in 2008, Google was processing 20,000 terabytes of data (20 petabytes) a day (Big data stats & facts, 2017). A large percentage of users perform analytics on large volumes of data using Hadoop which was not possible before. It was predicted to reach US\$ 33.5 billion of annual revenue from the global big data market, with prediction suggesting this could double in size within the following four years (Statista, 2017). Revenue from big data and business analytics worldwide from 2015 to 2020 (in billion US\$) are illustrated in the figure 2 as:

Financial System of Bangladesh

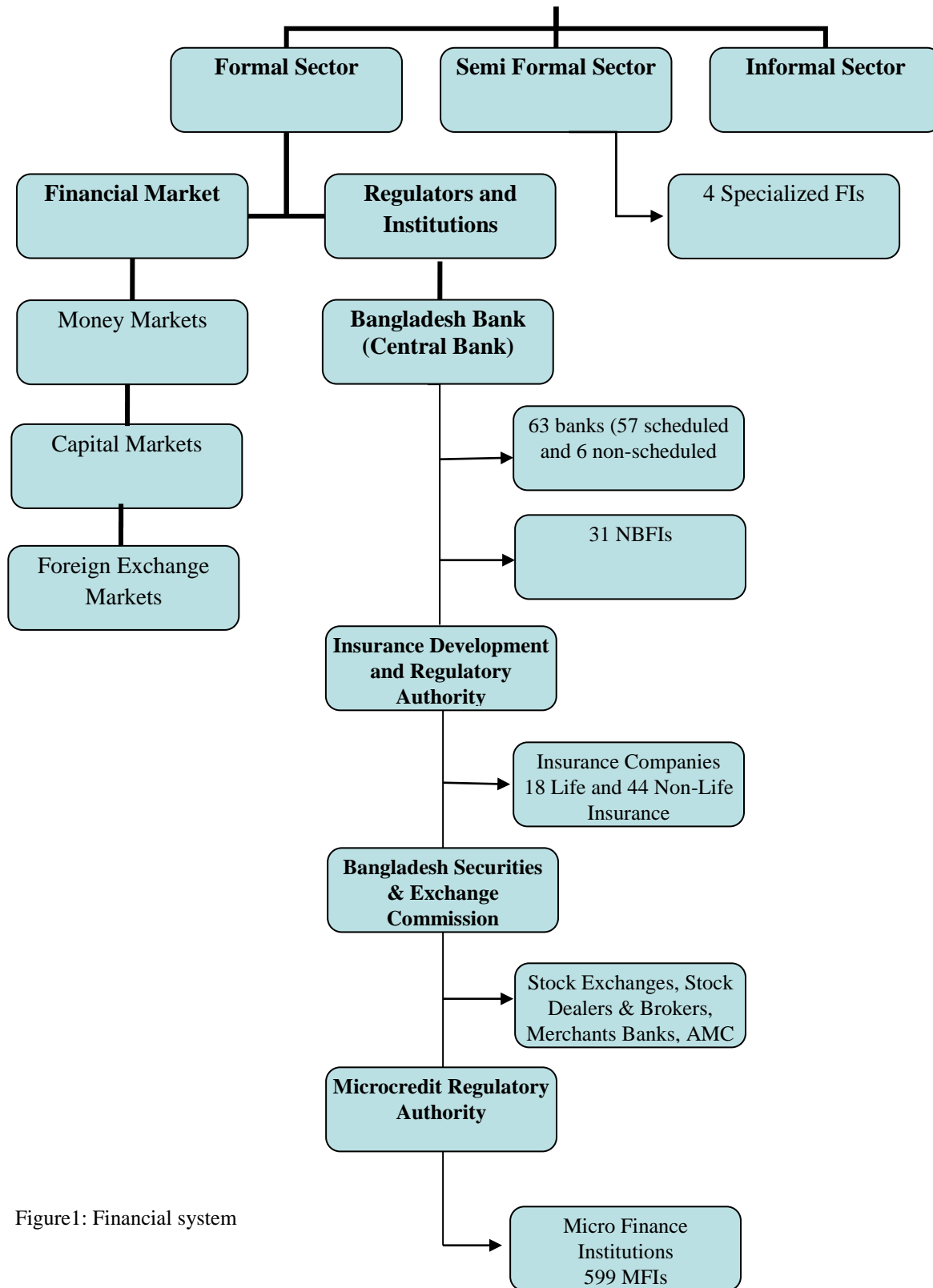


Figure1: Financial system

Revenue in billion US\$

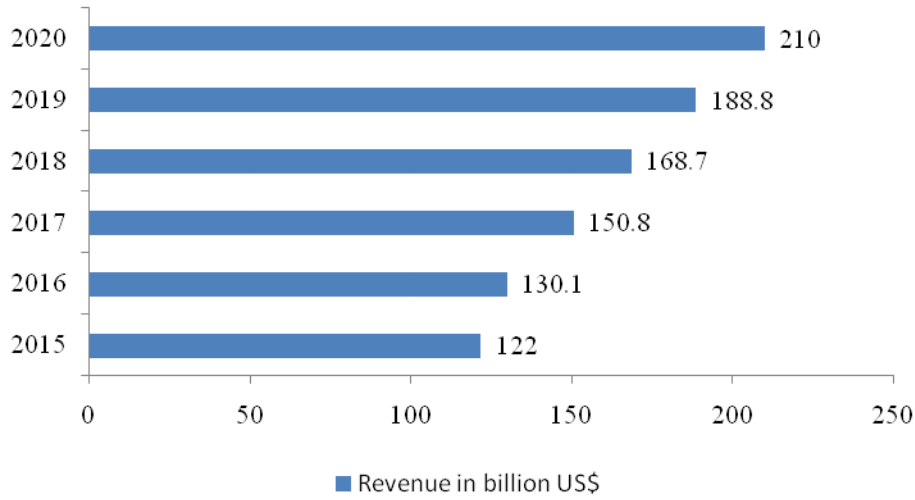


Figure2: Big data market size forecast from 2015 to 2020

Source: Statista, 2018

4. Methodology

The current study aims to review the use of big data in financial sector in Bangladesh. To meet this aim, we collect data from both primary and secondary sources. The former explains some telephone conversation with the financial sectors comprise with banks, non-banks and regulators role in the big data analytics. The later explains website sources such as the company website itself, regulator's homepage and so on.

5. Findings

Since the data collection is still in underway, we propose an explorative analysis and snap shot of big data in Bangladesh financial sector based on the questions that are raised as well as the secondary sources that are used in the study. Let us discuss the summery of the findings in the following way:

5.1 Bangladesh Bank role data initiative

Bangladesh Bank, the central bank and regulators of banks and non-banks financial institutions in Bangladesh took initiative to provide economic data to the stakeholders. Monthly data for various important economic variables are available now from this website. Moreover, the researchers interested in analyzing time series data 20 years back is also possible now. This initiative helps researchers and stakeholders to analyze data for their need using available software. Bangladesh Bank has plan to use big data analytics to handle default, manage risk very soon. But currently no information regarding big data analytics is available from their website.

5.2 Use of big data in banks

In Bangladesh, the concept of big data is still in primary stage. We discuss the issue with some banks and non-banks and ask their initiative toward data development procedures. The data are collected primarily from customer financial behavior such as deposit behavior, credit card transactions, loan statements and ATM transactions using various software. The banks and non-banks used in the sample, replied that they are acquainted with big data and have plan to exploit the potentiality of big data analytics very soon. These data are stored by IT department of the banks, that is, data is created through online banking behavior of the customer and use in order to the need. Some software is used for various purposes and to collect data for the customer. These data are mainly designed to collect for three sources; first, Core Banking Software is used for opening a bank account by deposit and loan customers, and recording their transactions, second, Switching Software is required to manage ATM and POS network, third, to collect data related to credit card issuance and transaction authorization, Credit Card Software is used, and fourth, for mobile financial services through banking network, a Mobile Banking Software is used. The data collection using these software by various BNBFI's are explained as follows:

5.3 Data collection from core banking solution

BNBFI's inform that they use several software to collect and operate data of customer for core banking solution of the banks and non-banks. T24, Flecube, Microbanker, Finware, Finacle, Corebank, Bankmaster and MidasPlus are some software that are commonly use by banks. These software are used to maintain various transactions, keeping customer information, interest calculation of loans and deposits, adjustments to accounts on withdrawal and deposit of funds. Huge data are generated in relation to the customer due to advent of ICT. Some banks and their data collection procedures using software are demonstrated in the following table 1:

Table 1: Core banking solution of BNBFI's

Software Name	Developer	BNBFI's
T24	TEMENOS	EXIM Bank Ltd, South Bangla Agriculture & Commerce Bank (SBAC) Ltd, Sonali Bank Ltd
Flexcube; Microbanker; Finware	Oracle Financial Services Software (formerly i-flex Solutions)	Dutch Bangla Bank Ltd., Prime Bank Ltd, IDLC Bangladesh
Finacle	Infosys Technologies	The City Bank Ltd., Brac Bank Ltd.,
Ababil	Millennium Information Solution Ltd. (MISL)	Dhaka Bank Ltd., Exim Bank Ltd., Union Bank Ltd.,
Equation; Bankmaster; MidasPlus	MiSys	IFIC Bank Ltd., AB Bank Ltd.,

Sources: Bank's Homepage, IT in Banking, 2013

5.4 Data collection from ATM and POS network solution

Data is generated through ATM and POS transactions using Switching Software. Pre-authorization such as card number, PIN, date of expiry and card status is required for the validation of the customer and the data are stored in the central IT department of the banks. These data are extensively used for fraud management, settlement and reconciliation of the

account to increase efficiency of the banks and non-banks. Some Switching Software use by banks to collect data are illustrated in the following table 2:

Table 2: Use of switching software use by BNBFI's

Name of Software	Name of Developer	Used by (bank)
IST/Switch	Oasis Technologies Ltd., Canada (now FIS Global Services, USA)	Dutch Bangla Bank, Prime Bank
iSwitch	Inter Block, Srilanka	UCBL, Islami Bank
Cardsuite	Tieto Enator, Latvia	One Bank, EBL
Phoenix / Iris	TPS Pakistan Limited, Pakistan	BRAC, Standard Bank, Dhaka Bank
Tranzware	Compas Plus Ltd., Russia	ITCL
ITM	Uronet Worldwide, USA	AB Bank (Cash Link)

Sources: Bank's Homepage, IT in Banking, 2013

5.5 Data collection from credit card transaction

BNBFI's inform that they collect data from credit card transactions of the user. These data are used to explain customer transaction behavior, customer feedback analysis, fraud management and overall risk management. Credit card management software use by BNBFI's are illustrated as follows:

Table 3: Credit card management software by BNBFI's

Software Name	Developer	BNBFI's
Transmaster	Tieto Enator, Latvia	Dutch Bangla Bank, EBL
CardPro	SunGurd System Access, USA	Prime, National, BRAC, BEPS
CTL Prime	Card Tech Limited, Cyprus (now Tsys Limited)	Premier, MTBL, Lanka Bangla
iCard	Inter Block, Srilanka	UCBL, Islami Bank
Tranzware	Compas Plus Ltd.	AB Bank

Sources: Bank's Homepage, IT in Banking, 2013

5.6 Data collection through e-commerce

Customer data is collected through e-commerce transaction using payment gateway software. Customers are asked several questions so that an authentic transaction can occur. The main objective of using payment gateway software by banks to manage risk and fraudulent of third party.

5.7 Data collection through mobile financial services

As of 2018, 18 banks in Bangladesh provide mobile financial services consisting 804,610 agents and 60,152,000 registered clients (about 35% of total population). Mobile financial services include inward remittance, cash in transaction, cash out transaction, P2P transaction, salary disbursement (B2P), utility bill payment (P2B), merchant payment, government payment and others (Bangladesh Bank, 2018). Bank store this data into central database and exploit in order to the need.

6. Discussion

Bangladesh has large potentiality of using big data to increase efficiency of BNBFI's since unbanked population is decreasing sharply and the use ICT is increasing gradually. BTRC reports that currently the mobile subscribers exceeded to 150 million, that is, more than 90 percent population use mobile phones in Bangladesh. Internet user on the other hand, surpasses to 85 million, that is, more than 50% of the population use either mobile internet or other sort of internet (BTRC, 2018). The good penetration of ICT refers to the strong innovation of cloud base data base so that the stakeholders can explore in order to the need (Abu, S. T., and Tsuji, M., 2011). This clearly suggests opportunity for the BNBFI's to exploit BDA so that they can collect customer data through online financial activities. When customer use more online financial services, it helps BNBFI's to store more data into their database to increase banking activities considering some major functions, such as:

- Customer transaction analysis
- Customer retention analysis
- Customer risk management
- Security and fraud analysis

7. Conclusion

Big data concept is new for BNBFI's in Bangladesh but they intend to use BDA to increase their efficiency. It opens many opportunities for financial industries if they can properly utilize. It offers accurate information to companies using complex and complete set of data sets from various sources. The important question of big data and efficiency of BNBFI's is thus relate to how the data suppose to be collected and analyzed so that it can provide complete image of their customers and therefore offer more diversified products and services to receive competitive advantage.

In Bangladesh, finance industry plays essential role in national economy. Proper information can help potential stakeholders to maximize their goal too. Traditional or unstructured data is difficult for people who do not have minimum knowledge to analyze data for their need. Thus, if this unstructured or traditional data are collected through structured way, it will offer notable advantage for BNBFI's in Bangladesh.

The current research is preliminary in nature. The main objective is to review the use of big data in banks and non-banks in Bangladesh. We observe that the revolution of data analytics have started and expect that the full fledge of big data utilization will occur if there impose noticeable improvement of policy through the legislative body. Besides, BNBFI needs to build proper data warehousing techniques, implement accurate methods and consult with experts for increasing efficiency through BDA.

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