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Thoughts on Banking and Finance

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July-December-2022

Bangladesh Bank Training Academy
Mirpur-2, Dhaka-1216

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Editorial Note

As a center of excellence Bangladesh Bank Training Academy (BBTA) publishes half yearly journal 'Thoughts on Banking and Finance' incorporating articles on macro prudential, monetary, economic and financial aspects providing insight to the bank professionals, policymakers, researchers and academicians. The current issue contains five articles shedding light on different economic and financial theme related to Bangladesh and other countries.

The first article 'Measuring and Comparing Technical, Allocative and Cost Efficiency of Islamic and Conventional Commercial Banks in Bangladesh Applying Data Envelopment Analysis (DEA)' deploying non-parametric tools DEA broadly examined and quantified efficiency of 19 commercial banks including five Islamic banks, four state-owned banks and ten conventional private commercial banks of the country. The inference of this paper is Islamic banks are more efficient comparing conventional state-owned and private commercial banks based on certain parameters. The overall findings suggest there is scope for betterment of cost efficiency by improving both technical and allocative efficiency. Accordingly, bank management need to adopt measures for promoting managerial efficiency (technical efficiency) and judiciously deploying inputs with due concentration in allocative efficiency for bringing robustness.

The second paper 'A case for building an Instant and Inclusive Payment System (IIPS) to support progress of the Bangladesh economy' aims to identify and unearth the issues for promoting efficient payment system. In this regard diagnostic review of existing payment systems is addressed for implementing the proposed IIPS matching economic development throughout the country. The data is used in this paper from both primary sources in terms of personal interviews and secondary sources. The paper articulated the experience of India, Thailand and the UK to justify the need for building an IIPS in Bangladesh. This study demonstrates some concerns about the services, costs and interoperability levels among existing digital financial service providers along with regulation and operation issues for making the financial inclusion meaningful. According to the recommendations of the paper Bangladesh Government and Bangladesh Bank may consider the issue of building an IIPS with due importance.

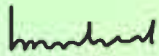
The third article 'Identifying the Spillover Effects of Domestic Oil Price Hike in the Inflation of Bangladesh' analyzes the effects of the recent oil price hike on inflation rate in Bangladesh deploying VECM approach. The author indicates a statistically significant long-run relationship among domestic oil prices, broad money supply (control variable), and the inflation rate of Bangladesh, but world oil prices show statistically insignificant

results. The inflation rate is extremely high when oil prices hike in the short run and in the long run it will be adjusted. The findings of this paper will play catalyst role for formulating monetary and fiscal policies combating the inflation.

The fourth article 'Does Islamic Bank Financing Spur Economic Growth in Bangladesh? An Application of VEC Model' evaluates the magnitude of contribution of Islamic bank financing on economic growth in Bangladesh during 1991-2020. Therefore, the paper applied Vector Error Correction Model (VECM) based on secondary time series data. The study quantitatively identifies Islamic finance including conventional bank finance, foreign direct investment and government expenditure affect GDP in positive manner in the long run. However, in the short run Islamic bank financing negatively impact the GDP growth.

The fifth paper 'A Situation Analysis of Access to Financial Services by Disabled Persons in Bangladesh' identifies the need of access to financial service of the disabled individuals for ensuring financial benefits for all segments of the society. The study deploying purposive sampling both quantitative and qualitative reveals banking system represents numerous challenges for people with disabilities in Bangladesh due to the fact that they lack banking literacy. Consequently, Banks should pay attention to the disabled customers and conduct research to improve their banking access for financial inclusion.

In conclusion, I would like to convey my heart-felt thanks and sincere gratitude to all authors, learned reviewers and members of the Editorial Advisory Board and the Editorial Board of BBTA Journal for their pragmatic and kind support to publish the current issue of the journal. My regards also extended to the associate members of the journal management committee for their thoughtful insight. I also solicit dynamic and constructive criticism and feedback for further improvement of the Journal overtime.



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Measuring and Comparing Technical, Allocative and Cost Efficiency of Islamic and Conventional Commercial Banks in Bangladesh Applying Data Envelopment Analysis (DEA)

Dr. Md. Golzare Nabi [1]

Abstract

The current study aims to measure and compare the technical, allocative and cost efficiency of Islamic and conventional commercial banks operating in Bangladesh during 2017-2022. It applies data envelopment analysis (DEA) technique to estimate efficiency of 19 commercial banks which include five Islamic banks, four state-owned banks and ten conventional private commercial banks. Islamic banks showed better efficiency performance against conventional state-owned and private commercial banks. The mean technical, allocative and cost efficiency scores were 0.990, 0.797 and 0.789 for Islamic commercial banks. In contrast, the mean technical, allocative and cost efficiency scores were 0.705, 0.536 and 0.398 for the conventional state-owned commercial banks and the scores were 0.964, 0.759 and 0.735 for conventional private commercial banks. The empirical results also show that the mean technical, allocative and cost efficiency scores of all commercial banks are 0.886, 0.698 and 0.641 respectively implying that all banks showed mean technical, allocative and cost inefficiency scores of 0.114, 0.302 and 0.359 respectively. The findings suggest that there is room for improvement of cost efficiency by enhancing both technical and allocative efficiency. To this end, bank management need to adopt measures for promoting managerial efficiency (technical efficiency) and using inputs in optimal proportion given their respective prices (allocative efficiency).

Keywords: Cost Efficiency, Data Envelopment Analysis, Commercial Banks, Bangladesh

JEL Classification Code: C14, C61, G21, G28

1 Director (Research), Research Department, Bangladesh Bank. Views expressed in the article are author's own which do not reflect necessarily the views of the institution in which he works. Feedbacks are welcome (golzare@gmail.com).

1. Introduction

Bangladesh banking system comprising Islamic and conventional commercial banks plays dominating roles in mobilizing savings and financing key sectors in the economy due to poor performance of capital market. Commercial banks have also more potential to play greater roles in accelerating saving-investment process of the country aiming at higher growth, employment generation and poverty alleviation. A growing number of studies also reveal strong association between financial and economic growth (Roubini N & Sala-i-Martin X, 1992; King and Levine 1993a,b; Hasan, R., & Barua, S., 2015). Better functioning commercial banks can promote GDP by allocating financial resources efficiently among competing economic agents (Beck, T., & Levine, R. 2004 and Sufian, F. 2014). In contrast, poor performing banks increase the chances of failure creating financial crisis and posing serious threat to the entire financial stability (Dell'Ariccia, G., Detragiache, E., &Rajan, R. 2008; Reinhart, C. M., & Rogoff, K. S. 2013).

Bangladesh economy depends on bank led finance heavily compared to capital market financing. The ratio of private sector's bank financing to GDP is 38.80% in 2022 while the ratio of market capitalization to GDP is 19.14% at the end of December, 2022 (World Bank, 2022; Bangladesh Bank, 2022b). As bank financing is the key source of financing in Bangladesh, evaluation of bank efficiency bears immense significance in accelerating saving-investment process towards inclusive growth, smoothing monetary transmission mechanisms and enhancing financial stability. Proper evaluation of banking performance in Bangladesh with sophisticated methods can offer necessary information on level of efficiency to regulators, managers, investors and customers to undertake prudent decisions.

Bangladesh Bank (BB), being the regulatory authority regulates and monitors the activities of all the scheduled banks and financial institutions (FIs). Currently, there are 6 state-owned commercial banks (SCBs), 3 specialized development banks (SBs), 43 domestic private commercial banks, 9 foreign commercial banks (FCBs), and 35 financial institutions (FIs) operating in Bangladesh (FSR, 2021). Among 58 commercial banks, 10 private commercial banks (PCBs) have been functioning as full-fledged Islamic Banks at the end of December 2022 (Bangladesh Bank, 2022c). The 10 private commercial banks offer Shariah compliant financial services with the aid of 1659 branches. In addition, 23 Islamic banking branches of 11 conventional commercial banks and 535 Islamic banking windows of 13 conventional commercial banks also provide Islamic financial services in Bangladesh. Islamic banks accounts for 25.81 percent share in terms of deposits and 29.20 percent share in terms of investments in the total banking industry at the end of December 2022 (Bangladesh Bank, 2022c). List of full-fledged Islamic Banks and Islamic banking branches and windows of conventional banks are shown in Appendix I.

There is plethora of studies on conventional and Islamic banks in developed, emerging and developing countries (Fethi, M. D., & Pasiouras, F., 2010;Bhatia, V., Basu, S., Mitra, S. K., & Dash, P., 2018; Hassan, M. K., & Aliyu, S., 2018; Narayan, P. K., & Phan, D. H. B., 2019;Tuan, L. T. D., 2020). Only few studies are found on conventional and Islamic bank

performance in Bangladesh (Rahman, M.M., 2011; Sufian, F., and F. Kamarudin. 2013; Hoque, M.R., and M.I. Rayhan. 2013; Abduh, M., Hasan, S. M., & Pananjung, A. G., 2013; Islam, S., & Kassim, S., 2015; Banna, H., R. Ahmad, and E.H. Koh. 2017; Rashid, M. H. U., et al., 2020). Against this perspective, the present study has been undertaken to examine the efficiency performance of both Islamic and conventional banks operating in Bangladesh. The current study would empirically measure and compare the cost efficiency of Bangladeshi Islamic and conventional commercial banks by using non-parametric Data Envelopment Analysis (DEA) over the period of 2017-2022.

The broad objective of the research project is two-fold: first, to examine and compare cost efficiency of commercial banks in Bangladesh over the period from 2017 to 2022. More specific objectives of the study project will be:

(a) to measure cost, technical and allocative efficiency of Islamic and conventional commercial banks in Bangladesh during the period of 2017 to 2022;

(b) to compare efficiency between Islamic and conventional commercial banks in Bangladesh during the period under study;

(c) to assess efficiency of Islamic and conventional commercial banks in Bangladesh before, during and after Covid 19 pandemic.

(d) to provide policy prescriptions for improvement of efficiency of commercial banks in Bangladesh;

The remaining portion of the paper has been organized as follows: introduction, the second section deals with review of literature; the third section focuses on methodology; the fourth section analyses findings and finally, the fifth section concludes with policy directions.

2. Literature Review

This section sheds lights on concepts of banking efficiency and some empirical studies on banking performance related to different countries particularly Bangladesh.

2.1 Measuring Performance of Bank

Bank performance can be viewed from the perspective of productivity, efficiency, competition, profitability and concentration (Bikker & Bos, 2008). According to leading Finance authors Rose & Hudgins (2013) bank performance can be defined as how fairly well a bank can satisfy the demands of various stakeholders including depositors, investors and shareholders. The writers also think that bank performance should be measured against its specific objectives and accordingly, commercial bank sets maximization of profit for shareholders and depositors as its prime objective.

In evaluating bank performance, the 'efficiency' concept of firm derived from production function in microeconomics has been widely used in many quality studies/papers (Berger and Humphrey (1997). Following this tradition, Hassan, K., M (2006) define bank efficiency as the relative performance of a bank given its inputs or outputs compared to

other banks with the same input or output limitations. In its basic output context, 'efficiency' measures the given output from a firm using a given input of resources. The most efficient bank produces maximum output from a given set of inputs. The most efficient bank will score 1 (or 100 per cent) while the most inefficient bank will score zero (0 percent). Inefficiency arises when a bank attains score of less than one.

Inspired by the pioneering work of Debreu (1951) and Koopmans (1951), Farrell (1957) introduced modern efficiency measurement based on the efficient frontier. He defined a simple measure of firm efficiency that could account for multiple inputs and he proposed that efficiency of any firm consists of two components: technical efficiency (TE)and allocative efficiency (AE).TE denotes the ability of the firm to maximize outputs from the given set of inputs while AE indicates the ability of the firm to use inputs in optimal proportion given their respective prices. Combining these two measures provides a measure of total economic or cost efficiency (Collie T. J, 1996).

A cost efficiency measure provides how close a bank's cost is to what a best-practice bank's cost would be for producing the same bundle of outputs (Weill 2004).If the objective of the production unit is cost minimization, then a measure of cost efficiency is provided by the ratio of minimum cost to observed cost (Lovell 1993).The cost efficiency has two distinct and separable components-technical efficiency (TE) and allocative efficiency (AE). The product of technical and allocative efficiency provides cost efficiency and one can calculate cost efficiency as CE=TExAE.

2.2 Empirical Papers/Studies

Here, we analyze some key papers/studies on bank's cost efficiency based on data envelopment analysis, as we will employ DEA to measure and compare cost efficiency of commercial banks in Bangladesh.

Sufian, F. (2011) critically examines the sources of inefficiency in the Korean banking sector over the period 1992-2003 employing data envelopment analysis. The DEA method allows for the decomposition of technical efficiency (TE) into its mutually exhaustive components of pure technical and scale efficiencies.The empirical findings suggest that estimates of TE are consistently higher under an operating approach vis-a`-vis the intermediation and value-added approaches. On the other hand, banks are characterized by a relatively low level of TE under the intermediation approach.

Ab-Rahim, R., et al., (2012) estimates the cost efficiency and its decompositions of Malaysian banks over the period of 1995 to 2010 by utilizing data envelopment analysis (DEA). Tobit regression analysis is also undertaken to identify the determinants of various measures of banking efficiency. The results indicate that government ownership, population density, demand density and market concentration are positively associated with several measures of efficiency while macroeconomic condition, capitalization, credit risk, asset quality and management quality have negative relationship with various

measures of efficiency. However, the size of banks is found to have mixed sign, positive coefficient with technical and pure technical efficiency while the negative relationship with scale efficiency, cost and allocative efficiency.

Raina, D., & Kumar Sharma, S. (2013) examines the cost efficiency of Indian commercial banks using Data Envelopment Analysis (DEA) over the period of 2005-06 to 2010-11. In consistent with the earlier findings, the results show that there is substantial inefficiency among the commercial banks in India over the period of the study. This result suggests that the observed cost inefficiency in the Indian banking industry is primarily due to the regulatory environment in which public sector banks are operating rather than the managerial problems in using the financial resources. The results further signify that the level of competitive practices and technology in the Indian banking industry during the post-reforms period served as a catalyst in improving the level of cost efficiency.

Islam, S., and Kassim, S. (2015) apply data envelopment analysis (DEA) in order to compare the efficiency between Islamic and conventional banks in Bangladesh during 2009-2013. The empirical results show that average technical efficiency score of Islamic banks and conventional bank is 0.965 and 0.976 respectively. Regarding sources of inefficiency of Islamic banks, the findings reveal that scale inefficiency is the main source of technical inefficiency rather than pure technical inefficiency. In contrast, technical inefficiency of conventional banks is mainly due to pure technical inefficiency rather their scale inefficiency.

Rahman, M. Mizanur & Sohel, M. Nurul Islam (2018) use Data Envelopment Analysis (DEA) in measuring the operational efficiency of the banking sector in Bangladesh during 2013 to 2017. The DEA results show that Islamic banks are slightly more efficient than conventional private banks and public conventional banks are the least efficient. The returns to scale estimation show that both conventional and Islamic banks in Bangladesh have still scope of improvement in scale efficiency. Second stage regression results indicate that Return on Asset (ROA) has significant contribution on efficiency level of the private commercial banks. It is also revealed that first-generation banks are efficient over second, third and fourth generation banks; while second generation banks are better than third and fourth generation banks.

Liu, R. (2019) applies both the Stochastic Frontier Analysis (SFA) and Data Envelopment Analysis (DEA) to examine and compare cost efficiencies of US and Canadian commercial banks during 2008-2017. The results regarding cost and profit efficiency conform to prior studies indicating a relatively low correlation. However, SFA and DEA produce very different and uncorrelated results, though DEA generates overall lower efficiencies, as expected. Thus, the findings suggest that methodology cross-checking along with information regarding variables selection is necessary before decision making.

Fagge, A. (2019) investigates the consistency of technical, allocative and cost efficiency of

deposit money banks in Nigeria over the period 2010 to 2017 using data envelopment analysis (DEA). The results show that the average technical, allocative and cost efficiency scores of the banking sector for the period under review are 80.6, 89.5 and 81.7 per cent respectively. It indicates that on average, bank could have used 19.4 per cent less resources, if it had used the method adopted by the most efficient bank.

Sang, M. (2022) analyzes the impact of COVID-19 on the efficiency of 26 Vietnamese commercial banks using data envelopment analysis (DEA) approach. Research findings reveal that Vietnamese commercial banks have effectively leveraged the impacts of the COVID-19 pandemic, since the average efficiency in 2020 improved over the pre-pandemic period in 2019.

Gulati, R., et al., (2023) estimate banks' deposits-generating and operating efficiencies using a two-stage directional distance function-based network data envelopment analysis (DDF-NDEA) approach and aims to capture the immediate impact of COVID-19 on these efficiency measures by comparing their magnitudes in the pre-pandemic (2014/15–2019/20), just 1-year prior to the pandemic (2019/20), and during the pandemic year (2020/21) periods. Findings show that the Indian banking system was resilient and withstood the immediate impact of the COVID-19 pandemic. Large and medium-sized banks experienced some efficiency losses in their operating performance.

3. Methodology

There are two main methods to measure efficiency of commercial banks namely financial ratios analysis approach and frontier analysis approach.

Under financial ratio analysis approach, different financial ratios are used to examine various aspects of banks performance. Yue (1992) mentions that though the financial ratio analysis (FRA) approach is popular for its simplicity, easy understanding and user friendliness, it suffers from some limitations. Simple financial ratios cannot be reduced to a single measure that can cover the multi-faceted bank operations. As banks use multiple inputs and produce multiple outputs, this method becomes insufficient to measure efficiency of commercial banks properly.

In contrast, under frontier analysis approach efficiency of bank is measured relative to a "best practice" frontier (production/cost function). Under the frontier analysis, various approaches use different techniques to envelop the observed data and make different accommodations for random noise and for the flexibility in the structure of the production technology (Lovell 1993). This approach is considered better as it can control differences among firms in a sophisticated multidimensional framework that has its roots in economic theory (Cummins and Weiss, 2000). Berger and Humphrey (1997) also support the frontier approach as it provides an overall, objectively determined, numerical efficiency value and ranking of firms.There are two methods to measure efficiency of bank under the frontier analysis approach such as parametric (econometric) and non-parametric (linear

programming based) methods.

Aigner et al., (1977) and Meusen and Van Den Broeck, (1977) developed the stochastic frontier analysis (SFA) as the most popular tool among parametric (econometric) methods. The stochastic frontier analysis (SFA) is used to estimate cost or production functions.It has an advantage of computing efficiency scores in multiple-inputs and multiple-outputs production setting such as banking firm with inclusion of distribution of the inefficiency and environmental variables in the model.

Charnes et al. (1978) proposed data envelopment analysis (DEA) and it is the most widely used techniques among non-parametric (linear programming-based) methods in measuring efficiency of banks. DEA is a methodology oriented on the frontiers instead of the central tendencies: it determines a linear surface on the top of observations. It is also a linear programming technique where the set of best-practice or frontier observations are those for which no other decision-making unit or linear combination of units has as much or more of every output (given inputs) or as little or less of every input (given outputs). The DEA frontier is formed as the piecewise linear combinations that connect the set of these best-practice observations, yielding convex production possibilities set. As such, DEA does not require the explicit specification of the form of the underlying production relationship.

DEA developed by Charnes et al. (1978) employed a mathematical planning program to measure the technical efficiency under constant returns-to-scale. This type of DEA model is known as Charnes–Cooper–Rhodes (CCR) model. Later, Banker et al. (1984) developed a revised model including variable returns-to-scale, thus allowing the computation of pure technical efficiency and scale efficiency which is called Banker–Charnes–Cooper (BCC) Model.

The present paper employs data envelopment analysis (DEA) in measuring cost efficiency of commercial banks in Bangladesh due to its applicability with small sample size and limitations of financial ratios analysis approach and the stochastic frontier analysis (SFA). DEA has an advantage of computing efficiency scores in multiple-inputs and multiple-outputs production setting without specifying any functional form and distribution of the inefficiency term as required by the stochastic frontier analysis (SFA).

3.1 Data Envelopment Analysis (DEA) Method: Model Specification

The present paper uses data envelopment analysis (DEA) under CCR model to estimate cost, technical and allocative efficiency of commercial banks in Bangladesh. DEA has three steps (Kumar, S., 2013).

The first step is to obtain a measure of TE. Let us consider N banks each producing M different outputs using K different inputs. The K x N input matrix, X, and the M x N output matrix, Y, represent the data of all N banks, while for the individual bank these are represented by the vectors xi and yi. The input-oriented measure of technical efficiency for

a particular bank is calculated as:

$$\min\theta, \lambda\ \theta,$$

$$st -yi + Y\lambda \geq 0$$

$$\theta xi - X\lambda \geq 0$$

$$\lambda \geq 0 \quad (i)$$

where θ is the scalar and λ is a N x 1 vector of constants. The value of θ indicates technical efficiency score for a particular bank where $0 \leq \theta \leq 1$. In case θ has value equal to 1 the bank lies on the frontier and is fully efficient while when $\theta < 1$, the bank is a relatively inefficient one.

The second step is to estimate cost efficiency of banks. If economic objective function aims to cost minimization and price information is available, DEA can be used to measure cost efficiency. We can write the cost minimization DEA model as:

$$\min\lambda, xi^* wi' xi^*$$

$$st \quad -yi + Y\lambda$$

$$xi^* - X\lambda$$

$$N1'\lambda = 1$$

$$\lambda \quad (ii)$$

where wi is a vector of input price of i-th bank and x* is cost minimization vector of input quantities for the i-th bank, given the input prices wi and output levels yi. The total cost efficiency (CE) or economic efficiency of i-th bank can be defined as

$CE = wi' xi^*/wi'xi$.....(iii)

This indicates that CE refers to the ratio of minimum costs to observed costs.

The third step is to obtain a measure of AE. Since product of technical and allocative efficiency provides cost efficiency, one can calculate allocative efficiency residually as the ratio of the measure of cost efficiency to the Farrell input-oriented measure of technical efficiency. Thus, a measure of allocative efficiency for bank i is obtained as

AE=CE/TE.....(iv)

3.2 Specification of Input and Output variables

In order to employ DEA approach, it is essential to define relevant input and output variables when measuring the efficiency of banks (Berger and Mester, 1997). Major bank studies use either production or intermediation approach.

My paper adopts the intermediation approach to select variables that has widely been used in bank studies (Hassan, M.K., 2006 and Islam, S., & Kassim, S., 2015). The

intermediation approach is suitable for banking study as banks intermediate between savers and investors by transforming deposits into earning assets, rather than as producers of services and loans.

The paper select three inputs and three outputs for the model. The input vectors include (a) deposits, (b) fixed assets and (c) labor. We measure deposits by the sum of demand and time deposits, fixed assets by costs on premises and labor by staff costs.

On the other hand, the output vector includes (a) total loans; (b) other earning assets (funds used in corporate and Government securities) and (c) off-balance sheet activities (Acceptances and endorsements, Letters of guarantee, Irrevocable letters of credit, Bills for collection).

The unit price of deposits is derived by dividing profits/interests by total deposits while calculating unit price of fixed assets by dividing expenditures on premises including other fixed assets by total fixed assets. By dividing total staff costs by the number of staff determines the unit cost of staff.

All variables are measured in millions of BDT (Bangladesh currency Unit, Taka).

3.3 Sample Size and Data

My empirical analysis is based on a sample of 19 commercial banks in Bangladesh, which includes 4 state-owned commercial banks, 10 domestic private conventional commercial banks and 5 Islamic commercial banks. The four state-owned banks cover 91% assets among state-owned banks, 10 domestic private banks cover 54% assets among private banks and 5 Islamic commercial banks cover 84% assets among Islamic banks. The 19 banks in the sample cover over 65% assets of the entire banking industry in Bangladesh which is well representative of the banking industry in Bangladesh. List of sample banks is shown in Appendix. II

The study uses balanced panel data of selected banks collected from their annual reports during 2017-2022 for measuring and comparing cost efficiency performance of commercial banks in Bangladesh. The DEAP version 2.1 program developed by Coelli, T. (1996) is used to compute efficiency applying data envelopment analysis.

4. Findings and Discussions

This section analyses and compares cost efficiency of different types of Commercial Banks in Bangladesh during the study period of 2017 to 2022. A 100 percent efficient bank attains score 1 (one) and bank with score less than 1 (one) is treated as inefficient bank. The more the score less than one, the higher will be inefficiency.

4.1 Efficiency of Islamic Private Commercial Banks

Table-4.1 depicts trend of cost efficiency of sample Islamic commercial banks during 2017- 2022. Among Islamic banks in the sample, Islami Bank Bangladesh Limited, the largest Islamic Bank secured mean technical, allocative and costefficiency scores of

Table 4.1: Efficiency of Islamic Commercial Banks (ICBs)

Bank	Efficiency	2017	2018	2019	2020	2021	2022	Mean
IBBL	TE	0.891	1.000	1.000	0.925	1.000	1.000	0.969
	AE	0.921	0.980	1.000	0.875	0.934	1.000	0.952
	CE	0.821	0.980	1.000	0.809	0.934	1.000	0.924
AAIBL	TE	0.931	0.978	1.000	1.000	1.000	1.000	0.985
	AE	0.889	0.766	0.762	0.572	0.642	0.679	0.718
	CE	0.827	0.750	0.762	0.572	0.642	0.679	0.705
SIBL	TE	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	AE	0.889	1.000	1.000	1.000	1.000	1.000	0.982
	CE	0.889	1.000	1.000	1.000	1.000	1.000	0.982
EXIM	TE	1.000	1.000	0.983	1.000	1.000	1.000	0.997
	AE	0.882	0.736	0.717	0.759	0.853	0.558	0.751
	CE	0.882	0.736	0.704	0.759	0.853	0.558	0.749
SJIB	TE	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	AE	1.000	0.5700	0.531	0.477	0.401	0.527	0.584
	CE	1.000	0.5700	0.531	0.477	0.401	0.527	0.584
Mean	TE	0.96	1.00	0.997	0.985	1.000	1.000	0.990
	AE	0.92	0.81	0.802	0.737	0.766	0.753	0.797
	CE	0.88	0.81	0.799	0.723	0.766	0.753	0.789

Source: Author's Calculation based on DEA

0.969, 0.952, and 0.924 respectively during 2017-2022. Al Arafah Islami Bank Limited attained mean technical, allocative and cost efficiency scores of 0.985, 0.718, and 0.705 respectively. The mean technical, allocative and cost efficiency scores were 1.000, 0.982 and 0.982 for SIBL, 0.997, 0.751, and 0.749 for EXIM bank and 1.000, 0.584 and 0.584 for Shahjalal Islami bank. All Islamic Banks face mean technical, allocative and cost efficiency scores of 0.990, 0.797, and 0.789 respectively during the study period. It implies that all Islamic banks could use 21.1 percent less resources (cost inefficiency) to produce the present level output.

4.2 Efficiency of State-Owned Commercial Banks (SCBs)

Table 4.2 shows efficiency scores of State-owned Commercial Banks (SCBs). Sonali Bank, the largest bank in Bangladesh secured mean technical, allocative and cost efficiency scores of 0.556, 0.371 and 0.264 respectively during 2017-2022. The mean technical, allocative and cost efficiency scores were 0.875, 0.559 and 0.500 for Janata bank, 0.680, 0.554 and 0.393 for Agrani bank and 0.711, 0.662, and 0.436 for Rupali bank during the period under review. All State-Owned commercial banks attained mean technical, allocative and cost efficiency scores of 0.705, 0.536, and 0.398 respectively during the study period. It implies that all state-owned commercial banks could save 60.19 percent resources (avoiding cost inefficiency) to produce the present level output.

Table 4.2: Efficiency of State-owned Commercial Banks (SCBs)

NCBs	Efficiency	2017	2018	2019	2020	2021	2022	Mean
SB	TE	1.000	0.377	0.475	0.442	0.495	0.546	0.556
	AE	1.000	0.226	0.196	0.214	0.281	0.311	0.371
	CE	1.000	0.085	0.093	0.094	0.139	0.170	0.264
JB	TE	1.000	0.942	0.888	0.771	0.829	0.820	0.875
	AE	0.888	0.582	0.521	0.421	0.466	0.474	0.559
	CE	0.888	0.549	0.463	0.325	0.386	0.389	0.500
AB	TE	0.962	0.596	0.672	0.553	0.578	0.716	0.680
	AE	0.850	0.602	0.517	0.429	0.457	0.466	0.554
	CE	0.818	0.359	0.348	0.237	0.264	0.333	0.393
RB	TE	0.799	0.598	0.740	0.634	0.789	0.703	0.711
	AE	0.825	0.812	0.740	0.578	0.420	0.595	0.662
	CE	0.660	0.486	0.353	0.366	0.331	0.418	0.436
Mean	TE	0.940	0.628	0.694	0.600	0.673	0.696	0.705
	AE	0.891	0.556	0.494	0.411	0.406	0.462	0.536
	CE	0.842	0.370	0.314	0.256	0.280	0.328	0.398

Source: Author's Calculation based on DEA

4.3 Efficiency of Conventional Private Commercial Banks (CPCBs)

Table-4.3 depicts cost efficiency of private conventional commercial banks during the study period.The mean technical, allocative and cost efficiency scores were 0.863, 0.676, and 0.604 for Pubali bank, 1.000, 0.942, and 0.942 for AB Bank and 1.000, 0.882 and 0.882 for NBL during the period under review.The mean technical, allocative and cost efficiency scores were 0.997, 0.659, and 0.656 for City Bank, 0.991, 0.991 and 0.983for IFIC and 0.964, 0.517 and 0.492 for UCBL during the period under review. The mean technical, allocative and cost efficiency scores were 0.894, 0.865, and 0.775 for DBBL, 1.000, 0.647 and 0.647 for Prime, 0.953, 0.639 and 0.611 for Southeast and 0.977, 0.776 and 0.756 for Brac Bank. All private commercial banks faced mean technical, allocative and cost efficiency scores of 0.964, 0.759 and 0.735 respectively during the study period. It implies that all conventional private banks could avoid wastage of 26.53 percent resources (cost inefficiency) to produce the present level output.

Table 4.3: Efficiency of Conventional Private Commercial Banks (CPCBs)

PCB	Efficiency	2017	2018	2019	2020	2021	2022	Mean
Pubali	TE	1.000	0.820	0.806	0.729	1.000	0.820	0.863
	AE	0.938	0.645	0.535	0.462	1.000	0.473	0.676
	CE	0.938	0.529	0.431	0.337	1.000	0.388	0.604
AB	TE	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	AE	1.000	0.914	0.912	0.825	1.000	1.000	0.942
	CE	1.000	0.914	0.912	0.825	1.000	1.000	0.942
NBL	TE	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	AE	0.984	0.889	1.000	0.955	0.465	1.000	0.882
	CE	0.984	0.889	1.000	0.955	0.465	1.000	0.882
City	TE	1.000	1.000	1.000	1.000	0.984	1.000	0.997
	AE	0.906	0.567	0.583	0.536	0.943	0.417	0.659
	CE	0.906	0.567	0.583	0.536	0.928	0.417	0.656
IFIC	TE	0.948	1.000	1.000	1.000	1.000	1.000	0.991
	AE	0.948	1.000	1.000	1.000	0.999	1.000	0.991
	CE	0.899	1.000	1.000	1.000	0.999	1.000	0.983
UCBL	TE	0.952	0.889	0.980	0.962	1.000	1.000	0.964
	AE	0.952	0.511	0.404	0.415	0.361	0.458	0.517
	CE	0.881	0.454	0.396	0.399	0.361	0.458	0.492
DBBL	TE	0.837	0.957	0.947	0.869	0.877	0.879	0.894
	AE	0.986	0.960	0.904	0.743	0.778	0.821	0.865
	CE	0.825	0.918	0.856	0.646	0.682	0.722	0.775
Prime	TE	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	AE	1.000	0.517	0.549	0.575	0.618	0.620	0.647
	CE	1.000	0.517	0.549	0.575	0.618	0.620	0.647
Southeast	TE	1.000	0.870	0.932	0.913	1.000	1.000	0.953
	AE	1.000	0.612	0.607	0.555	0.506	0.555	0.639
	CE	1.000	0.532	0.566	0.507	0.506	0.555	0.611
BRAC	TE	0.862	1.000	1.000	1.000	1.000	1.000	0.977
	AE	0.856	1.000	0.745	0.751	0.715	0.589	0.776
	CE	0.738	1.000	0.745	0.751	0.715	0.589	0.756
Mean	TE	0.960	0.954	0.967	0.947	0.986	0.970	0.964
	AE	0.957	0.762	0.724	0.682	0.739	0.693	0.759
	CE	0.917	0.732	0.704	0.653	0.727	0.675	0.735

Source: Author's Calculation based on DEA

4.4 Relative Efficiency of Islamic Banks, State-owned and Conventional Private

The comparative analysis reveals that Islamic banks attained higher technical efficiency score (0.990), allocative efficiency score (0.797) and cost efficiency (0.789) compared to those of state-owned commercial banks and conventional private commercial banks (Table 4.4). All commercial banks faced mean technical, allocative and cost efficiency scores of 0.886, 0.698 and 0.641 respectively during the study period. It implies that all banks could avoid wastage of 35.95 percent resources (cost inefficiency) to produce the present level output.

Table 4.4: Mean Efficiency of Islamic, NCBs and Private Commercial Banks

Bank	Efficiency	2017	2018	2019	2020	2021	2022	Mean	Rank
Islamic Bank	TE	0.964	0.996	0.997	0.985	1.000	1.000	0.990	1
	AE	0.916	0.810	0.802	0.737	0.766	0.753	0.797	1
	CE	0.884	0.807	0.799	0.723	0.766	0.753	0.789	1
NCBS	TE	0.940	0.628	0.694	0.600	0.673	0.696	0.705	3
	AE	0.891	0.556	0.494	0.411	0.406	0.462	0.536	3
	CE	0.842	0.370	0.314	0.256	0.280	0.328	0.398	3
PCBs	TE	0.960	0.954	0.967	0.947	0.986	0.970	0.964	2
	AE	0.957	0.762	0.724	0.682	0.739	0.693	0.759	2
	CE	0.917	0.732	0.704	0.653	0.727	0.675	0.735	2
Overall Mean	TE	0.955	0.859	0.886	0.844	0.886	0.889	0.886	
	AE	0.921	0.709	0.673	0.610	0.637	0.636	0.698	
	CE	0.881	0.636	0.606	0.544	0.591	0.585	0.641	

Source: Author's Calculation based on DEA

4.5 Efficiency of Commercial Banks Before, During and After Covid 19

The study also finds that the mean technical, allocative and cost efficiency scores of all banks fall during covid 19 period (2020) and rise after Covid 19 period. It implies that Bangladeshi commercial banks showed resilience after covid 19 period. Massive stimulus packages supported by Bangladesh Bank, the Central Bank and Government of Bangladesh have contributed greatly to attainment of resilience after covid 19 period. The Government declared stimulus packages amounting BDT 1,213.53 billion, i.e., 4.34 percent of the GDP up to November, 2020. Bangladesh Bank, being the monetary authority of the country quickly introduced voluminous refinance schemes, monetary easing and reviewing the key policy rates to ensure adequate liquidity and fund flows into the financial system to facilitate the faster recovery process of the real economy (Bangladesh Bank, 2021).

5. Conclusion and Policy Directions

The present study examines and compares the technical, allocative and cost efficiency of commercial banks operating in Bangladesh during 2017-2022. It applies data envelopment analysis (DEA) to compute efficiency of 19 commercial banks which include five Islamic banks, four state-owned banks and ten conventional private commercial banks.Islamic banks outperform both conventional state-owned banks and conventional private commercial banks. The mean technical, allocative and cost efficiency scores were 0.990,

0.797, and 0.789 for Islamic commercial banks. The respective scores were 0.705, 0.536 and 0.398 for the state-owned banks and 0.964, 0.759 and 0.735 for conventional private commercial banks. The study finds that the mean technical, allocative and cost efficiency scores of all banks are 0.886, 0.698, and 0.641 respectively during 2017-2022. It implies that all banks could avoid wastage of 35.95 percent resources (cost inefficiency) to produce the present level output.

Based on the empirical results, the following policy directions can be deduced:

i. In my study, the main source of cost inefficiency is allocative inefficiency and the minor source is technical inefficiency. Technical inefficiency occurs due to employing higher inputs to produce a certain level of output while allocative inefficiency is said to occur when the cost is not minimized with given output level and input price. It is clear that there is room to improve technical and allocative to promote cost efficiency scores of commercial banks by removing inefficiency.

ii. The findings suggest commercial banks in Bangladesh for rationalizing financing and operating costs for removing allocative efficiency.

iii. The commercial banks in Bangladesh, state-owned banks in particular can improve technical efficiency by promoting managerial performance. To this end, appointment of qualified persons in the Bank's Board and more allocation for salaries, training and skills development for bank staffs are required to remove managerial underperformance.

iv. Bangladeshi commercial banks showed resilience after covid 19 period due to adoption of massive stimulus packages supported by Bangladesh Bank, the Central Bank and Government of Bangladesh. Adoption of stimulus packages will be required in future to address the adverse effects of crisis like Covid-19.

v. The findings of the paper should be interpreted carefully. The adjustment of non-performing loan in output variable may reduce technical efficiency further. Our sample is based on 19 banks out of 58 commercial banks for 6 years period only. Moreover, performance evaluation of Islamic Banks needs to apply additional tools beyond traditional tools as these banks have to follow the rules of Islamic Shariah.

vi. The DEA method has some weakness as it assumes that every input and output variables can be known without uncertainty. However, in practice, it is not possible to have data with homogeneous features. Measurement error and environmental factors affect form and position of the frontier. Given this, some scholars have continued efforts to further develop DEA for addressing the issues (Hossain et al., 2013).

vii. To attain more reliable and robust findings, future research may include adoption of two methods rather than single method for methodological cross checking, selection of larger sample size with longer period and use of control and environmental variables in the model and inclusion of Maqasid al Shariah (objectives of Shariah) issues for efficiency analysis of Islamic commercial banks.

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Appendix 1

List of Islamic Banks, Branches and Windows, 2022

Bank Name / Branches	Full-fledged Islamic Banks	Islamic Banking Branches of Conventional Banks	Islamic Banking Windows of Conventional Banks
1.	Islami Bank Bangladesh Limited (384)	The City Bank Limited (1)	Sonali Bank Limited (58)
2.	ICB Islamic Bank Limited (33)	AB Bank Limited (1)	Janata Bank Limited**
3.	Social Islami Bank Limited (179)	Dhaka Bank Limited (2)	Agrani Bank Limited (60)
4.	Al-ArafahIslami Bank Limited (208)	Premier Bank Limited (2)	Pubali Bank Limited (17)
5.	EXIM Bank Limited (147)	Prime Bank Limited (5)	Trust Bank Limited (15)
6	Shahjalal Islami Bank Limited (140)	Southeast Bank Limited (6)	Bank Asia Limited (5)
7.	First Security Islami Bank Limited(209)	Jamuna Bank Limited (2)	Standard Chartered Bank (1)
8.	Union Bank Limited (112)	Bank Alfalah Limited (1)	Mercantile Bank Limited (46)
9.	Standard Bank Limited (138)	NRB Bank Limited (1)	Midland Bank Limited (1)
10.	Global Islami Bank Limited (99)	One Bank (2)	NRBC Bank Limited (268)
11.		UCB (1)	One Bank Limited (14)
12.			Meghna Bank Limited (9)
13.			Mutual Trust Bank Limited(15)
14			Premier Bank Limited (25)

Sources: Bangladesh Bank (2022c).

Note: Figure in parenthesis indicate number of branches/windows

**Janata Bank Limited has obtained permission for starting Islamic Banking window from Bangladesh Bank, but not yet started operation.

Appendix II

List of Sample Banks

State Owned Commercial Banks (SCBs)

1. Sonali Bank Limited (SB)
2. Janata Bank Limited (JB)
3. Agrani Bank Limited (AB)
4. Rupali Bank Limited (RB)

Islamic Commercial Banks (ICBs)

1. Islami Bank Bangladesh Limited (IBBL)
2. Al-ArafahIslami Bank Limited (AIBL)
3. Social Islami Bank Limited (SIBL)
4. Export Import (EXIM) Bank of Bangladesh Limited (EXIM)
5. Shahjalal Islami Bank Limited (SJIBL)

Conventional Private Commercial Banks (CPCBs)

1. Pubali Bank Limited (PUB)
2. AB Bank Limited (ABB)
3. National Bank Limited (NB)
4. The City Bank Limited (CB)
5. International Finance Investment and Commerce Bank Limited (IFIC)
6. United Commercial Bank Limited (UCB)
7. Dutch-Bangla Bank Limited (DBB)
8. Prime Bank Limited (PBL)
9. Southeast Bank Limited (SEB))
10. BRAC Bank Limited (BRAC)

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A case for building an Instant and Inclusive Payment System (IIPS) to support progress of the Bangladesh economy

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Abstract

The main objective of this study is to analyze the case for building a proposed IIPS (Instant and Inclusive Payment System) [1] in Bangladesh. Hence, a diagnostic review of existing payment systems was done also to assess whether their performance was enough to meet the current and future demands of the economy; or whether implementing the proposed IIPS is required for balancing the progress of the economic development throughout the country. The data have been collected from both primary sources i.e. personal interviews and secondary sources. The experience of India, Thailand and the UK is used to justify the need for building an IIPS in the context of Bangladesh. This study highlights some concerns about the services, costs, and interoperability levels among existing DFS providers. I also consider the regulation and operation issues for making the financial inclusion meaningful. Finally, by taking cognizance of the features and recommendations mentioned below for establishing an IIPS in Bangladesh, I am humbly requesting the Government and Bangladesh Bank to consider the issue of building an IIPS as a part of implementing the SDGs by 2030.

Keywords: Drivers, considerations, Fast payment services, IIPS, Bangladesh

Standard JEL Classification Codes: C42, E42, E58

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Views expnessed in this article are author's which do not reflect necessarily the views of the institution in which he works.

i. Introduction

The banking system acts as an intermediary for the transfer of fund from surplus units to deficit units of the different segments of the economy of the country, as such the economic activities have been recycled for the development and value of economy. The value has been created for both public and private sectors at large. The payment system infrastructure plays an important supportive role in the money creation process in the economy. The flow of money has been circulated by using banking sector platforms for a long time. The manual clearing system provided logistic support under the control of Bangladesh Bank before 2008. The manual system was not enough to meet up the market demands of the growing economy.

For ensuring the fast and secure money transfer and financial instruments, the Manual clearing system had been replaced by the Bangladesh Automated Cheque Processing System (BACPS) in 2010. Side by side, Bangladesh Electronic Fund Transfer Network (BEFTN) was introduced for debiting & crediting fund electronically on a limited scale among all participating banks since 2011. The national payment switch of Bangladesh (NPSB) had been established in 2012 to bring interoperability of card and online transactions among participating banks under the BB. The EMV Standardization process for cards and implementation of PCI-DSS compliant environment is under process. In 2015, BB started a new journey with the Bangladesh Real Time Gross Settlement (BD-RTGS) system for providing instant settlement of high-value transactions. Another significant development has been made in the field of digital banking in 2011. By using the service of mobile network providers, bank led mobile banking had been enacted. The mobile financial services (MFS) providers have extended their digital payment platform toward the mobile phone users through their agents. Mobile banking transactions are out of the purview of the existing electronic clearing system. The formalities for opening mobile banking accounts are easy. Mobile banking has reduced the need for using branch banking step by step. As such, mobile financial services are becoming popular. During the span of 12 years (2008-2020), the payment systems of Bangladesh have implemented different payment and settlement mechanisms to ensuring secure and quick payment to the targeted customer digitally under the different market segments.

The MFS providers are dealing only in retail transactions [III] i.e. P2P and some of the G2P services for social services and distribution of government safety nets. During the pandemic, the use of MFS has been increased gradually. But a significant amount of business transactions (wholesale transactions) in Bangladesh are still routed through a cheque clearing system even though gradual improvement of other digital payment systems like Electronic Fund Transfer Network, National Payment Switch, Real-Time

Gross Settlement system, and mobile Financial services are made. The satisfactory progress of card and ATM-based transactions are observed even during the pandemic situation. The safety and security of the above payments system have been maintained properly by the respective providers and Bangladesh Bank has also enhanced its supervision activities from time to time to ensure a level playing field among competitors and to reduce stability risk at the comfort level.

The whole economy of Bangladesh is cash-based. The electronic banking covers a small portion of transactions. The informal economy is dependent on cash but has contributed to providing significant employment to the economy. Electronic banking has not yet provided services to the customers satisfactorily and is also charging the high costs for each transaction. The publicity and reputation of MFS are in a primitive stage and even creating some moral hazards to the juncture of financial inclusion at the grass-root level. The high growth rate of Bangladesh's economy has been cut down due to the unfavorable effects of the pandemic. Bangladesh Government has a specific target to implement the SDGs by 2030 and to escalate to become a rich country by 2041, supported by continuing high growth rate together with balancing development needs. To achieve the goal, the various segments of the economy and the payments platforms need to integrate into a newer shape.

The present payment platform is not yet customized to deal with the proposed transactions to be aligned with the country's rapid growth due to some limitations. In that situation, the building of the proposed **IIPS** ***(an instant, interoperable, real-time, immediate, rapid and around the clock on a 24/7 basis payment service providers which transmit fund instantly to the beneficiaries to be used by them suitably at anytime and anywhere)*** by the Bangladesh Bank in coordination with the Government is one of the panaceas in line with implementing the SDGs under the NFIS and also to remove the existing shortcomings within the payment ecosystem. A comparative analysis of benchmark countries is given below to be used for expediting the initiative by the BB. As per Table 1, it appears that in terms of access to finance, mobile phones, and banking; the position of Bangladesh is below than other 3 countries. The success of those countries depends on the rapid implementation of fast payments[2] infrastructures, which all of them now have, whereas Bangladesh is in the primary stage together with facing some hassles yet to alleviate the fast payment or IIPS environment. The features and recommendations mentioned in this paper definitely will be helpful for the regulators if they desire to work on this issue.

- **Comparative analysis with countries that implemented fast payments services: (Table – 1.0)**

Sl.	Indicators	India (2019)	Thailand (2019)	UK (2019)	Bangladesh (2019)
01.	GDP	$2.875 tln	$543.6 bln	$ 2.83 tln	$351.24 bln
02.	Income Category	Lower middle	Upper middle	High	Lower Middle
03.	Population	1.366 bln	69.6 mln	66.83 mln	166.5 mln
04.	Access to Mobile Phone	68.52%	92.3%	94.53%	54%
05.	Access to Internet	14.13%	54.1%	88.82%	28%
06.	Bank Account	79.87%	81.6%	96.36%	50%
07.	Branches per 1,00,000 adult	14.72	11.88	15.56	8.98
08.	Made or received digital payment in last 1 year	28.69%	62.3%	95.60%	34%
09.	Received government wages or transfer in account	13.06%	38.04%	75.51%	41%

Source: Resources | Fast Payment System (https://fastpayments.worldbank.org/resources); The Global Findex Database 2021(https://www.worldbank. org/en/publication/ globalfindex/ Data); Bangladesh: internet penetration rate | Statista; GSMA-Achieving mobile-enabled digital inclusion in Bangladesh (https://www.gsma.com/ mobilefordevelopment/wp-content/ uploads/2021); Bangladesh GDP - 2022 Data - 2023 Forecast -1960-2021 Historical - Chart – News (https://tradingeconomics.com/ bangladesh/gdp); Bangladesh-Bank Branches Per 100,000 Adults - 2023 Data 2024 Forecast 2004-2020 Historical (https:// tradingeconomics.com/ bangladesh/ commercial -bank-branches-per-100-000-adults-wb-data.html).

ii. Review of countries' experience of adopting fast payment services:

The World Bank Group (2020)[4] has prepared a toolkit to guide different countries in customizing policies and existing models to implement fast payment systems (p1-19). This toolkit covers the experiences of implementing fast payment services by the 85 stakeholders around the world. Among them, we took the experiences of three countries for analysis purposes below:

The World Bank (2021)[5] focuses in a case study of India (p1-52) on the issue of facilitating a fast payment network, RBI and the National Payments Corporation of India **(NPCI)**, which started its journey as a separate institution in **India** in 2010, worked together for establishing an immediate payment service **(IMPS)** network by leveraging Smartphone technologies in a real-time 24*7*365 environment. Later on, In2016, RBI and NPCI came up with a convenient solution named Unified Payments Interface **(UPI)** within 9 months for establishing communication across different mobile banking applications of banks and also adding the option of interoperability. It carries out Bulk payments (e.g., salaries, etc.) by banks and Fin-Techs through APIs (such as Pay U, Cash-free, etc.) or file transfer. 40 percent of UPI transactions are from Merchant payments. The IPO of capital market and the foreign remittance of domestic leg is routed through UPI. The increased bank accounts were a key enabler of UPI with unique 15.96 crore users. The Interoperability between channels, participants, and payment instruments is the key. The ISO 8583 was adopted in IMPS for standardizing the communication format. Both IMPS and UPI have implemented two-factor authentication in line with RBI guidelines. The IMPS and UPI both are under the jurisdiction of The PSS Act, 2007 in India. The NPCI was a non-profit organization. The proper risk management and cyber security are duly ensured throughout the process.

As per case study of Thailand conducted by the World Bank (2021, p1-39)[6], **Prompt Pay of Thailand** was launched in 2016 for providing a real-time electronic fund transfer operating system (24*7 bases). It is also used for social welfare transfers and tax refunds by the government. The ISO 20022 (for internal switch) and ISO 8583 (member banks) are applied. It provides deferred net settlement. Multiple aliases are supported here. Monetary Authority of Singapore (MAS) and the BOT are working together to link Pay-now and Prompt Pay systems to facilitate cross-border payments. Additionally, The Thai government and the BOT are working on the development of infrastructures, such as the National Digital ID and e-KYC. In 2019, Prompt Pay processed significant transactions. The Payment System Act B.E. 2560, which was announced in 2017, supports the activities of Prompt Pay. The prompt pay has adequate corporate governance with sound risk management. They have a window to mitigate credit and liquidity risks.

As per case study of UK conducted by the World Bank (2021, p1-36)[7], **United Kingdom's (UK)** Faster Payments Service **(FPS)** provides real-time 24*7 payment services to individuals, businesses, and government agencies since 2008. FPS was formed under government guidance to reduce payment processing time to a single day. Side by side, the

industry subsequently improved its system to Near Real- Time payments (NRT). As a result, the Users can transfer funds via branch, internet banking, mobile banking and telephone banking. Currently, the FPS also supports standing order payment, forward dated payment, bill payment, bulk payment, and single immediate payments i.e., spontaneous payments on the part of the payer as use cases. The provisions for the Financial Service (Banking Reform) Act 2013; Banking Act 2009; the Competition Act 1998; the Enterprise Act 2002 and Payment Services Regulations (PSRs) 2017 have created sufficient ground to conduct a fast payment network in UK. Bank of England oversees the payments system. On the other hand, in 2015, Payment Systems Regulator (PSR) was formed as an independent regulator to promote competition and enhance innovation in the payments landscape in the country. Bank of England, Financial Conduct Authority, and Payment Systems Regulator came under a Memorandum of Understanding (MOU) for providing the roles and responsibilities of individual entities for payments regulation in the UK.

iii. Review of regulations for payment systems in Bangladesh:

Bangladesh Bank Order-1972 is the main legal foundation to operate the payment and settlement system (Bangladesh Bank, n.d.)[8] safely and securely. The payment system department of Bangladesh Bank regulates and supervises the activities of different segments of payment systems of Bangladesh. To enact a National Payment System Act in Bangladesh is in underway. There are some other relevant laws such as the Negotiable Instruments Act, 1881; Bankers Book of Evidence Act 2021; The Banking Companies Act, 1991; Money Laundering Prevention (Amended) Act, 2015; Information and Communication Technology Act, 2006; The Bankruptcy Act, 1997; The Foreign Exchange Guidelines, Volume1 & 2; Foreign Exchange Regulations Act, 1947; The Bangladesh Telecommunication Act, 2001; Anti Terrorism Act'2009; Competition act, 2012 and other related banking laws has been updating time to time for ensuring proper legal backing of a sound electronic payment ecosystem all over Bangladesh.

The feature of **Bangladesh Automated Cheque Processing System (BACPS)** was mentioned in the write up of Ismail, Kazi Mohammad (2016, PPT 1-15)[9]. The rules of BACPS has been updated lastly vides PSD circular No. 07/2019 dated 05 December, 2019 as a part of enacting a newly upgraded BACPS system including a FC clearing system. Learning BD School (2018)[10] mentioned an overview of **Bangladesh Electronic Funds Transfer Network (BEFTN),** it is operated under BEFTN Operating Rules Version 2.0 enacted vide PSD Circular No. 08/2020 dated 28 October'2020. **"Regulations on Electronic Fund Transfer 2014"** enacted for transferring fund electronically by using different channels.

There was a revolutionary step by the Bangladesh Bank to formulate the **"Bangladesh Payment and Settlement System Regulations, 2014"** by replacing **"Bangladesh Payment and Settlement System Regulation, 2009".** Bangladesh Bank (n.d.)[11]

mentioned the feature of NPSB in its website. **The guideline for the National payment Switch Bangladesh (NPSB) logo** vide PSD circular letter no. 01/2019 dated March 11, 2019 for effective use of logo at NPSB designated ATM Booths, POS terminals, Digital display, and all proprietary cards. Bangladesh Bank (n.d)[12] also discussed the issue of RTGS clearly. **Bangladesh Real-time Gross Settlement (BDRTGS) System Rules** were issued in September 2015. Business haunt (2022)[13] has pointed out the importance of MFSPs in Bangladesh. **The MFS Regulations 2018** was enacted later on by replacing the previous guidelines. **The Payment Service Provider (PSP) and Payment System Operator (PSO)** licenses have been awarded by Bangladesh Bank as per provisions contained in "Bangladesh Payment and Settlement Systems Regulation-2014 (BPSSR-2014)". **Regulatory FinTech Facilitation Office (RFFO)** was established in Bangladesh Bank in October 2019 to review the regulation related to Fintech.

iv. Limitations and challenges in the existing system:

From the survey and from the secondary sources i.e. newspapers, journals, websites, and other related blogs, the following limitations and challenges in the existing system were found:

- Lower access to bank accounts (50%) than expected like in India, Thailand and the UK
- No interoperability
- Monopoly and high charges
- High infrastructure cost
- Cyber threat
- Cash dependent economy
- Check based transactions
- Lack in products
- Lack in oversight
- The existing switch is clumsy to extend or not feasible to be customized with innovative technology or new API
- Lack of implementing the International messaging standards
- Poor governance and Risk Management.
- Lack of agile mindset of regulators, operators, participants, and end- users to adjust swiftly to new developments

v. Objectives to set up an IIPS:

The World Bank Group (2021, p 1-18)[14] has clarified the objectives to set up an IIPS clearly. Before choosing the objectives, for the sake of the stakeholders, a short picture of the market share for the payments system in Bangladesh is given below:

Dynamics of Market share of Payment services in Bangladesh

Table 2.0 - value of transactions (in %)

Time	RTGS	BACPS	BEFTN	NPSB	MFS
2016-17 Q2	32.05	56.68	3.04	0.23	8.00
2016-17 Q4	41.06	48.24	3.08	0.24	7.39
2017-18 Q2	46.48	43.36	2.96	0.26	6.95
2017-18 Q4	5.34	76.02	5.76	0.50	12.39
2018-19 Q2	29.14	56.51	4.33	0.41	9.60
2018-19 Q4	29.18	55.34	4.81	0.51	10.15

Source: Payment Systems Quarterly Trend, July 19 (https://www.bb.org.bd/ fnansys/payments/ quarterlyjuly19.pdf).

Table 3.0 - Number of transactions (in %)

Time	RTGS	BACPS	BEFTN	NPSB	MFS
2016-17 Q2	0.020	1.38	0.87	0.70	97.04
2016-17 Q4	0.034	1.18	0.97	0.75	97.06
2017-18 Q2	0.053	1.14	0.98	0.96	96.86
2017-18 Q4	0.030	1.02	1.11	1.01	96.82
2018-19 Q2	0.048	0.98	1.02	1.00	97.02
2018-19 Q4	0.063	0.86	1.44	1.18	96.46

Source: Payment Systems Quarterly Trend, July 19(https://www.bb.org.bd/ fnansys/payments/ quarterlyjuly19.pdf).

- It appears from the above 2 tables that in terms of the number of transactions, 96.46 percent (2018-19) are routed through the MFS providers. But in terms of volume (BDT), RTGS and BACPS cover the market share of 29.18 percent and 55.34 percent respectively during 2018-19 Q4. At this stage, the share of MFS is only 10.15 percent. **So, the first goal of an IIPS is set up to decrease volumes of retail payments (Committee on Payment and Settlement Systems, 2012, p3)[3] initiated via cash and cheques and consequently, increase volumes of retail payments initiated by the IIPS providers.**
- MFS is becoming popular in Bangladesh, but the cash-out charges are very high relative to other countries i.e. India and China, and also than expectations. The 15% VAT is also a concern. The high rates discourage consumers from using MFS at the grass-root level. So the 2nd objective for the set up of an IIPS is to reduce **electronic retail payment costs on the initiation and acceptance side** by creating affordable payment clearing/settlement services for PSPs to the end- user and to increase the number of merchants accepting electronic payments.
- **The third objective is to set up payments related open APIs and aliases like IMPS and UPI in India have done.** The above methods are indicated as the cost of fund transfer through United Payment Interface (UPI) is minimal. UPI supports a wide range of mobile-based apps for small payments.UPI ensures security by not using individual bank account numbers or debit/credit-card related data. It provides an Id or Virtual Payment Address (VPA) for payments purposes. The VPA is simple and easy to remember. It does not require any registration. It is more advantageous than the mobile wallet. Other services i.e. requests for call-back from customer care, blocking/unblocking of debit cards, applying for loans and credit cards, access to customized account statements, making standing instructions for scheduled payments, sharing transaction details, and a seamless shopping experience with partners were performed through UPI (RBL Bank, (2020)[15]. Immediate Payment Service (IMPS) is a service that enables to make payments using MMID or mobile or Aadhaar number, consists of benefit mentioned in Bank Bazaar (n.d.)[16], connect quickly to bank accounts for completing payments. It has no minimum amount limit on transactions of funds. IMPS are safe, secure, and cost-effective (indiafilings, n.d.)[17]. In Bangladesh, banks and MFSPs use their API for processing payments but those are not bonafide stated above. So, the above objective is to be selected for the betterment of the existing eco-system.
- Existing level of access to bank accounts in Bangladesh is only 50 percent, whereas it is 79.87 percent in India, 81.6 percent in Thailand, and 96.36 percent in the UK. **So, the fourth objective is set up to increase access to transaction accounts for individuals and businesses and to the increased number of physical points and access channels that offer financial services by extending financial inclusion.**

- The government and Bangladesh Bank are on the right track to interoperability of digital transactions among MFS providers in real-time and at a lower cost. Business Outlook (2021)[18] published the benefits of Interoperable Digital Transaction Platform (IDTP), an initiative of the government of Bangladesh. A mobile App for the proposed Interoperable Digital Transaction Platform (IDTP) has been developing in the meantime. Ali, Khondoker Shakhawat (2021)[19] has mentioned some factors to bring interoperability among MFS providers. Registration of each customer with the platform, validation with NID system, authentication, competitiveness, the capacity of the key MFS providers, customer awareness, diversification of products, preparedness of the regulatory authority, data security, acceptance testing, upgrading of the system of various providers for integration with the IDTM are also challenging needs to be resolved **by enacting an new interoperable system, switch and governance under IIPS (fifth objective)** following Business Outlook (2021)[18] & Ali, Khondoker Shakhawat (2021)[19].

vi. Results of Interviews: Would an IIPS support balanced growth in Bangladesh's Economy?

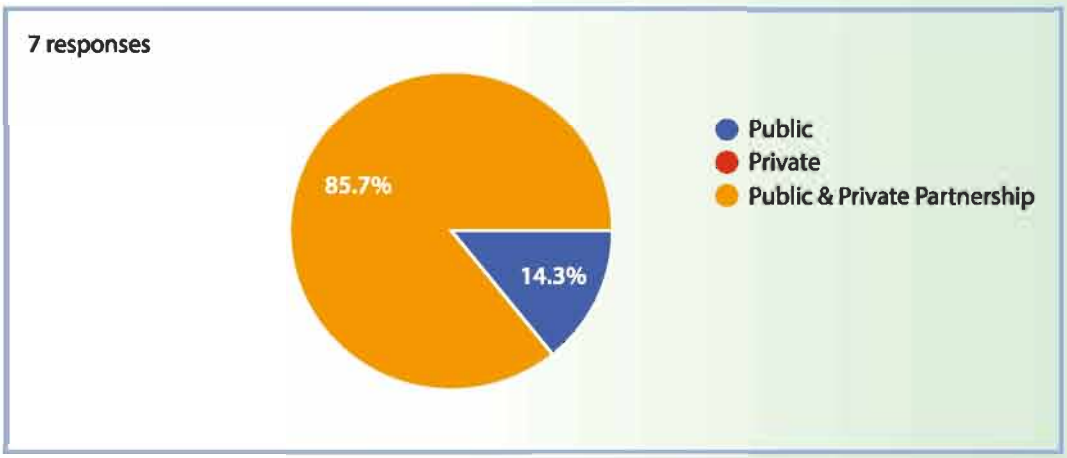
- Interviews were conducted on the above issue among a limited target group including think tank leaders, CEO of Fintech/ digital technology- related companies, and members of Digital finance Forum, Bangladesh. The sample was limited because the issue of IIPS is a new concept and in our country, most of the people are not aware of this technology except small segments that are acquainted with this concept recently by reading related materials. In total, seven persons responded to the questionnaire. Among respondents, two CEOs and one founder were from digital technologies related companies, two were bankers, one was a distinguished Professor, and rest one was a representative from a regional business have participated in the interview process. The sample covers significant segments from the pool who have sound knowledge about this new innovation and helped the survey to be completed successfully Their responses are summarized below sequentially:

1. **Regarding the existence of a use case for the Instant and Inclusive payment System (IIPS) in Bangladesh:** 2 respondents answered 'no' in terms of the above question, whereas 5 respondents said yes. They said that any digital transmission to and from any account through PSP, **Blaze software,** an initiative of Sonali Bank Plc., Home Pay, and ITCL in which the expatriates can send money to the country in just five seconds mentioned in the (Bangladesh Sangbad Sangstha, 2021)[20], interoperability between bank accounts and wallets, online payments, peer-to-peer payments, loan disbursements, etc are the use cases of IIPS. Their answers mainly highlighted our **existing system, which differs from the IIPS.**

2. **Regarding the benefit of IIPS for establishing interoperability among MFS providers in Bangladesh:** All the 7 respondents have supported the benefit in principle.

3. **Regarding the possibility of IIPS delivering low-cost services by creating more products in Bangladesh:** Among 7 respondents, 6 respondents said yes to the above question.

4. **Regarding the governance and ownership structure of IIPS in Bangladesh - Public or Private or Public & Private Partnership:** As per the pie chart, 14.3 percent of respondents supported public ownership, whereas 85.7 percent have accepted the public-private partnership proposal for governance or ownership structure of IIPS in Bangladesh.



5. **Regarding hampering the existing growth of MFS providers for switching to IIPS:** 4 respondents commented 'no' on the issue of hampering the existing growth of MFS providers. They also urged that IIPS creates positive competition in the market and also reduces anti-competitive practices. 1 respondent argued 'yes' to some extent and another respondent referred the issue to the market decision on which solution is to use.

6. **Regarding the risk that a common scheme and switch (IIPS) may damage the existing setup of MFS providers and recovery planning in case of loss:** 1 respondent commented that there is an adjustment required to make the whole process commercially viable with the help of the market mechanism. Other respondents have acknowledged the temporary loss but supported the decision for the sake of the greater interests of the country and also for lowering the cost levels. 3 respondents said 'no' on the issue. Other respondents are in favor of introducing digital lending (like nano loan) for helping MFIs to provide loan disbursement & loan payment by using this system. Other respondents emphasized that the market participants (end customers, merchants,

fin techs, etc.) are the key decision-makers in selecting the desired solution to be used. In case of loss due to wrong selection, the burden will be shared among respective users throughout the process.

7. **Regarding the effect on other businesses due to introducing the IIPS:** 1 respondent strongly supported the question as it speeds up the related businesses and reduces cost, and another 1 provided no answer. 1 respondent emphasizes regulation and the regulator understands of the overall scope. The regulator should consider all licensee's interests rather than hearing major players. The regulator issues licenses only after ensuring the capacity of the proposed company. They advocated for promoting and creating a cashless society, PSO and an Open Banking Enabler and also made comment on the benefit of IIPS i.e. as it reduces the amount of direct integration required to enable Open Banking, lowering cost and offering speed, and reducing the loan processing time in helping both lenders & customers to disburse & recovery of loan quickly.

8. **Regarding the role of IIPS in extending financial inclusion at the marginal level:** All of them took the matters positively. It helps all stakeholders including banks & MFSPs to participate easily at the grass-root level. Significantly un-banked people may be included in the banking system & get a quick loan in the future.

9. **Regarding thoughts on the use cases in which IIPS and RTGS may combine each other for extending the scope of hassle-free services among a large population:** 6 respondents positively answered this question. They commented that higher business payments and reconciliations are done in an automated system quickly. It is necessary to combine IIPS and RTGS for hassle-free services. It is required to make interoperability among banks, MFS, and different wallets.

10. **Regarding the coverage of the existing legal framework of Bangladesh or the requirement of new regulation for establishing an IIPS:** Most of the respondents argued for amendments to existing law or in favor of introducing new regulation like other countries i.e. the UK, India, and Singapore for setting up an IIPS in Bangladesh.

11. **Regarding the idea of technology for set up an IIPS:** Most of the respondents commented positively. They want to set up a payment initiation model. But they emphasized the need for dialogue held among stakeholders for designing a commercially viable and sustainable model for users. The pure switch level transaction protocol is required including all ASPSP connections. A combination of e-KYC and payment switching is also required. The IIPS can be initiated from Mobile/Internet/ATM channels and instruct Debit & Credit Confirmation by SMS. They also suggest for checking out Fast and Secure Transfers (FAST) in Singapore, UPI in India, Prompt-Pay in Thailand, and Insta-pay in the Philippines in this respect.

12. **Regarding the contribution of IIPS to achieving the Sustainable Development Goals (SDGs) within 2030 or the capacity of the existing payment system of Bangladesh to meet up the target:-**The respondents supported the benefits of IIPS in general. They have advocated for this new system. They are mainly in favor of the accomplishment of the respective objectives so far framed to set up an IIPS. They expressed some positive views/links for the implementation of SDGs by 2030 together with boosting up the services of IIPS.

13. **Regarding other comments:** They brought forward the cases of China, USA, Brazil, Argentina, and Turkey for becoming the top 5 nations within the G20 as per the Digital Riser Report 2021 published by the European Center for Digital Competitiveness. On the other hand, they pointed out that among the top 30 nations by Revenue from Digital Services as a share of GDP, 16 countries are from Emerging World. , Estonia first moved to 'Block-chain' technology in 2012. They are giving 24/7 basis Govt. services. Therefore, Estonian people prefer govt. services more than private services. They are less vulnerable to corruption as well as lead the no. 1 position as per the 'Digital Empowerment Index', they are now considered as advanced/developed in the context of using the digital network by the World Bank's evaluation. Though only 5% of Kenyans carry Credit Cards, however, more than 70% have access to 'Digital Banking'. More than 70% of the Egyptian are financially underserved despite mobile penetration in that country exceeding 90% or more.

vii. Drivers for building an IIPS:

Based on different journals, newspapers, literature and hearing from different webinars, the following trends were derived which establish a congenial environment or support for setting up an IIPS:

- The MFS and agent banking activities are increasing at the doorstep of customers.
- The central bank's activities toward digital payment system are satisfactory (new regulation, PS act is in the process). Bank's activities go on online and an Interoperable Digital Transaction Platform (IDTP) is in the process by the BB and Government.
- The use of Smartphone by the general people is increasing; the 5G is in the process to increase internet capacity.
- The govt. is using MFS in distributing social safety nets to the poor segments, many services are routed through the digital platform
- The govt. has implemented Digital Bangladesh initiative programs at different levels
- Availability of electricity

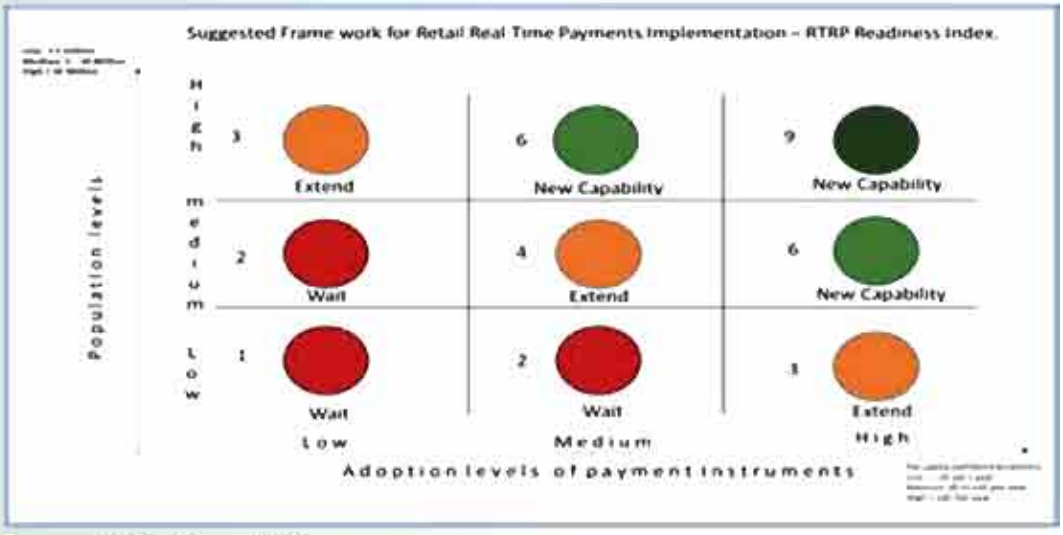
- Regulatory oversight is strengthening
- Implementation of AML practices
- Easy liquidity in the market
- National monitoring cell is working well for implementing financial inclusion strategy by 2030

World Bank readiness index shows medium score is perhaps an indication of relatively medium levels of financial infrastructure and hence the potential for instant and inclusive payments.

viii. Proposed Framework for IIPS implementation:

The following quantitative framework developed by Balakrishnan (2016), used in the publication of the World Bank Group (2021, p 1-18)[14], is applying to assess the readiness of Bangladesh for instant payments.

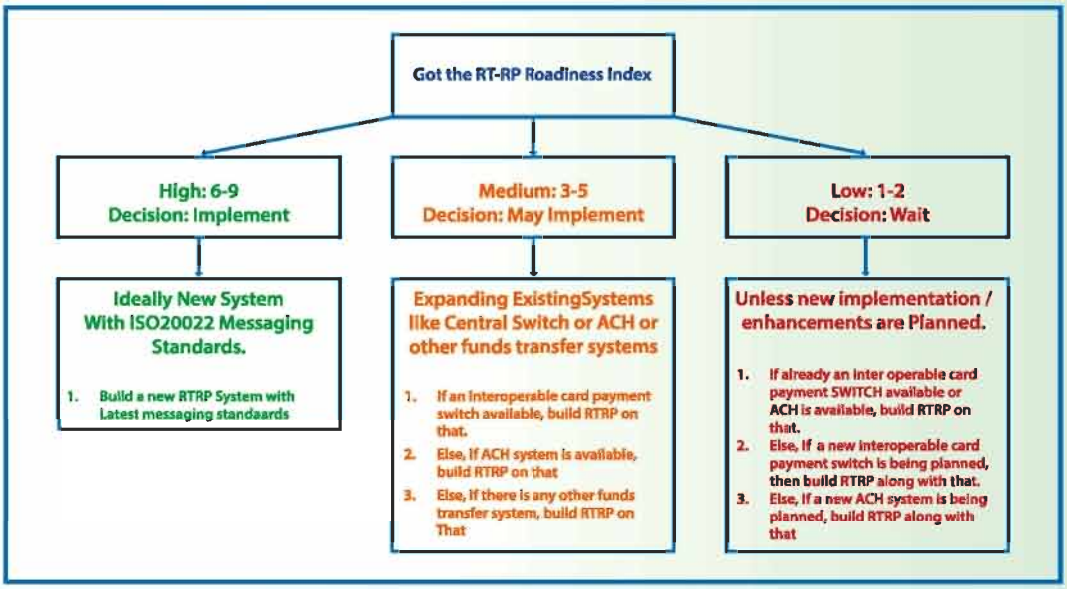
a) Figure: Readiness Index :



Source: Balakrishnan (2016)

By analyzing the above readiness index, the population level of Bangladeah exists in the high level (3) and the adoption level of payment instruments is 2i.e. medium levels. The medium score is perhaps an indication of relatively better levels of financial infrastructure and hence medium potential for fast payments.

b) Figure: Decision-Making Tree:



Source: Balakrishnan (2016)

The readiness score supports the case of expanding existing system like central switch or ACH or other fund transfer systems (The World Bank Group, 2021)[14]. In Bangladesh, the existing system of BACH, RTGS, BNPS, and BEFTN are due to upgrade from time to time. But to expedite retail payments, it is required to set up a separate switch (innovative and technologically feasible), scheme, governance, separate API (open loop and interoperable among every stakeholder), and oversight i.e. IIPS in Bangladesh as a part of accomplishing the objectives mentioned in column (v).

viii. Legal consideration :

The existing legal framework has sufficient provisions to set up an IIPS in Bangladesh. In addition, the competition law-2012 can be exercised to stop any antitrust activities and unhealthy competition.

ix. Considerations Regarding Messaging Standards :

As per the WB guideline, the IIPS of Bangladesh should be required to make use of proprietary message standards, which will be designed in line with international messaging standards such as ISO 20022, and ISO 8583. The decision on messaging standards is based on several considerations such as use cases being considered, cost of implementation, and interoperability, among others. Such an approach would also reduce the learning curve for participating institutions and would also reduce the implementation timelines and perhaps even the complexity of IIPS implementation under the control of the Bangladesh Bank.

x. Considerations Regarding Settlement Options:

As per the CPMI 2016 publication on Fast Payments, the real-time settlement model is preferred for the settlement among service providers at the same time as the successful processing of the transaction. In this mode, transactions are settled in real-time and on a gross basis by using the central bank accounts maintained by the providers. While the decision on settlement models will depend on the intensity of usage and scale of adoption of payment services in general, it would also depend on other aspects such as the availability of liquidity tools for market participants to track and the feasibility of real-time linkage with the country's large value payment system or the equivalent. In the absence of robust liquidity tools like inter-bank markets or collateralized overnight facilities, using the RTRP model could pose liquidity risks and potentially also impact market confidence. The other aspect to consider is the scalability of an existing the large value payment system and its ability to handle the larger volume of retail transactions that will come through for settlement. Under the circumstances, a large value RTGS system is required to be available 24*7 and the IIPS may bring under the umbrella of BB settlement systems to reduce the stability risks.

xi. Ownership Considerations:

A key aspect of fast payment system implementation is the decision on the ownership of the implementation and operations of the system on an ongoing basis. In Bangladesh, I would recommend the model of the central bank and private sector co-ownership (hybrid). The fast payment systems in Australia (NPP), Hong Kong (FPS), Malaysia (RPP), Nigeria (NIBSS), and Poland (Express Elixir) are all examples of the hybrid model. The existing regulation supports to set up of an IIPS in Bangladesh with above formula by issuing circulars or regulations. As cost involves there, Bangladesh Bank and the Government require clear vision to implement this. I think this would not be difficult, because Bangladesh Bank earlier provided full cost to update the clearing system, RTGS, NPSB, and other existing digital modes; Government has also allocated a huge amount of money for building digital Bangladesh infrastructures and side by side implementing SDGs within 2030.

xii. Other considerations :

The following principles may be addressed to set up an IIPS in Bangladesh:

- Open and interoperable payment loop like the UPI system of NPCI
- Real-time payment (Pull or Push both) (24x7x365)
- All use cases (retail transactions-P2P, B2B, G2B, P2B, P2G)
- Irrevocable payment

The costing, products, and customer awareness may be a part & parcel of the total plan:

- low cost
- More products
- Price transparency

Scheme structure considerations:

- All banks, FIs, MFPs, and Fintech companies
- Payment addressing (VPA not using bank account number or card details)
- Inclusive governance
- Fraud utility and Customer Redressal
- Connectivity to others
- Avoid concentration risk
- Scheme and regulatory oversight

xiii. Conclusion:

These final remarks may help guide the process to set up an IIPS in Bangladesh:

- The optimal process guiding the implementation choice of IIPS implementation should be dynamic as per World Bank guidelines. The Bangladesh Bank as well as Government has sufficient capacity regarding modernization of existing / legacy payment systems depending on factors such as general market conditions, maturity, and the technical state of the existing payments infrastructures if they desire. The cost/benefit implications will be shared between public and private based on extending financial inclusion to the larger population segments. Of course, in the public segment, the government and Bangladesh Bank will play a major role by taking a significant stake to ensure the maximum benefit for the major stakeholders and end-users.
- BB is required to take a broad view regarding IIPS implementation and ownership, thereby ensuring both the immediate and wider aspects of financial inclusion and the country's overall growth trajectory. In this context, particular research activities may be needed to establish the most sustainable approach. Moreover, Bangladesh Bank and the Government should undertake particular steps and considerations regarding the process to ensure that it is done most efficiently and aligned with market needs.
- BB may consider modernization initiatives in payment systems as a part of the national financial inclusion strategy (NFIS) to implement SDGs by 2030. In this

case, the public and private initiatives may be augmented in line with NFIS to include all relevant stakeholders.

- A customer redressal approach is very much required to protect customer interest at the end user level.

By taking into account, the above considerations and way forward, the survey report from local stakeholders, and the existing legal setup, I believe that the case for establishing an IIPS in Bangladesh is strong and it will open a new horizon in the field of quick and digitally accepted retail transactions in bulk. Consequently, I would like to recommend that BB, in coordination with the Government, take initiative and necessary steps by following the above guidelines and remarks for accomplishing the target goal of country's sustainable development within due time.

END-NOTES:

I. William Cook, Dylan Lennox, Souraya Sbeih (2021, p7)[1] focuses on instant payments, which are also frequently referred to as "fast payments" or "real-time payments" (Committee on Payments and Market Infrastructures, 2016)[II]. These payments are always acting digital, often use mobile as a channel, and frequently use the credit/ push payment as an instrument. However, some instant payment systems support other channels and instruments, such as biometrics, cards, and debit-like services.

II. According to Committee on Payments and Market Infrastructures (2016, p1)[2], Fast payments can be defined by two key features: speed and continuous service availability. Based on these features, fast payments can be defined as payments in which the transmission of the payment message and the availability of final funds to the payee occur in real time or near-real time and on as near to a 24-hour and 7-day (24/7) basis as possible.

III. According to Committee on Payment and Settlement Systems (2012, p3)[3], Retail payments differ from large-value payments in several ways. First, retail payments typically relate to the purchase of goods and services by consumers and businesses. As compared with interbank transactions, they are used in more varied situations, such as face-to-face payments at the point of sale (POS) and remote payments via the internet. Second, retail payments are executed using a greater variety of payment instruments than large value payments. Third, retail payments make more extensive use of private sector systems for transaction processing than do large-value payments.

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Identifying the Spillover Effects of Domestic Oil Price Hike in the Inflation of Bangladesh

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Abstract

This study purposes to analyze the effects of the recent oil price hike (fuel prices oil) on the inflation rate in Bangladesh. The estimation process of this study utilizes the monthly secondary data from July 2013 to September 2022 available from different sources (like; Bangladesh Petroleum Corporation, World Bank) by using the VECM approach. The rate of inflation is the dependent variable in the estimation process, domestic and global oil prices are our independent variables, and the broad money supply is included as a control variable. A simple Correlation Matrix is also done to observe the connection among the variables. The result of this study indicates a statistically significant long-run relationship among domestic oil prices, broad money supply, and the inflation rate of Bangladesh, but world oil prices show statistically insignificant results. Besides, this is consistent with theory, and the short-run adjustment coefficient has a statistically significant with negative sign, implying that long-run equilibrium is stable in the presence of any short-run shocks in oil prices. In the short run, the inflation rate is extremely high when oil prices hike, and as time goes on, the inflation rate will be adjusted in the long run. This finding is informative to policymakers or experts for formulating monetary and fiscal policies as well as providing important insights for the handling of inflation.

Keywords: Inflation, Oil price, Co-integration, VECM

JEL Classidication: E31, E610, Y10.

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The views expressed in this paper are solely of the authors and do not necessarily reflect the views of the institution in which they work.

1. Introduction

Oil is a major component of almost all services and goods, similar to in other nations, and it significantly affects people's lives in Bangladesh as well. As a fuel, it is considered the engine of an economy because it has a broad scope of applications, supplying various sectors of a nation, including agriculture, transportation sector, industry, and households. Therefore, when oil prices are imbalanced and unreasonable, people's quality of living fluctuates. This is because, any changes in oil prices may influence the prices of other commodities directly or indirectly which may influence the quality of living standard of people. Bangladesh is an oil-importing nation, thus it is crucial to understand how rising oil (fuel oil) prices may affect inflation. Naurinetet al. (2016) found Consumer Price Index is positively affected by any surge in oil prices. Lacheheb & Sirag (2019), utilizing annual data and applying nonlinear autoregressive distributed lags (NARDL), also found a significant positive relationship between oil price increase and the inflation rate in Algeria. In a word, oil prices are one of the important determinants or influential factors of inflation for an oil-importing country like Bangladesh because they may influence macroeconomic activities in both supply-side and demand-side channels. As demand-side channels, consumer spending and government spending raised due to rising commodity price which are a result of oil price hike. In this way, oil price hike influences the inflation through demand side channel. Additionally, a rise in oil prices triggers supply-side shocks, which might cause production costs to become a driving force behind cost-push inflation. So, the cost of production rises due to oil price hikes, it may contribute to increasing inflation by influencing the different channels of the economy. According to Haque (2007).), if domestic oil prices are allowed to rise in line with global oil prices, the entire economy will suffer from higher inflation, and the government's efforts to national poverty reduction program will severely harm. During 2021, the world's economy became more volatile, and oil prices increased for oil-importing countries. This is because, at the beginning of the pandemic, a global lockdown caused a huge fall in demand for oil, and as a result, the price of global oil also fell. On the other side, after the lockdown eased, oil exporting countries made allies to artificially increase the global oil price. Such ups and downs made the global oil market volatile. In this volatile global oil market situation, Bangladesh Petroleum Corporation (BPC) reported that it faced huge losses of around $85 million (in the first seven months of 2022) on oil sales.

Consequently, BPC announced to increase the domestic oil price in two phases. The first is in November 4, 2021, when the Bangladesh government raised diesel and kerosene prices by 23 percent. Accordingly, in August 2022, BPC again raised oil prices by 40 to 50 percent, the highest price since Bangladesh's independence. The reason behind this is that

the Bangladesh government recently decided to adjust domestic oil prices in line with global oil prices. Besides, the general public of Bangladesh uses other fuels too, like CNG, LNG, and LPG, but most public transportations like trains or other motor vehicles utilize fuels like diesel, patrol or octane, etc. Furthermore, diesel or patrol fuel is used in agricultural irrigation or other machinery. So, all three sectors of the Bangladeshi economy—the agricultural, industrial, and service sectors—were affected directly or indirectly by the oil price hike. This huge oil price hike is also significantly influencing non-food inflation in Bangladesh, which affects the people's purchasing power, standard of living, and real income. According to Saha et al. (2018), the increasing oil price is not a good sign for Bangladesh's economy because it might negatively affect economic growth in the short run as well as long run.

The basic goal of this study is to visualize the correlation between the increase in oil prices and the resulting inflationary impact on the economy of Bangladesh. However, for this purpose, this study analyses the secondary data available from different sources and adopts the Vector Error Correction model in the estimation process to find out the long-run association between the domestic oil price and inflation in Bangladesh. A correlation matrix is also used to examine the relationship between domestic oil prices (diesel, petrol, and octane) and world oil prices with the inflation rate. The correlation matrix shows a positive relationship between oil prices and the inflation rate. Other than this technical analysis, this study also incorporates the real scenario of the impacts of global and domestic oil prices hike in the overview section. The rest of that study is arranged as follows; section 2 reviews the literature, section 3 describes a brief overview of oil price and inflation in Bangladesh, section 4 exhibits the data and methodology with the interpretation of the results of the study, and section 5 offers policies and explains conclusion.

2. Literature Review

Though there is some research on how global oil price shocks may affect domestic inflation rates, there is very little study on domestic oil price hikes and its impacts on inflation in the context of Bangladesh. For this reason, the study pursued to find out the recent domestic oil price adjustment with the global oil price and how it affects inflation in Bangladesh. These previous literatures included in this study to explain any shocks or increase in domestic or global oil price how create impact on inflation in Bangladesh as well as different economy.

For five SAARC countries, Ahmed et. al. (2017) tried to investigate the effect of oil price shocks on real GDP, interest rates, inflation, and currency rates (India, Pakistan,

Bangladesh, Sri Lanka, and Bhutan). However, they utilized time series data from 1982 to 2014 using the modeling technique known as the impulse response function and forecast error variance decomposition approach in the structural vector auto regression (SVAR) context. Additionally, the co-integration approach proposed by Johansen and Juselius (1990) is also implied for long-term relationships. According to the findings, the macroeconomic determinants, however, were found to be sensitive to even slight changes in oil prices.

Rahaman et. al. (2020) used the co-integration method and a vector error correction model to investigate the effects of oil price shocks on CPI of Bangladesh. According to the results, there is a poor correlation between Bangladesh's CPI and international oil prices. Contrarily, the broad money supply, a control variable, had a statistically significant positive influence on the CPI. The study's most significant conclusion is that the long-run equilibrium is unstable when there are short-term shocks since the short-run adjustment coefficient was statistically significant and had a positive sign.

Hussain & Zaman (2008) conducted a study on understanding inflation in Bangladesh, showing how the administrative price of oil might increase inflation very fast. The results from this study suggested that the increased administrative oil prices indirectly stimulating non-tradable inflation. It is clear from this study upward adjustment of domestic fuel prices was likely to have caused a spike in inflation and extended in rural and urban areas. Besides, due to indirect effects, oil prices pass through to the rest of the economy.

Taslim & Hossain (2015) applied the time series technique and found evidence that even though the domestic price and world price of oil grow together in the long run, the speed of adjustment towards equilibrium is not symmetric: positive shocks are transmitted at a faster rate compared with the negative ones. When global prices increase, domestic prices respond positively almost instantly, but domestic prices do not reflect the same fluidity when global prices decline. The fact that business collaboration prevents price flexibility in the downward direction is essential information for the policymaker.

Using monthly data from January 2000 to December 2014, Asghar & Naveed (2015), explored the pass through of global fuel prices to inflation of Pakistan. They applied Autoregressive Distributed Lag (ARDL) bounds testing approach to investigate the long run pass through of world oil prices to domestic inflation in Pakistan with a control variable, i.e., exchange rate. Based on the empirical results of the estimation procedure, the exchange rate and long-run international oil prices considerably impact Pakistan's inflation rate. Furthermore, the oil price has a positive association with inflation, and nominal exchange rate has a negative association with the inflation rate in Pakistan.

Sultana & Uddin (2018) conducted a study to overview the international oil price and Bangladesh by using secondary data from newspapers, websites, periodic journals, reviews, and various published data. In addition, this paper investigated the impact of the sharp fall in the world's oil price on Bangladesh's Economy. It finds out that there is a negative connection between Bangladesh's oil price and the global oil price.

Kose & Ünal (2021) perused to find out the effects of the oil price and oil price volatility on inflation in Turkey by applying the SVAR model, utilizing the data for the month between March 1988 and August 2019. In the estimation procedures, they implied variance decomposition. The findings of the variance decomposition indicated that the impact of oil prices and the oil price volatility on inflation were slight in the early month but increased with the month went on. This result of this research provided important dynamics to control inflation. This paper suggested that turkey can adopt three important policies such as energy policy along with both fiscal and monetary policies. A proper and dynamic energy policy where the oil resources are a significant component of inflation in a country like Turkey helps to manage inflation on time.

Talha et al. (2021) endeavored to examine the effect on specific macroeconomic indicators such as inflation and the country's oil prices, energy consumption, and gross domestic product. For this purpose, they applied year-to-year information from the 1986 to 2019 series. This research study estimated regression model, correlation model, and descriptive analysis to break down the information about oil prices, energy consumption, economic growth, and inflation rate. The findings of this research study revealed how oil prices, energy consumption, and economic growth positively affect the inflation rate in Malaysia.

Nasir et al. (2019) attempted to investigate the influence of the oil price shock in the Gulf Corporation Council (GCC) members' counties, and in this study, they applied a structural Vector auto-regression (SVAR) model for the period 1980–2016. They found the significant positive effects of oil price shocks on inflation and other variables like GDP and trade balance. In respect to inflation, there are also significant variations in how much oil shocks affect the overall price, which signals that the GCC's monetary policies might experience various difficulties in achieving price stability for such shocks. Though the GCC's countries are oil-exporting countries, those countries are struggling to handle inflation when the price of oil fluctuates.

Hammoudeh & Reboredo (2018), analyzed the connection between inflation expectation and oil prices by implying a Gaussian affine term structure model in the United States. This research work revealed that the effect of oil price changes on inflation expectations is stronger.

Using imperial data from 2000 to 2021, Abuselidze (2022) intended to assess the effects of changes in oil prices on inflation dynamics. In this study, a correlation-regression analysis is applied to examine the impact of the increase in petroleum products on generating inflation.

Khan & Malik (2016) aimed to determine the increase in oil prices pass through to producer price index and consumer price index for Pakistan Economy. For this purpose, the study applied the recursive VAR model to examine the pass through of oil prices to inflation in Pakistan from July 1991 to December 2015. This study found that the oil price has a moderate impact on domestic inflation.

Pradeep (2022) investigated the effects of the recent diesel price hike on the Indian economy. Using the (NLADL) model with the Augmented Phillips Curve framework, this research analyzes the effects of diesel price reform pass through on domestic prices. This study concluded that the diverse influence of diesel price reform across sectors was very useful for policymaking.

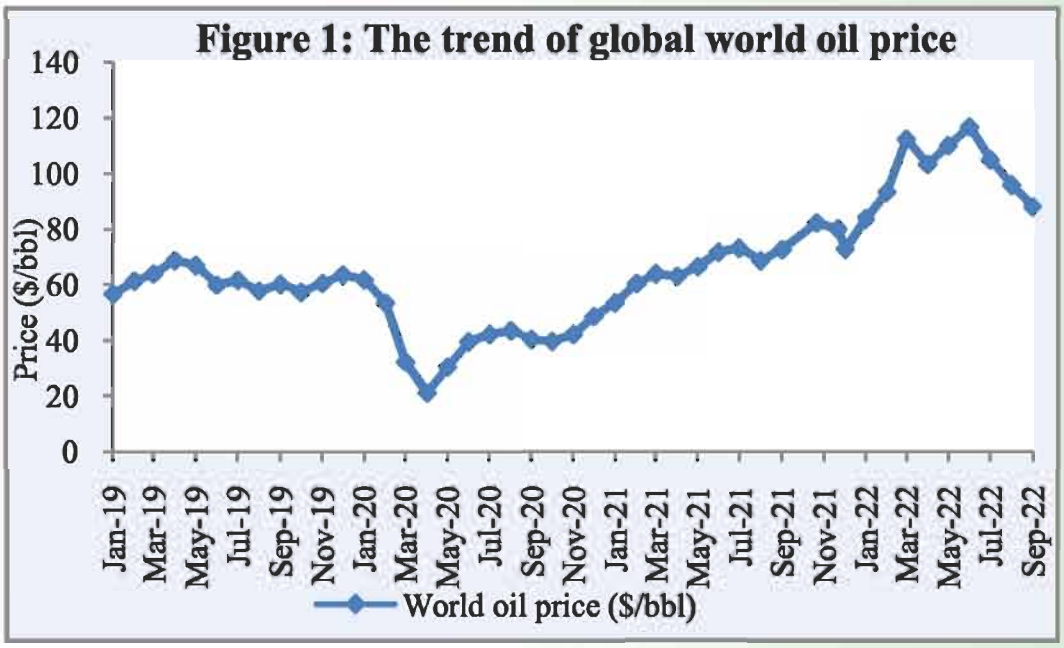
Choi et al. (2017) used an unbalanced panel data from 1970 to 2015 for 72 advanced and developing economies to examine how the oil price changed affect domestic inflation. They discovered that a 10 percent increase in global oil prices caused an average increase in local inflation of roughly 0.4 percentage points, which lasted for two years. Additionally, they found that the effect was asymmetrical, with positive oil price shocks having a larger effect than negative ones. The findings of this study pointed out that the portion of transport sector on CPI basket and energy subsidies are the most vigorous factors in the explaining of the effects of oil price shocks.

Bass (2019) aimed to describe the effect of world oil price shocks on inflation dynamics in Russia by using a VECM model. The outcome of the research work exhibited that oil prices, exchange rates, and consumer inflation are co-integrated in the long run in Russia.

3. Overview of Oil Prices and Consumer Prices

3.1. Current scenario of global oil price and domestic oil price

Every country in the world experiences the effect of changes in world oil price as a global phenomenon. Due to the financial instability and vulnerability to external shocks, emerging countries' economies are particularly susceptible to the impact of the oil price. The world price of oil is one of the main drivers of the rate of inflation and variations in pricing in developing countries, including Bangladesh.



Source: World Bank

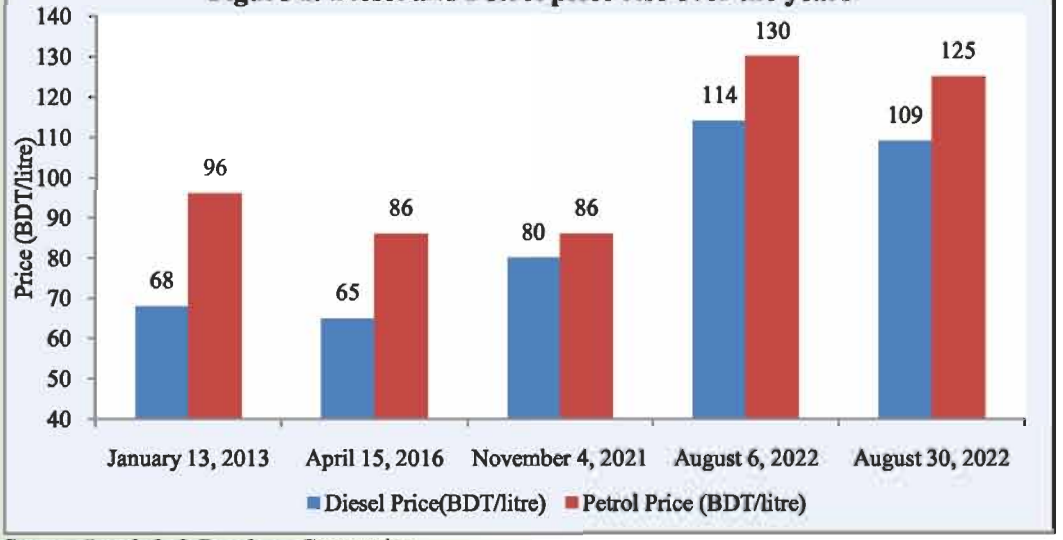
Figure 1 shows the global price of oil from January 2019 to September 2022. In 2019, the global oil price was around 56 US dollars per barrel (USD/barrel) to 64 USD/barrel. The price of world oil has been disruptive since the start of Covid 19 pandemic. There was a downward trend in oil prices in 2020 due to the pandemic. The global oil price reached its lowest point in April 2020, only 21.04 USD/barrel. The economic activity has been slowed down due to lockdown and mobility restrictions during the pandemic's starting time, which created lower demand of oil. So, due to the lower demand for oil globally, world oil prices were relatively low.

However, with the lower cases of Covid 19 at the end of 2020, restrictions have been eased in most countries, and economic activities started to rebound soon. The increase in production across countries also brings in rising demand for petroleum product. Moreover, the global oil supply has experienced an unprecedented supply shortage since the Russian invasion of Ukraine on February 24, 2022. Russia is the second-biggest exporter of oil after Saudi Arabia and the largest exporter of oil to international markets. As a result, increasing demand and supply shortage pushes the price of world oil up. Due to the global fear of geopolitical tensions arising from the Russia-Ukraine war, the world oil price increased immediately after the Russian invasion of Ukraine. It peaked at 116.80 USD/barrel in June 2022. However, the world price has decreased in recent months due to the increasing

production of OPEC countries and other supportive measures taken by the US Federal Reserve System. The petroleum price has a direct impact on the prices of refined oil products and an indirect impact on consumer prices through production costs in Bangladesh. For this, the petroleum prices have been kept administered by the Bangladesh Petroleum Corporation (BPC).

Figure 2 illustrates administered price set by BPC from January 13, 2013 to August 30, 2022. BPC kept domestic oil prices steady from April 2016 to October 2021. However, when economic activities were restored fully after the lockdown due to Covid 19, the world oil price also increased sharply. Following this, in November 2021, BPC increased the prices of kerosene and diesel by 23 percent after five years, from 65 Bangladesh Taka per liter (BDT/liter) to 80 BDT/liter. However, BPC kept the price of petrol unchanged and decreased the price of octane by 3.4 percent.

Figure 2: Diesel and Petrol price rise over the years



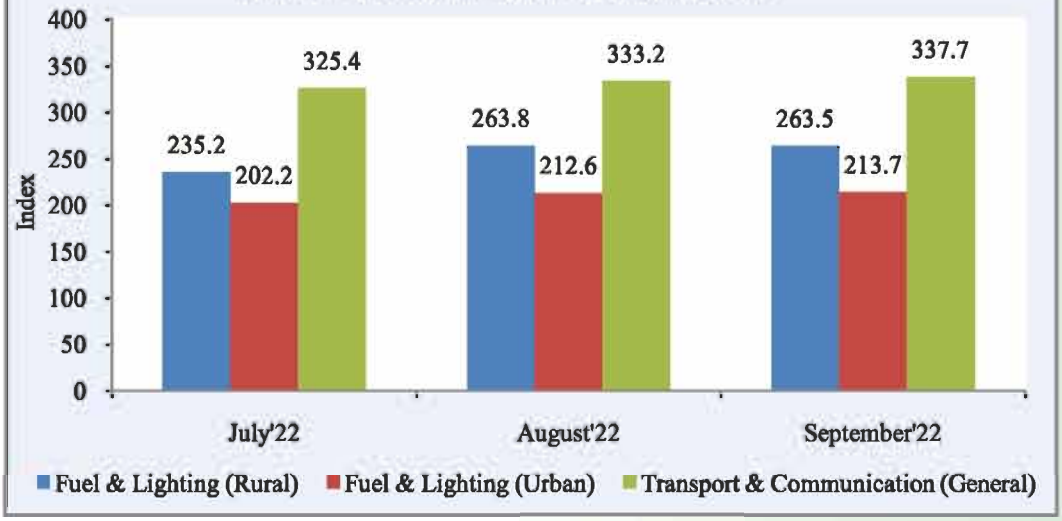
Source: Bangladesh Petroleum Corporation

After starting the Russian-Ukraine war in February, 2022, the global price of oil has been erratic and reached as much as 116.80 USD/barrel in June 2022. However, the BPC did not raise the domestic petroleum prices in Bangladesh during that time. So, it incurred a huge loss in the account of BPC. Despite the decreasing global oil price trend after June 2022, BPC increases domestic oil prices by a huge margin to tackle the loss it faces earlier. On August 6, 2022, BPC hiked diesel and kerosene prices by Tk34 per liter, petrol prices by Tk44 per liter, and octane by Tk46. However, BPC slightly reduced the fuel prices later on August 30, 2022.

3.2. Domestic oil price increase and its impact on consumer prices

Diesel is Bangladesh's most widely used fuel, making up over 73 percent of all fuel usage (BPC, 2022). The recent price increase on various fuels, including diesel, in August 2022 immediately impacts transportation and daily necessities. After BPC raised oil prices in August 2022, the effect of the increase was immediately felt in the fuel, lightning, transportation, and communication sectors of non-food inflation. Bangladesh Road Transport Authority and transport owners have raised bus fares by 22 percent after a record fuel price hike. The effect of rising oil prices in August 2022 on the indexes of transportation and communication index and fuel and lightning is depicted in Figure 3. In rural areas, the fuel and lightning index increased from 232.2 in July 2022 to 263.5 in August 2022. The fuel and lightning index in urban areas increased from 202.2 in July 2022 to 212.6 in August 2022. The Transport and Communication Index rose 2.37 percent from July to August 2022. In September 2022, fuel, lightning, and the Transport and Communication index increased.

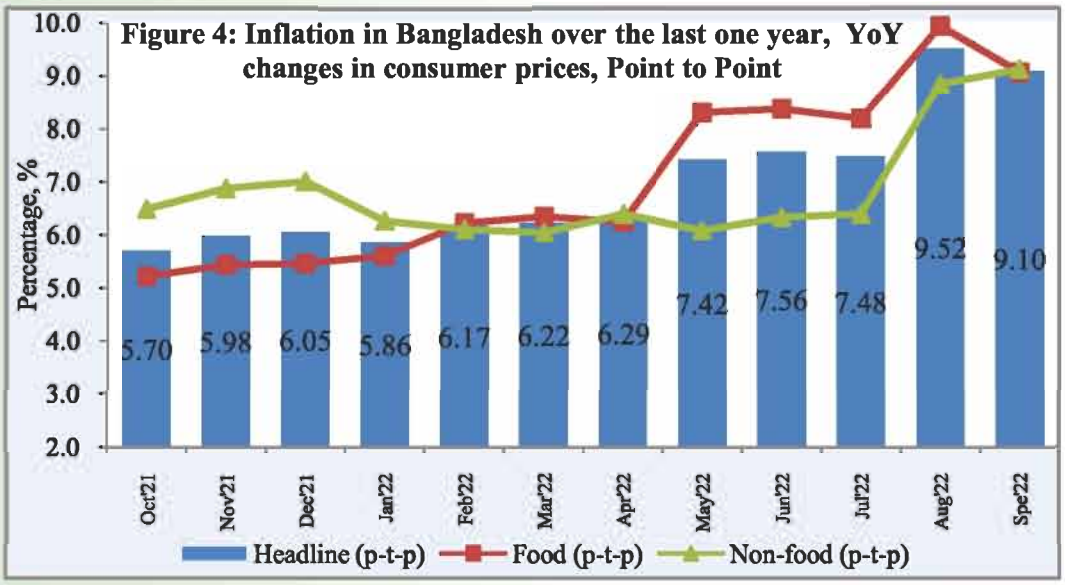
Figure 3: Fuel & Lightning and Transportation & Communication Index in recent months



Source: Bangladesh Bureau of Statistics

The first week of November last year saw the first surge in oil prices. Diesel prices had jumped by 23 percent at the time. However, the current price increase has broken all previous records. People are once more under financial strain as a result of the high cost of living. As a result of the increase in fuel oil prices, almost all essential goods' prices have

increased, and now power prices are expected to increase as well. In addition, there is a huge demand for diesel in agricultural production. So, the cost of agricultural production increased with the oil price increase. As a result, food and non-food prices increased at the consumer level.



Source: Bangladesh Bureau of Statistics

Figure 4 shows the trend of inflation in Bangladesh over the last years, from October 2021 to September 2022. Food and non-food inflation drive the headline point-to-point inflation upward in the last 12 months. Since February, the global markets have plummeted, food costs have gone up, and inflation has spread to every country. However, after the oil price hike in August 2022, Bangladesh saw its highest inflation rate in 135 months, hitting a record high of 9.52 percent in August 2022.

Moreover, in August 2022, point-to-point food and non-food inflation stood at 9.94 percent and 8.85 percent, respectively. According to the BBS statistics, non-food inflation rose to 9.13 percent nationwide in September, with rural areas seeing a higher rate of 9.48 percent and urban areas experiencing a lower rate of 8.66 percent.

4. Data and model specification

This research work is based on secondary data, and these data are collected from different official sources. However, this study utilized the monthly data of inflation rate, domestic oil prices (diesel, petrol and octane), broad money supply (m2), and world oil price. The data of inflation rate is collected from the Bangladesh Bureau of Statistics, and the data of

domestic oil prices at the consumer level is collected from Bangladesh Petroleum Corporation. The world oil price data is collected from World Bank, and the data of broad money supply is collected from Bangladesh Bank. We used monthly data from July 2013 to September 2022 in the estimation process.

4.1. Model of the estimation procedure

In this research, our key variable is inflation, since we want to explore how the recent increase in oil prices may affect the inflation rate in Bangladesh. So, we employed the rate of inflation as a dependent variable and other variables respectively diesel price, world oil price, and m2 (Broad Money Supply) are implied as explanatory variables or independent variables. In this case, the diesel price is used as a proxy for the domestic oil price. In this investigation, the estimating process is done using the VECM model. Additionally, a correlation matrix is also illustrated to point out the connection between inflation, domestic oil prices, and global oil prices.

This analysis followed the functional form of each variable in natural log form except the rate of inflation. Rahaman et al. (2020), using the co-integration method and a VEC model in their research work to investigate the effects of oil price shocks on inflation of Bangladesh. The equation is given below:

Infl_rate = f (ldiep, lwop_usd, lm2)..... (1)

Where, Infl_rate= Rate of inflation;

Ldiep= log of diesel price;

Lwop_usd= log of world oil price;

Lm2= log of Broad money supply;

This study uses a simple vector error correction model to determine the long-run effect of inflation with oil prices. The VECM equation of this analysis is:

$\Delta(infl\_rate)t = \alpha0 + \sum n\ i=0 \alpha i \Delta infl\_rate t-i + \sum n\ i=0\ \beta1 \Delta diept-i + \sum n\ i=0\ \boxtimes 1 \Delta wop\_usdt-i + \sum n\ i=0\ \mu1 \Delta m2t-i + \boxtimes 1\ \emptyset t-1 + \notin t$.....(2)

Øt-1is the ECT and the residual from the following long-run co-integrating regressis:

$\Delta(Infl\_rate)t = \alpha0 + \alpha1 ldiept + \alpha2 lwop\_usdt + \alpha3 lm2t$ ..... (3); and

ECT is defined as,

Øt-1=Error correction termt-1 =Δ(Infl_rate)t-1 - α0 -α1 ldiept-1 - α2lwop_usdt-1 - α 3lm2t-1... (4)

This VECM equation will represent the existing long-run relationship among the variables, and the error correction term shows short-run effects. Here, Δ means the change, t means time, ∉t symbol of error disturbance term, α0 is the intercept, Øt-1is the ECT and α1, α2 and α3 are the coefficient of the exogenous variables.

4.2. Result analysis

Before proceeding toward the VECM model, the correlation among the variables has been checked to understand how well the variables are connected.

Table 1: Correlation matrix

	Inflation	Diesel Price	Petrol Price	Octane Price	World Oil Price
Inflation	1				
Diesel Price	0.682641	1			
Petrol Price	0.785067	0.644933	1		
Octane Price	0.783997	0.657992	0.999639	1	
World Oil Price	0.672311	0.524662	0.310426	0.31	1

Source: Author's calculation

Table-1 shows that the prices of diesel petrol, octane, and world oil are positively correlated with the inflation rate. The correlation between inflation and oil prices indicates that change in oil prices affected the rate of inflation positively. This correlation matrix is also consistent with theory.

To start the estimation of the analysis, at first, we examined the stationary test of the variables because a random time series is assumed to be stationary if its mean and variance are time invariant (Gujarti, 1995).

At first, to determine whether the variables are stationary, we have done ADF test. ADF is the simple and convenient approach to determine stationarity. Philips-Perrron (PP) unit root tests (Philips-Perrron, 1988) have also been used to test stationarity among the variables. However, all variables are stationary in the first difference at the 5% significance level. The results of the unit root test are presented in Table-2.

Table 2: Unit root test

Variables	ADF-test				PP-test			
	At level		At first difference		At level		At first difference	
	t- statistics	p- value	t- statistics	P* - value	Adj.t-statistics	p-value	Adj.t-statistics	P* - value
Infl_rate	-2.189033	0.2115	-7.692796	0.0000	-1.109110	0.7104	-12.32971	0.0000
Ldiep	1.053015	0.9969	-13.95774	0.0001	4.202820	1.0000	-10.49746	0.0000
Lwop_usd	-2.189033	0.2115	-7.692796	0.0000	-2.086879	0.2504	-6.865835	0.0000
Lm2	-2.154658	0.2242	-12.70299	0.0001	-1.932121	0.3166	-13.80531	0.0000

Null hypothesis is no unit root presence and * is for statistically significance.

After testing stationarity among the variables, we select the optimum lag length in the estimation procedure. In this analysis, according to the Akaike information criterion (AIC), sequential modified Likelihood Ratio (LR) test statistic (each test at 5% level), and Final prediction error (FPE) criteria appropriate for choosing the lag length. In these criteria, the optimal lag is 2. The result of optimal lag length is showed in table-7 in appendix.

By utilizing optimal lag length, we found co-integrating equation among the variables. If there exist at least one co-integrating equation, then we can proceed to run the VECM model; otherwise, we have to carry on ARDL model.

In our analysis (Table 3), we used the most convenient co-integration method, the Johansen co-integration test, and we found only one co-integrating equation. Besides, the trace test indicates only 1 co-integrating equation at the 0.05 level, and the Maximum–eigen value test also showed 1 co-integrating equation at the 0.05 level. The results of the Johansen co-integration test indicate the long-run relationship among the variables.

Table 3: Johansen co-integration test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.258053	49.34080	47.85613	0.0360
At most 1	0.086688	18.00071	29.79707	0.5660
At most 2	0.059874	8.479580	15.49471	0.4156
At most 3	0.018837	1.996721	3.841465	0.1576

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

4.3. VECM test

VECM model generally indicates the long-run relationship among the variables and its error correction approach shows the short-run adjustment. The following table represented the findings of VECM model:

Table 4: VECM model	
(Dependent Variable is rate of inflation)	
Variables	Co-efficient Value (t-Value)
$Infl\_rate_{t-1}$	1.000000
$Ldiep_{t-1}$	- 48.57099 (-3.40179)***
$Lwop\_usd_{t-1}$	- 2.782393 (-1.23043)***
$Lm2_{t-1}$	- 6.989122(-2.86546)***
C	322.7480

*** is for statistically significance.

On the basis of VECM estimation, the equation can be written as follows:

Infl_ratet-1 =-322.7480+ 48.57099 Ldiept-1+ 2.782393 Lwop_usdt-1+ 6.989122 Lm2 t-1+ ¢t-1

Here, infl_rate= rate of inflation; Ldiep = log of diesel price; lwop_usd = log of world oil price; Lm2 = log of M2; ¢t-1 = error correction term.

The VECM is appropriate in this study to show the long-term effects. This result of VECM indicates that percentage changes in domestic oil prices influence the rate of inflation. In recent times, a 1 percent increase in domestic oil price might covers nearly 50 percent in total inflation rate, which is coherent with the real scenario. This is actually representing the immediate impact of oil price hike. When domestic oil price just increased it may immediately boost inflation rate up. Besides, this result is also statistically significant. This result showed that domestic fuel prices have the huge impact in increasing inflation in Bangladesh's economy, because the oil price is directly and indirectly connected with overall economic sectors. However, a 1 percent increase in the world oil price will increase the inflation rate by 2.78 percent, but the statistical result is insignificant. Again, a 1 percent increase in broad money supply will increase inflation by 6.98 percent, which is also statistically significant.

4.4. The error correction term

ECT coefficient is (-) 0.043820, which is statistically significant. The negative sign of the coefficient indicates the existence of a short-run adjustment mechanism in the pace that brings the long-run relationship back to equilibrium once the system gets out of equilibrium. However, the magnitude of the coefficient indicates that it takes about four years to get back to equilibrium.

Table 5: The error correction term			
Test	coefficient	Standard error	t-statistics
$Ø_{t-1}$	-0.043820	(0.008442)	-5.190438

4.5. Serial Correlation test

Table 6: VAR Residual Serial Correlation LM Tests						
Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	12.73277	16	0.6922	0.793881	(16, 281.7)	0.6924
2	12.58481	16	0.7028	0.784453	(16, 281.7)	0.7030
3	17.86083	16	0.3321	1.123634	(16, 281.7)	0.3324

From the above table, it is clear that there is no serial correlation in the estimated model. So, the model is free from serial correlation and accepting the null hypothesis.

5. Conclusion and Policy Recommendation

In today's world, inflation is inextricably linked to national prosperity. In this study, the effect of the recent oil price hike on the inflation rate is analyzed by using the VECM. From the outcome of this study, it is clear that domestic oil price hikes have a significant positive long-run relationship with the inflation rate in Bangladesh. The error correction term of the estimation process confirmed that the long-run coefficient has a stable equilibrium. Other than that, the impact of world oil prices has very small positive effects on the inflation rate, but it is statistically insignificant. Moreover, M2 also influences the inflation rate and is statistically significant. In recent times, oil price change has significantly impacted economic growth, commodity demand, government revenue, price stability, and overall

national well-being in Bangladesh. Therefore, timely implementation of policies is necessary for managing inflation due to oil price hikes. With strong governmental measures and careful planning during the oil price surge, it will be easier for the government to keep inflation stable for the general public. The following policy proposals may be taken into account:

- The Bangladesh government recently adjusted the oil price to match the world market and passed on the new price to the general public. As a result, the government may change its tax and subsidy policy on fuel to reduce or control cost-push inflation during oil price hikes.

- The increase in oil prices may impact the economy directly and indirectly by increasing the food and non-food inflation, which may adversely influence economic growth. In this regard, the central bank may declare a proactive policy aimed at controlling the future impact of inflation rather than the current situation due to maintaining its core purpose of price stability and employment generation.

- To attain sustainable economic development, Bangladesh should emphasize using renewable energy, especially for transportation sectors that depend solely on fossil fuel or oil. Thus, as an oil-importing country, slight volatility in oil prices significantly influences the inflation rate. So, the government, researchers, and policymakers should take the initiatives to invest in the innovation and new creation of renewable energy for the transportation sector. The government and central bank might introduce new policies to support innovation and the creation of renewable energy for transportation sectors. As part of policy assistance, the banks and FIs should also launch a new credit facility for renewable energy innovation. Jain and Goswami (2021) suggested using renewable energy facilities is a better strategy.

- BPC should adopt a regulatory policy about adjusting domestic oil prices in line with world oil prices rather than maintaining a strict administered price policy. That means BPC might take policy to fix oil prices according to market demand and supply. It might reduce the sudden hike of inflation due to domestic fuel price rise.

- Diesel is a fundamental element in irrigation and transportation used in the agricultural activities. So, diesel price increase may raise the production cost in the agricultural sector. The government should take the initiative to reconsider and redesign different subsidy-related policies in the agricultural sector to subdue any external shock in oil prices.

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Appendix

Table 7: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	70.57699	NA	3.19e-06	-1.305431	-1.202491	-1.263747
1	788.5540	1365.564	3.35e-12	-15.06969	-14.55499	-14.86127
2	842.3666	98.12887	1.60e-12*	-15.81111	-14.88465*	-15.43595*
3	853.6115	19.62347	1.76e-12	-15.71787	-14.37965	-15.17598
4	861.5026	13.15172	2.08e-12	-15.55887	-13.80889	-14.85025
5	879.6263	28.78481	2.02e-12	-15.60052	-13.43877	-14.72515
6	899.1903	29.53771	1.92e-12	-15.67040	-13.09689	-14.62830
7	923.6249	34.97501*	1.66e-12	-15.83578*	-12.85052	-14.62695
8	936.4807	17.39316	1.83e-12	-15.77413	-12.37711	-14.39856

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

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Does Islamic Bank Financing Spur Economic Growth in Bangladesh? An Application of VEC Model

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Abstract

In tandem with global rapid expansion of Islamic finance, Bangladesh has experienced phenomenal growth in Islamic banking in the backdrop of strong public demand and support for the system. The Islamic banks play key role in promoting economic growth in Bangladesh by mobilizing deposits, collecting foreign remittances and financing major economic sectors such as agriculture, industries and trade. The current paper seeks to find out the magnitude of contribution of Islamic bank financing on economic growth in Bangladesh during 1991-2020. To this end, the paper would apply Vector Error Correction Model (VECM) based on secondary time series data. It is found that Islamic finance including conventional bank finance, FDI and government expenditure affect GDP positively in the long run. However, GDP is negatively related to the growth of Islamic bank financing in the short run.

Keywords: GDP Growth, Islamic Bank Financing, Conventional bank financing, FDI, Bangladesh

JEL Classification: E01, E21, E22, E23, G21, O4

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1. Introduction

Islamic banking has emerged as a potent, popular and potential alternative sub-sector in the modern financial landscape of the world. After its humble beginning in 1960s, the world witnessed a record growth of Islamic finance in Muslim majority countries as well as in non-Muslim countries during the last four decades. Sustained growth of Islamic finance overtime across the world in terms of number of financial institutions, deposits, investment and innovations is a vivid testimony of solid performance of Islamic financial services industry (IFSI). Total assets of Islamic financial services industry (IFSI) grew to an estimated USD 3,058.7 billion by the end of 2021 in which Islamic banking remains the dominant sector with approximately 69% of the total Islamic financial assets (IFSB, 2022). The miracle success of Islamic finance within a short span of time lies in its basic principle that financial transaction must be accompanied by an underlying, legitimate, productive economic activity. Based on this spirit, the Islamic finance industry demonstrated its resilience during the global financial crisis stemmed from sub-prime mortgage problem in the USA in 2008. The Islamic financial industry has been able to prove itself as a sound and less risky alternative viable sub-sector of modern finance industry of the globe. In tandem with global rapid expansion of Islamic finance, Bangladesh, a developing Muslim majority country of South Asia has also experienced phenomenal growth in Islamic banking in the backdrop of strong public demand and support for the system.

Commercial banks are the backbone of a modern economy; no economy can go even a day without bank. Banks play crucial roles in the economy of both developed and developing countries by channeling resources from savers to investors for deployment in different sectors, smoothing payment system, managing risks, promoting domestic and international trade and working as conduit for conducting monetary policy effectively (Bhattacharya and Thakor 1993; Allen and Santomero 1997; Mishkin, F. S. 2015). As capital market is underdeveloped in Bangladesh like most developing countries, banking sector comprising both Islamic and conventional banks work as the pivotal part of financial system by playing dominating role as financial intermediary in keeping the wheel of the economy moving forward.

Bangladesh Islamic banking industry started its operation in 1983 and recorded robust growth during the last 40 years. Like conventional banking system, Islamic banks offer different types of financial services such deposit services, credit/investment facilities and trade finance. Bangladesh's Islamic banking sector belongs to 10 full-fledged Islamic banks with 1671 branches at the end of December 2021. In addition, 41 Islamic banking branches of 9 conventional commercial banks and 368 Islamic banking windows of 13 conventional commercial banks also provide Islamic financial services in Bangladesh at

the end of December 2021(Bangladesh Bank, 2021). List of full-fledged Islamic Banks and Islamic banking branches and windows of conventional banks are shown in Appendix I.

Deposits and investments (financing) in Islamic banking industry reached at BDT 3931.11 billion and BDT 3534.48 billion at the end of December 2021. The market shares of deposits and investments of Islamic banks stood at 27.89% and 27.88% respectively at the end of December 2021. Islamic banks mobilize foreign remittances of BDT 759.33 billion in 2021 which accounts for 40.44% of total foreign remittances in Bangladesh. Deposits, financing and remittances of Bangladesh Islamic banks contribute greatly to promote savings, finance industrial project towards higher GDP, generate employments and reduce poverty and inequality. The number of branches is 2080 while account holders are 25.18 million in number

Given the strong relationship between the well-being of the banking sector and the development of the national economy, investigation of nexus between economic growth and Islamic bank financing would provide key insights to all stakeholders- regulators, managers, investors and customersin formulating and implementing policies to improve the role of Islamic commercial banks in promoting GDP Bangladesh. There are growing studies on relation between Islamic bank financing and economic growth in other Muslim majority countries and regions such as KSA (Jouini, 2016), Indonesia (Anwar et al., 2020), Malaysia (Kassim, 2016), Southeast Asia (Lebdaoui& Wild, 2016) and 22 Muslim countries (Abedifar et al., 2016). However, there are only few studies conducted on the link between Islamic bank financing and economic growth in Bangladesh using sophisticated modern methods with adequate sample and time span (Abduh, M., & Chowdhury, N. T., 2012; Chowdhury et al., 2018). Given this, the present study would examine the association between Islamic bank financing and economic growth in Bangladesh in order to accelerate saving-investment process for promoting higher inclusive GDP growth and generating greater employment opportunities toward poverty reduction. The current paper seeks to find out the magnitude of contribution of Islamic bank financing on economic growth in Bangladesh during 1991-2020.

2. Literature Review

There is plethora of studies on nexus between conventional finance and GDP growth in both developed and developing countries. Following this tradition, Islamic economists started to conduct research to find out the correlation between Islamic finance and GDP growth in Muslim majority countries.

Abduh, M., & Chowdhury, N. T. (2012) aims to examine the long run and dynamic relationship between Islamic banking development and economic growth in Bangladesh

using the quarterly time-series data of economic growth, total financing and total deposit of Islamic banking from Q1:2004 to Q2:201. The study applies cointegration and Granger's causality method and finds that Islamic bank financing has a positive and significant relationship with economic growth both in the long and short run. The authors suggest that the government should adopt policies to develop Islamic banking for promotion of national income.

Hachicha, N., & Ben Amar, A. (2015) investigates empirically the impact of the Islamic Bank Financing on Malaysia's economic growth over the period 2000Q1-2011Q4 using co-integration and error correction model. The findings show that Malaysian GDP is not sensitive to the Islamic financing in the long run but the elasticity of the Malaysian output with respect to the different Islamic financing indicators in the short run is positive with coefficient of 0.35. The result can be analyzed that Malaysian Islamic banks offer less financing in profit-and-loss sharing (PLS)-based activities and financing more in non-participatory activities whose impact is generally, short run in nature.

Zirek, D., Boz, F. C., & Hassan, M. K. (2016) analyzes the impact of Islamic banking variables on economic growth in 14 OIC countries during 1999-2011. The author examines both short run and long run effects by employing the Panel VAR method. They find a positive and significant relationship of Islamic finance with GDP which is robust with regard to several macroeconomic control variables such as capital stock, unemployment, inflation, and government expenditure.

Zarrouk, H., El Ghak, T., & Abu Al Haija, E. (2017) aims to examine the causality between financial development in general, Islamic finance in particular and real economic growth in the United Arab Emirates (UAE) during 1990-2012. The authors employ a bivariate vector autoregressive model to document the financial development-Islamic finance-growth causal nexus and forecast growth. The paper finds the direction of causality from financial development to economic growth without reverse causality. It also reveals that the real gross domestic product (GDP) causes Islamic financial development with no reverse effect. In addition, the forecasting results indicate that the past relation has been a proxy for the future where financial development leads to better progress in real economic activity and it will likely continue to stimulate the development of Islamic finance.

Chowdhury, M. A. F., et al., (2018) attempt to investigate the association between Islamic financing principles and economic growth (EG) in Bangladesh during 1984-2014 by taking into consideration two Islamic financing principles, risk sharing and non-risk sharing separately. The study uses an Autoregressive Distributive Lags (ARDL) approach and it also employs a continuous wavelet transform approach to check robustness. The study finds that the risk sharing instruments are positively related to the EG of the country while

non-risk sharing instruments are negatively related to the EG of the country.

Boukhatem, J., & Moussa, F. B. (2018) seeks to build a consistent theoretical framework for the relation of Islamic finance with economic growth and assess empirically the impact of Islamic finance on economic growth in 13 MENA countries during 2000-2014. The authors find strong relation of Islamic finance with economic growth in MENA countries. However, the positive nexus is hindered by underdeveloped institutional frameworks. The findings prescribe implementing active economic and institutional policies for promotion of Islamic finance.

Ben Mimoun, M. (2019) assesses empirically the nature of dynamic interactions between IBs' financing and the real performances in the non-oil private sector (investment and GDP) in the context of a dual banking system of Saudi Arabia. The study employs the Bounds test in the context of reparametrized autoregression distribution lags (ARDL) models to analyse both long-run and short-run dynamics governing Islamic and conventional banks' (CBs) financings on one hand and real investment and GDP in the private sector on the other hand over the 2007q1-2016q4 period. The key findings reveal a stable and significant long-run relationship between IBs' financing and real performances in the private sector. It is also found that steady-state real GDP is dissociated from conventional bank's financing in the long-run.

M. Anwar, S. et al., (2020) examines short run and long run contribution of Islamic bank to economic growth in Indonesia over the periods 2009: Q1 – 2019: Q4. The study uses cointegration analysis, autoregressive distributed lag (ARDL), vector error correction model (VECM), variance decompositions (VDCs) and impulse response functions (IRFs) to investigate the link between Islamic bank and economic growth nexus. The empirical result shows a significant relationship in the short-run and long-run between Islamic bank deposits and economic growth. The study also finds evidence of a bidirectional relationship between the Islamic bank and economic growth.

3. Data and Methodology

This sub-section focuses on methodological issues to examine the Islamic bank finance-growth nexus in Bangladesh.

3.1 Data and its Sources

We collect data on relevant variables over the period of 1991 to 2020 from World Development Indicators published by World Bank, Annual Reports of Islamic and conventional banks, and Bangladesh Bureau of Statistics. We use data since 1991 as Islamic banking starts its operation in 1983 and its business gets momentum since 1991

following adoption of market based financial reforms.

3.2 Model Specification

We specify the following regression model for determining relationships between GDP growth and Islamic bank financing (ibf), conventional bank financing (cbf), government expenditure as percent of GDP (gexgdp), foreign direct investment (fdi) and remittances (remit) during1991-2020.

gdp=f(ibf, cbf, gexgdp, fdi, remit)----------(1)

By taking natural logarithm (ln) both sides we get

$\ln gdp = \beta_0 + \beta_1 \ln ibf + \beta_2 \ln cbf + \beta_3 \ln gexgdp + + \beta_4 \ln fdi + \beta_5 \ln remit + \acute{\varepsilon}$----------(2)

As the model is in logarithm form, the coefficient will express the elasticity of the variables. So, we focus on the values of β.

We incorporate Islamic bank financing to private sector in our model as Bangladesh Islamic banking sector is a key part of banking sector and it contributes to GDP greatly. Few other studies also consider this variable to estimate the link between Islamic finance-GDP nexus (Abduh, M., & Chowdhury, N. T., 2012; Chowdhury et al., 2018).

We include conventional bank financing to private sector in the model as Bangladesh hinges significantly on it due to underdeveloped capital market and low level of foreign capital inflow following other studies (King, R. & Levine, R. 1993; Levine, R. 2005; Jedidia et al., 2014; Durusu-Ciftci et al., 2017).

As Bangladesh spends significant amount of funds in the Government sector, we incorporate Government expenditure in our model to capture its effects on GDP as suggested by other studies (Cooray, A., 2009; Dao, M. Q., 2012; Churchill, S. A., et al., 2015).

Bangladesh has allowed FDI to promote GDP. Rahman, A. (2015) mentioned that FDI plays a role in reducing the domestic savings gap, foreign exchange gap, BOP deficit, unemployment rate, inflation rate, and level of poverty and diversifying exports. We include FDI in the model to find out its impacts on GDP inspired by other studies(Fry, 1999;Romer, 1993;Borensztien et al., 1998;Makki and Somwaru, 2004;Kabir, 2007;Rahman, A., 2015)

Bangladesh is one of top remittance recipient countries of the world and receives about USD 20 billion annually. Remittances are used for both consumption and investment

purposes which further encourages the demand for goods and services, and contributes to the gross domestic product (GDP) (Barai, 2012;Azam, M., 2015). Considering the role of remittances in affecting GDP, we incorporate remittances in the model.

3.3 Estimation Techniques

Many studies have used the Co-integration Technique and Vector Error Correction Model (VECM) to examine the finance-growth nexus (Udeaja, E. A., & Onyebuchi, O. K. ,2015;Biswas, B. P., &Masuduzzaman, M., 2016). Following other studies, we have used the Co-integration Technique and Vector Error Correction Model (VECM) to estimate the relationship between Bangladesh's GDP growth and Islamic finance including other variables during 1991-2020.

We choose the Johansen-Juselius co-integration technique as it is robust in case of dealing with variables of the same order of integration. The number of cointegrating vectors is detected through the two likelihood ratio test statistics (trace test and maximum eigen value test). Although co-integration test considers long run dynamics, it does not consider short-run disequilibrium. The Vector Error Correction Model (VECM) is applied to address short-run disequilibrium in the long-run. In the VEC Model, long run is expressed as the error correction term where the sign must be negative and significant for ensuring long-run equilibrium. The negative sign indicates that any disequilibrium occurred in the short run will converge to long-run equilibrium.

At first step of the estimation, we perform the unit root test to all variable in order to check whether related variables are stationary or not. It is essential to maintain stationary feature of time series in order to avoid spurious result. For testing the nature of time series, we also examine the order of integration to determine the subsequent long-run relationships among the variables. In our study, we have employed Augmented Dickey Fuller (ADF) test developed by Dickey and Fuller (1979) and Phillips and Perron (PP) test promoted by Phillips and Perron (PP) (1988) to check unit root of the variables.

In the next step, we proceed to run test for cointegration among the variables under study. The cointegration is applied to testing for the presence of cointegration among variables of the same order of integration through framing cointegrating equation. This helps us to find out a long-run relationship among variables. In our model, we follow Johansen (1988) and Johansen &Juselius (1990) approach to run cointegration test.

After testing for cointegration, we proceed to specify a Vector Error Correction Model (VECM) which explains the short-run relationships among the variables. With a view to maintaining the stability of equilibrium relationship, we need to have at least one of the Error Correction Terms to be significant as they indicate the coefficients for the speed of

adjustment in case of any shock.

4. Empirical Results and Analysis

We use statistical software package E-views 11 to estimate parameters and conduct relevant tests in our study.

4.1 Unit Root Test Results

With a view to testing for the presence of unit root in the data using both trend and intercept and determining the integrating level of variables, we conduct ADF and PP techniques. The results of ADF and PP test are presented in Table-1 which reveals the behavior of the variables in level and first difference. The results show that all variables are non-stationary in their levels and they are stationary in first difference meaning that they are integrated of order one i.e., I(1).

Table 1: Results of Stationary Test of Variables

	Augmented Dickey-Fuller Test					Phillips-Perron test statistic					
Variables	Levels		First Diff					First Diff			Order
Name	Intercept	Trend and intercept	Intercept	Trend and intercept	Critical value at 5%	Levels	Trend and intercept	Intercept	Trend and intercept	Critical value at 5%	
lGDP	2.082156 (0.9998)	-2.112543 (0.5184)	-3.669585* (0.0100)	-4.078133* (0.0165)	-2.933158	1.898004 (0.9997)	-2.125019 (0.5118)	-3.725113* (0.0088)	-3.907298* (0.0242)	-3.520787	I(1)
lCBF	1.139977 (0.9969)	-2.286248 (0.4282)	-4.447890* (0.0014)	- 4.590953* (0.0050)	-2.933158	1.064924 (0.9962)	-2.307576 (0.4174)	-4.483510* (0.0013)	-4.590953* (0.0050)	-3.520787	I(1)
lGEX GDP	-1.001892 (0.7396)	-2.551109 (0.3034)	-4.580975* (0.0010)	-4.481194* (0.0065)	-2.933158	-0.8963 (0.7003)	-2.083881 (0.5335)	-4.520199* (0.0012)	-4.395347* (0.0079)	-3.520787	I(1)
lIBF	-0.564922 (0.8641)	-1.360583 (0.8520)	-3.656905* (0.0103)	-3.622914* (0.0446)	-2.933158	-0.523503 (0.8730)	-1.301503 (0.8581)	-3.656905* (0.0103)	-3.622914* (0.0446)	-3.520787	I(1)
lFDI	-1.746847 (0.3985)	-283108 (0.9975)	-5.214725* (0.0002)	-6.575660* (0.0000)	-2.933158	-2.480674 (0.1300)	-1.670219 (0.7394)	-8.286022** (0.0000)	-13.24690* (0.0000)	-3.520787	I(1)
lREMIT	-1.110836 (0.6983)	-1.418637 (0.8345)	-3.722484* (0.0088)	-3.764855* (0.0330)	-2.933158	-0.977697 (0.7482)	-1.122760 (0.9081)	-3.680893* (0.0097)	-3.708235* (0.0373)	-3.520787	I(1)

*Indicates 1% level of significance ** indicates 5% level of significance
Source: Computed by the authors based on statistical software package E-views 11.

4.2 Empirical Results based on Cointegration Test

After deriving the order of integration of variables i.e. I(1), we conduct cointegration test among the series. As the results of Johansen Cointegration Test are lag sensitive, we used both the AIC and SBC to determine the optimal lag length subject to the condition that residuals follow White Noise Process. Results of Johansen Cointegration test are reported in Table 2.

Table 2: Results of Johansen Cointegration Test

Cointegration Rank Test						Cointegration Max-Eigen test					
Eigenvalue	H_0	H_1	Trace statistics	0.05 Critical Value	Prob.**	Eigen value	H_0	H_1	Max - Eigen statistics	0.05 Critical Value	Prob.**
λ0 0.83486	r=0*	r≥1	143.6493	94.15	0.0000	0.83486	r=0*	r>1	54.02914	39.37	0.0007
λ1 0.78762	r≤1*	r>2	89.62018	68.52	0.0006	0.78762	r≤1*	r>2	46.48075	33.46	0.0010
λ2 0.46592	r≤2	r>2	43.13943	47.21	0.1292	0.46595	r≤2	r>2	18.81810	27.07	0.4287
λ3 0.33022	r≤3	r>3	24.32133	29.68	0.1872	0.33022	r≤3	r>3	12.02434	20.97	0.5453
λ4 0.23361	r≤3	r>3	12.29699	15.41	0.1432	0.23361	r≤3	r>3	7.98175	14.07	0.3806

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level.
Max-eigenvalue indicates 1 cointegrating eqn(s) at the 0.05 level.
*Denotes rejection of the hypothesis at the 0.05 level.
**MacKinnon-Haug-Michelis (1999) p-values.

Results from Table 2 suggest that the null hypothesis of no cointegration among the variables is rejected at 5% level for both Trace statistics and Maximum Eigen statistics. Both trace statistics and maximum eigen value provide one cointegrating equation at 5% level of significance.

4.3 Vector Error Correction Model (VECM)

The presence of long-run relationships among the variables can be shown with the aid of Vector Error Correction Model (VECM). The long-run estimates of co-integrating vectors are shown in Table 3.

Table-3 Long-run estimation

	C	LFDI	LCBF	LGEXGDP	LIBF	LREMIT
Coefficient	-11.6561	-0.04239	-0.56597	-8.23575	-0.30164	0.280469
Std. Dev	----	-0.00592	-0.04135	-2.19183	-0.03525	-0.0398
t-statistics	----	-7.15650	-13.6878	-3.75747	-8.55631	7.04634

Note * indicates 5% levels of significant.

So long run equation is as follows

lgdp=-11.6561+0.04239lnfdi+0.56597lncbf+8.23575lngexgdp+0.30ln64libf-0.280469lremit

It is evident from Table 3 that long-run coefficients of Islamic bank finance, conventional bank finance, FDI and government expenditure are positive and statistically significant. Clearly, Islamic finance, conventional bank finance, FDI and government expenditure affect GDP positively in the long run. However, remittances have negative impact on GDP in the long run.

The error correction term obtained from long-run equilibrium is mentioned in Table 4.

Table 4- Error Correction Term

Error correction term	Coefficient	Std. Error	t-Statistic
Ect_{t-1}	-0.268862	0.120712	-2.227292

The coefficient of error correction term that measures the speed of adjustment towards long run equilibrium is negative (-0.268862) at 1% level of significance (Table-4). This implies that the adjustment towards long run equilibrium requires 4 years when the equilibrium is disturbed due to any shock.

We require VCEM to estimate the short run dynamics among the variables. The results of the Error Correction Model are shown in Table 5. This Table reports the parsimonious regression results for nominal GDP growth and its determinants in Bangladesh in the short run during 1991-2020. It is assumed that co-integrating equations follow a linear trend and intercept.

Table 5: Error Correction Estimates

Dependent Variable Δlgdp				
	Coefficient	Std. Error	t-Statistic	Prob.
C	0.102213	0.029871	3.421818	0.0024
D(LGDP(-1))	0.418750	0.174351	2.401762	0.0252
D(LFDI(-1))	-0.018590	0.005129	-3.624433	0.0015
D(LCBF(-1))	0.035435	0.135217	0.262060	0.7957
D(LGEXGDP(-1))	-5.436649	3.591156	-1.513899	0.1443
D(LIBF(-1))	-0.140797	0.085820	-1.640616	0.1151
D(LREMIT(-1))	-0.038079	0.047145	-0.807696	0.4279
ECT(-1)	-0.268862	0.120712	-2.227292	0.0365
R^2=0.555221				
Adjusted R^2=0.413700				
F-statistic=3.923252				

The result reveals that GDP is positively associated to the growth of GDP in the past period. The relation is statistically significant.

The result shows that GDP is negatively related to the growth of FDI in the past period. The relation is statistically significant.

The empirical finding exhibits that GDP is positively related to the growth of conventional bank financing in the past period. However, it is insignificant.

It is found that GDP is negatively related to Government expenditure in the past period. However, the relation is not statistically significant.

The empirical finding exhibits that Islamic bank financing affects GDP growth negatively. However, it is significant at 10% level.

We find that the impact of remittances on GDP is negative. However, it is insignificant.

4.4. The Robustness Test

We conduct several diagnostic tests to check robustness of the Error Correction Model as shown in Table 6. These tests include Jarque-Bera test for normality, LM test for Serial Correlation and White Heteroscedasticity Test for Heteroscedasticity. The Jarque-Bera test is usually run for large data set and it matches the skewness and kurtosis of data to check whether it possesses a normal distribution. The Breusch-Godfrey (B-G) test also known as Lagrange Multiplier (LM) is used to conduct Serial Correlation test. White Heteroscedasticity Test is applied to check Heteroscedasticity in the residuals from a least square regression.

Table 6: Summary of Robustness Check/Diagnostic test

Test	GDP
Jarque-Bera Test	4.913754 (0.0857)
Breusch-Godfrey (B-G) Test (Serial correlation LM Test)	2.747336 (0.2532)
Heteroskedasticity Test (No cross term)	16.07274 (0.1879)

Probability values are given in the parenthesis.
Source: Computed by the authors applying E-Views 11.

It is evident from the results as shown in Table 6 that the VEC model has passed the diagnostic test or robustness successfully. The JB test for normality is satisfied implying that the residuals are normally distributed under null hypothesis. The result of Breusch-Godfrey (B-G) test showed no Serial Correlation. The white Heteroscedasticity Test confirms the absence of Heteroscedasticity. Thus, the results of all tests suggest that the model is well-specified and it provides consistent results.

5. Conclusion and Policy Implications

The present study examines the causal relationship between Islamic bank financing, conventional bank financing, Government expenditure, FDI, remittances and the economic growth in Bangladesh during 1991-2020. The Augmented Dicky-Fuller (ADF) test and Philips-Perron (PP) test are employed to check the stationarity. All the unit test results show that the variables are non-stationary at level but stationary at first difference. The Johansen cointegration approach is applied as the variables are I(1). Both the trace test and maximum eigenvalue test statistics indicate one cointegrating equation.

It is evident from Vector Error Correction Model that Islamic bank financing has positive and statistically significant impact on GDP in the long run. In addition, conventional bank financing, government expenditure and FDI also affect GDP positively in the long run. However, remittances have negative impact in the long run.

Now we will focus on the short run relationships. GDP is positively and significantly associated to the growth of GDP in the past period. GDP is negatively and significantly related to the growth of FDI. GDP is also negatively and significantly related to the growth of Islamic bank financing. Remittances have no significant impacts on the present value of GDP.

The estimated model has passed all diagnostic tests. It is free from the issue of autocorrelation, heteroscedasticity. The residuals of the model are normal too.

It is found that the coefficient of adjusted R-square is 0.41 implying that all explanatory variables used in the study explained 41% variations in GDP growth. The omitted variables not considered in the study can explain the remaining 59% variation in GDP growth.

The following policy implications based on the findings of the study may be derived:

i. Bangladesh needs to further develop Islamic banking as it affects GDP positively and significantly.

ii. Despite achieving marked success in case of GDP growth and poverty reduction, one-fourth people still live below poverty line in Bangladesh. For further reduction of poverty, she requires to raise GDP growth over 8%. To this end, Bangladesh needs to increase private investment-GDP ratio to over 32% from the present level of 24 percent for which financial sector, banks in particular must be efficient and well-performing for augmenting saving-investment process toward higher GDP growth and poverty elimination.

iii. More issues of Islamic Shariah compliant sukuk may be made in financing projects, infrastructure projects in particular to reduce pressure on banking sector. Recently, Bangladesh has started to issue both sovereign and corporate sukuk

iv. Our model has been able to explain 41 percent of variation of GDP in the long run in Bangladesh. This implies that there are some omitted factors which can also affect GDP. The future research on GDP growth needs to include other variables in the model such as environmental and equity issue, labor productivity, technology and innovation, infrastructure and liberal economic policy. Special attention is required to conduct research to find out factors which can promote sustainable development based on economic, social and environmental issues.

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Appendix 1

List of Islamic Banks, Branches and Windows, 2021

Bank Name / Branches	Full-fledged Islamic Banks	Islamic Banking Branches in Conventional Banks	Islamic Banking Windows in Conventional Banks
1.	Islami Bank Bangladesh Limited (384)	The City Bank Limited (1)	Sonali Bank Limited (58)
2.	ICB Islamic Bank Limited (33)	AB Bank Limited (1)	Janata Bank Limited**
3.	Social Islami Bank Limited (172)	Dhaka Bank Limited (2)	Agrani Bank Limited (17)
4.	Al-ArafahIslami Bank Limited (201)	Premier Bank Limited (22)	Pubali Bank Limited (17)
5.	EXIM Bank Limited (140)	Prime Bank Limited (5)	Trust Bank Limited (15)
6	Shahjalal Islami Bank Limited (132)	Southeast Bank Limited (6)	Bank Asia Limited (5)
7.	First Security Islami Bank Limited(201)	Jamuna Bank Limited (2)	Standard Chartered Bank (1)
8.	Union Bank Limited (104)	Bank Alfalah Limited (1)	Mercantile Bank Limited (45)
9.	Standard Bank Limited (138)	NRB Bank Limited (1)	Midland Bank Limited (2)
10.	Global Islami Bank Limited (166)		NRBC Bank Limited (179)
11.			One Bank Limited (2)
12.			United Commercial Bank (11)
13.			Meghna Bank Limited (1)
14			Mutual Trust Bank Limited(15)

Sources: Bangladesh Bank (2021)

Note: Figure in parentheses shows branches and windows of Islamic banks. **Janata Bank Limited has obtained permission for starting Islamic Banking window from Bangladesh Bank, but not yet started operation.

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A Situation Analysis of Access to Financial Services by Disabled Persons in Bangladesh

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Abstract

In Bangladesh, nearly three million individuals are disabled. We cannot guarantee equal treatment for all if disabled people are excluded from our financial sector. Access to financial services is the primary requirement for disabled individuals' financial inclusion. The study aims to determine thecurrent status of disabled individuals' financial access opportunities in Bangladesh. The study also examines the utilization of financial services by disabled individuals in Bangladesh. The study also highlighted the difficulties a disabled individual faces when obtaining financial services. The study was conducted using a mixed methodology. In this study, both quantitative and qualitative methods have been employed. The study reveals that the banking system represents numerous challenges for people with disabilities in Bangladesh due to the fact that they lack banking system knowledge. Consequently, financial access, one of the most reliable indicators of how much a person benefits from the banking system, is extremely low among physically challenged individuals in Bangladesh.

Keywords: Disability, financial services, Accessibility, challenges

JEL Classification: G2, I3, I15

1.0 Introduction:

Disability is acknowledged by WHO as a global public health concern, a human rights issue, and a development priority. Disability is a global public health issue because people with disabilities face extensive barriers to accessing health and related services throughout their lives. Globally, there are over a billion persons with a disability, or approximately 15% of the world's population, or one in seven people. (World Health Organization, 2015). In their personal life, they cannot move easily or often they cannot do their own work. They need the support of other people. In social life, they are not treated fairly in society. In

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economic life, they face most obstacles. They cannot get access to the proper financial services. Many of them experience lower social benefits than people with no disabilities. In Bangladesh, people with disabilities live in deplorable economic conditions marked by social exclusion and disadvantage. The majority of them live below the poverty line and are excluded from adequate income and resources.(Hussain, 2021). Due to discrimination and access barriers, Bangladesh's primary lending sources were inaccessible to individuals with disabilities. Regular discrimination, taking the forms of negative attitudes, social exclusion, lack of economic opportunities, and unpaid or underpaid work, has long been an integral part of the lives of Persons with disabilities.(Smolen, 2014).Access to financial services means they can open hassle-free bank accounts, can make transactions easily, etc. In our country, disabled people are almost three million. This large number of people is believed to be unbanked. As a result, they have little access to financial services.

This study aims to find out the financial access level of physically challenged people. This paper makes a significant contribution to society because the findings of the study will assist the government in determining the financial accessibility level of disabled individuals and in taking steps to increase the financial services accessibility level of the country's enormous disabled population by addressing their challenges.

2.0 Objective of the study:

The general objective of this study is to explore the situation of the use of financial services by disabled persons in Bangladesh. To fulfill this general objective, the specific objectives are

- ✓ To Identify the most used financial services by disabled persons.
- ✓ To Identify the saving pattern of disabled persons.
- ✓ To Identify the obstacles faced by the disabled person while getting financial services.

3.0 Methodology:

The study was conducted using a mixed methodology. In this study, both quantitative and qualitative methods have been employed. The study applied a technique of purposive sampling. The area of research is the Dhaka District. Both primary and secondary sources were used to gather the data. The primary data sources are a questionnaire survey, interviews, and focus group discussions (FGD). The survey questionnaire was administered to a total of 95 disabled individuals. This method of interviewing comprises key informants. Several government employees, Upazilla social service officers, and officials from various NGOs who are responsible for the welfare of disabled individuals are among the main informants. Their responses were documented in survey format

following an oral interview. Before the interview, they provided verbal consent. Books, articles, national and international journals, magazines, institutions, etc. are examples of secondary data sources. Secondary data aids in identifying key factors affecting disabled individuals' financial access.

Distribution of the respondent

Types of Disabilities	No. of Respondent
Blind	22
Dumb	14
Lame	26
Handless	25
Deaf	08
Total	**95**

4.0 Literature Review

Contextual Analysis of Disabilities:

Disability is a part of biodiversity. Not all disabilities are visible. Physical disabilities are very common among the population. There are various types of disabilities. People become disabled because of various reasons. Some people are disabled by born. Some people become disabled because of various types of incidents. There are also various consequences of disabilities. Disabled people are considered underprivileged. A disability is any condition that restricts a person's day-to-day activities on an ongoing basis.

The view of disabilities is considered as human variation with a view of the universal human condition (Zola, 1989).Disabled people's health is often thought of as their disability. It connects disability with impairment. Thus, "disabilities" include blindness, deafness, mental diseases, Downs Syndrome, and epilepsy. This is the medical model of disability. From the 1970s, the UK disability movement critiqued the traditional view of disability, which became the social model. It challenged the medical model of disability by arguing that social, cultural, economic, and environmental barriers disadvantaged disabled people, not their impairments. (Albert, 2004)

In another article, the author describes that every individual has physical, intellectual, and emotional differences compared to others. A few have been disabled because of social structures and organizations (Jones and Basser Marks, 1999).

Situation Analysis:

Disability detection survey program under the department of Social Services (DSS)was brought to measure the actual statistics of disabled people in Bangladesh by competent authoritiesThedisability detection survey programmeis a continuous programme. The detection of disability types and levels of disabilities was started by the physician & consultant designated by the Directorate General of Health Services from June 1, 2013.They have segregated twelve categories of physically disabled persons.(DSS, 2023)

DISABILITY TYPE	MALE	FEMALE	THIRD GENDER	TOTAL
Autism	51032	32123	54	83221
Physical Disability	1039545	590542	1,344	1631844
Long-term Disability	71005	47706	97	108826
Visual Disability	249365	184040	127	433596
Vocal Disability	109457	80906	106	190469
Intellectual Disability	124091	91129	243	215463
Hearing Disability	67839	58530	66	26435
Hearing and Vocal	7525	6244	5	13774
Cerebral Palsy	73098	46954	31	120083
Multiple Disability	138164	100072	129	238365
Down Syndrome	3533	2843	9	6385
Others	10948	7662	629	19239
Total	1946109	124851	2,840	**3197700**

Source: Department of Social Services ,2023

According to the findings of the Disability Detection Survey Programme in 2023, it is evident that there exists a population of around 3.1 million individuals in Bangladesh who are experiencing various forms of disability. In contrast, as indicated by the 2016 World Bank study, an estimated 10% of the population in Bangladesh, equivalent to 16 million individuals, are identified as disabled(Khan 2020).This discrepancy arises because the World Bank takes a more comprehensive approach to understanding disability, whereas the Department of Social Services in Bangladesh has limited its categorization to twelve specific categories of physically disabled individuals who are only registered in the Disability Information System (DIS) software. However, this registration system does not accurately represent the true number of disabled individuals in Bangladesh. Many disabled individuals remain unregistered in the DIS software for various reasons, including poverty, lack of accessibility, and geographical distance (Chandan, 2021).

On the other hand According to the Bangladesh Bureau of Statistics' National Survey on Persons with Disabilities 2021, there are approximately 4.5 million people with disabilities in Bangladesh..(Kamruzzaman et al., 2023).The report on disability also states that the disability rate is higher in the developing countries. As Bangladesh is a developing country, so we have a higher rate of disabled people. People with disabilities (PWD) constitute a sizeable, diversified minority group in Bangladesh. According to the 7th Five Year Plan (2016-2020) of the government of Bangladesh, it is estimated that approximately 9 percent of the total population is disabled, and nearly half a million are suffering from multiple disabilities.

To support physically disable people government has various types of safety net. The government has also introduced a quota for physically challenged people in our country. However, there is no specific policy for excess financial services of this physically challenged people.

Numerous Microfinance Institutions (MFIs) exist to serve all client segments for financial inclusion. In mainstream microfinance institutions in Bangladesh, people with disabilities face a number of exclusions. MFIs confront numerous obstacles in their efforts to serve these people. Even if it is not a formal analysis, it has been determined that PWDs face significant social, political, physical, cultural, and environmental discrimination, as well as severe obstacles including formal and self-employment, less access to credit, government support, and a social safety net system. (Sarker, 2015)

Financial Services:

Financial services are the services that are generally provided by a financial institution. A bank can provide financial services. In 2011, Bangladesh Bank, the country's central bank,

effectively used the off-branch MFS, which played a significant role in the current online business and other business and financial services carried out in a hectic and pandemic world. (Kumar, 2022). Financial services include sending and receiving money, Utility bill payments, different online purchases, different deposits, etc. Another type of financial services includes- different types of loan facilities, other banking services, savings, business, etc. Financial inclusion is not possible without access to financial services.The significance of an inclusive financial system is widely acknowledged within the policy community. By providing avenues for secure and safe saving practices, an inclusive financial system improves efficiency and welfare. It facilitates an enormous variety of efficient financial services, such as credit, insurance, and payment services.(Shirin, 2016).Disabled individuals are particularly susceptible to discrimination and disadvantage in the workplace. Entry or re-entry to the labour market is hindered for many disabled individuals by impairment or disability, lack of skills or qualifications, and income insecurity during the transition from disabled unemployment to rehabilitated employment. (Doyle, 1993).

Access to financial services of disable in India:

There exists a distinction between access to financial services and the finance. Access can be defined as the provision of financial services that are of acceptable quality and are reasonably priced.(Claessens, 2006)The Indian constitution mandates an inclusive society for all, including those with disabilities. As a result of the provisions of the numerous policies and acts for PWDs, the perception of PWDs in Indian society has improved. Access to health, education, employment opportunities, and rehabilitation measures, including AT services, has expanded. (Karki et al., 2021) .The Government of India has established the National Handicapped Finance and Development Corporation (NHFDC). NHFDC serves as the apex institution for channeling funds to individuals with disabilities via State Channelizing Agencies (SCAs) nominated by State Governments and Nationalized Banks. Additionally, it offers financing for graduate and postgraduate study. In addition, it aids in the upgrading of technical and entrepreneurial skills, enabling beneficiaries to manage their production unit effectively.(Koka et al., 2018)

Access to financial services of disable in Pakistan:

Pakistani banks have also taken initiatives to help the physically challenged people to access banking services. We have taken data from several Pakistani commercial banks. Among them Faysal bank is one. We have found that they treat their disabled customer with utmost sincerity. They have created model branches across the Pakistan to help the Physically challenged people. They have also introduced supportive infrastructure all of their branches such as -Low Height Adjusted Counters for Wheelchair Users,Installation of

Talking ATM's, Braille Account Opening Forms,Accessibility Posters in Sign Language,-Availability of Sign Language Interpretation Application etc.(Financial Inclusion Of Persons With Disabilities (PWDS) - Faysal Bank, n.d.)

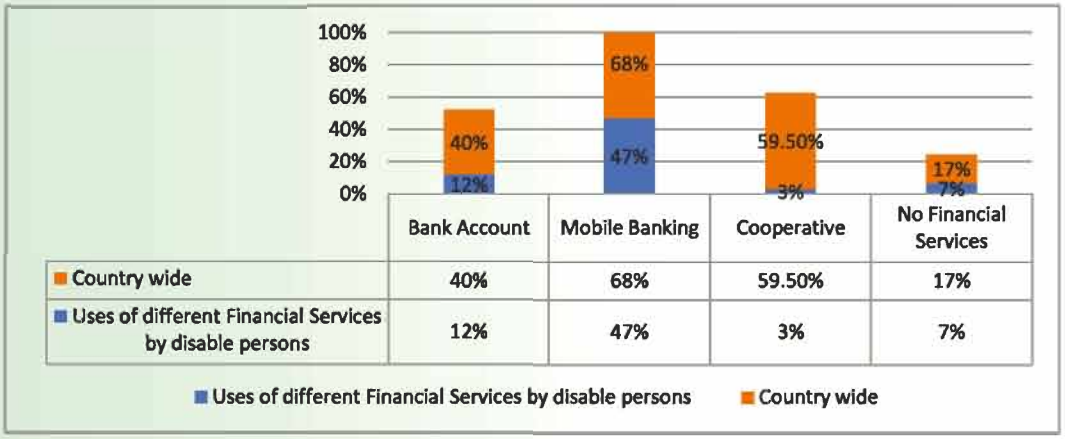
Although there are some suggestive international research, report, or discussions on financial inclusion, ensuring accessibility of disabled persons in the bank. Most of the studies in this field have only focused on the individual part of disabled persons, such as visually impaired or speech impaired or hearing impaired, etc., and their accessibility to particular services like ATM banking, online banking, etc. In Bangladesh, there has been some research on disabled children, their social behavior, accessibility in society and culture, social rights, education, employment, etc. But there has been no significant study on disabled persons relating to their financial rights in the banking sector or accessibility of those in banking services. This study intends to fill some of this gap by analyzing financial accessibility level of disabled individuals and in taking steps to increase the financial services accessibility level of the country's enormous disabled population by addressing their challenges.

Findings of the Study:

Table:5.0 Demographic profile of the respondents

category	variable	Number
Gender	Male Female	76 19
Community type	Village Urban Area	26 69
Age	Less than 20 21-30 31-40s 41 and above	26 33 19 17
Education	Below SSC HSC Honors MS	68 16 11 0
Profession	Unemployed Job Business	55 8 32

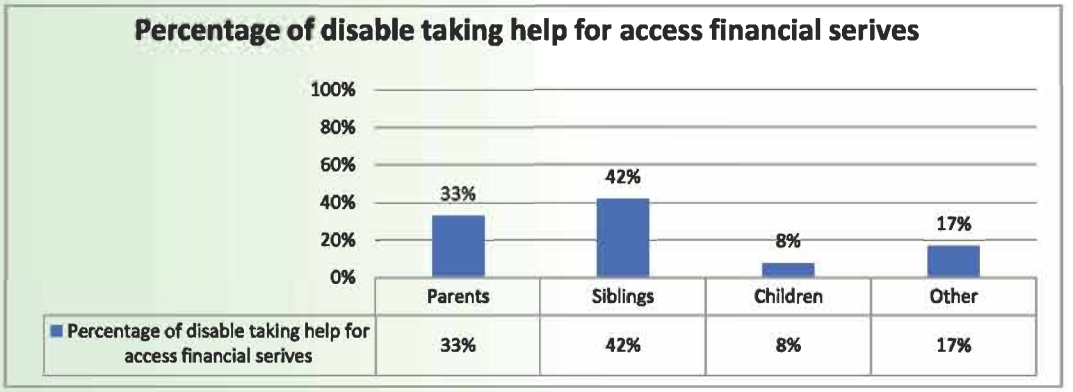
Figure 5.1: Uses of different financial services from banks and other organizations



Source: survey data

During the survey, the respondents were asked about the uses of financial services. We explained different types of financial services to them. Financial services include- MFS, Banks, cooperatives, etc. The study shows that almost all of them use some sort of financial service. But among the respondents, 7% of the respondents do not use any sort of financial services. Among the remaining 93% of respondents, 68% use mobile banking for financial transactions. They receive money through mobile banking. They also perform basic tasks like top-up and e-commerce-related tasks with the help of mobile banking. We have seen that only 12% of the respondents have bank accounts. The figure is very low compared to mobile banking accounts. These include current accounts, savings accounts, and fixed deposit accounts. Only about 3% maintain the local cooperative account.

Figure 5.2: Disabled people taking help from others to access financial services.

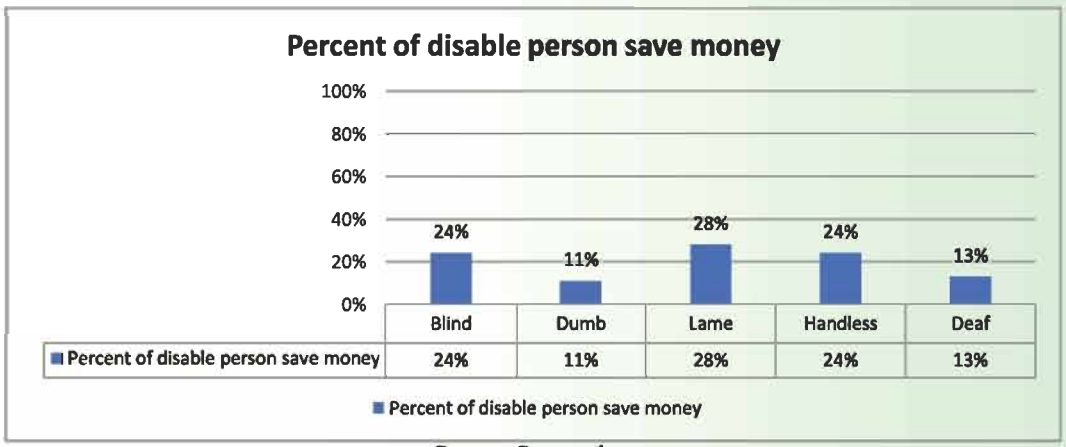


Source: survey data

Physically challenged people are dependent in many ways. They sought help from their relatives and close ones for performing different activities of their life. We know physically challenged people need to take help from their relatives or others to get financial services. Without their help it is not possible to operate or use financial services. They are including Parents, Siblings, Children and other relatives and neighbor.

The findings show that disabled persons largely depend upon their siblings. About 42% of disabled people are dependent upon their siblings for their basic financial transactions. Then about 33% of the respondents said about their parents when they seek help for financial transactions. 8% of the respondents said they have taken help from their children to perform financial transactions. Some disabled persons take help from other persons. These other people include neighbors' relatives etc. About 17% of the respondents said that they have taken help from other people in doing financial transactions.

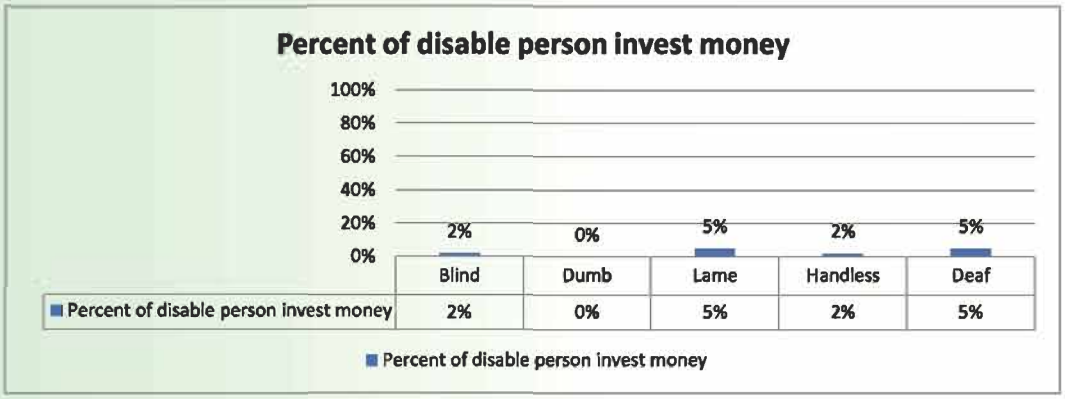
Figure 5.3: Percentage of disabledpeople save money.



Source: Survey data

The habit of saving money is a key indicator while measuring financial literacy. People save money for future consumption. Or they save money if any emergency need arises. Some save money to purchase any special goods or services. For example, some disabled persons save money to buy a wheelchair or electric wheelchair. Disable a person saving money from government donations. They can also save money from different charities or NGOs. Nowadays many NGOs help disabledpeople with money. From our survey, we see that 24% of blind respondents save money. On the other hand, only 11% of the respondents who is Dumb save money. The rate of saving is high among lame people. Survey shows that almost 28% of lame people save money. Handless people also save money. The rate is 24% of blind people save money. The deaf person also saves less than the lame, handless, and blind. They save merely 13% of the deaf respondents.

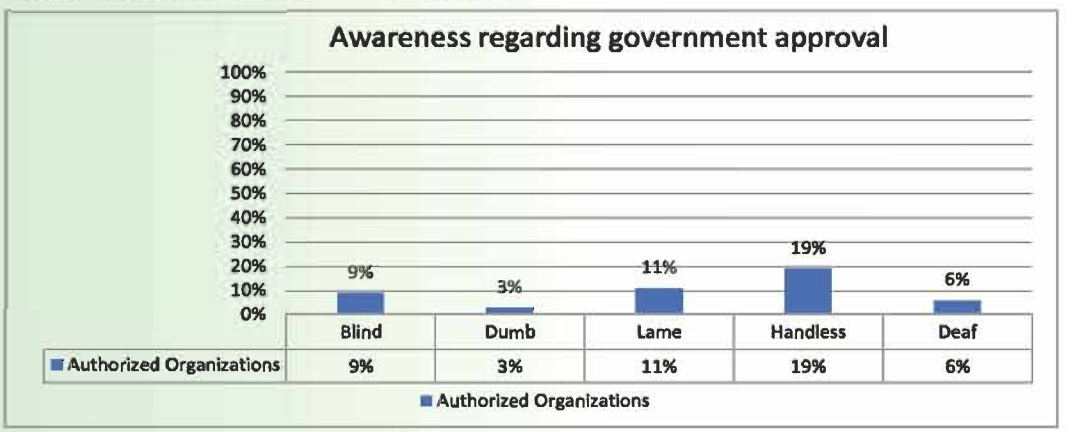
Figure 5.4: Percent of disabledpeopleinvest saving money



Source: survey data

People get some sort of return from their savings. For example, if anyone saves money in a saving account, they get a return. Another way is they can use a fixed deposit for earning a return. Rational people invest their savings ina return. The investment rate among normal people is very high. Either they invest in less risky areas, or they invest in high-risk areas. Wherever they invest the risk depends on return. Usually, normal people do not keep their money idle. They invest in various sectors. For example, some people invest money in the stock market, some invest in land and some people make a fixed deposit of their funds. Some people also keep their money in a saving account so that they can earn some sort of interest. But the difference is very high between normal and disabled persons. Our survey result shows that less than 10% of disabled persons have some sort of investment. We see from our survey results that only 2% of blind people have some sort of investment. But we did not find any savings among the dumb people we interviewed.

Figure 5.5: Percentage of disabled people aware of the approval of Financial Service Providers

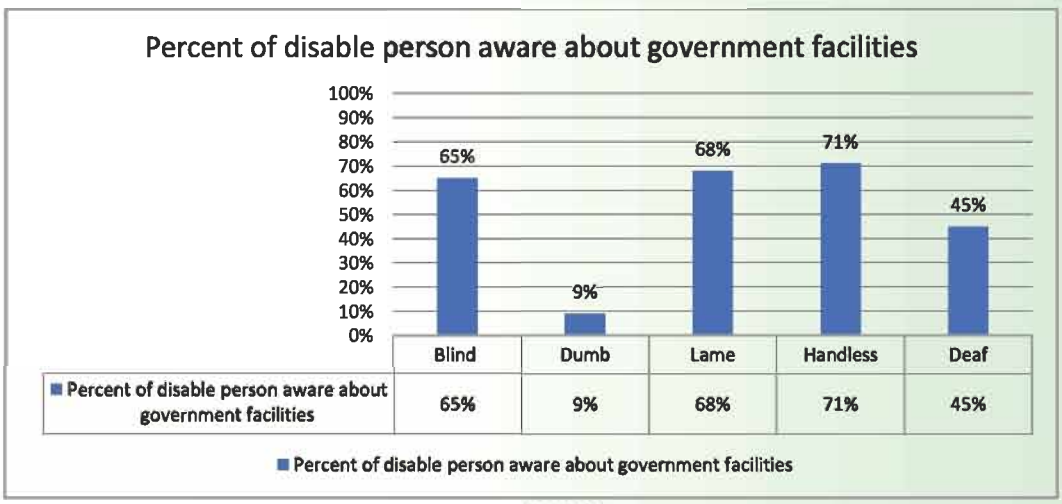


Source: survey data

We know both legal and illegal organizations are providing financial services in the country. Legal entities are banks and other Non-Bank Financial Institutions (NBFI). There are also some cooperatives thathave government approval. But there are some organizations that don't have government permission to operate. These organizations are often making fraudulence to the people who deposited money to these organizations. Knowledge about the organization's approval from the authority is a key indicator of financial literacy. As a part of my study, we have asked the five types of disabled persons regarding the approval of financial institutions operating in our country and their use.

The result of the study found that 19% of the handless disabled person are aware of the government approval of financial institutions like banks and NBFI. We can say that they have some sort of knowledge regarding the authorization of these services. So, the possibility of being derived is comparatively low among them. But other disabled persons have very little idea about the proper authorization of their financial service providers.

Figure 5.6: Percentage of the disabled person aware of government facilities for them

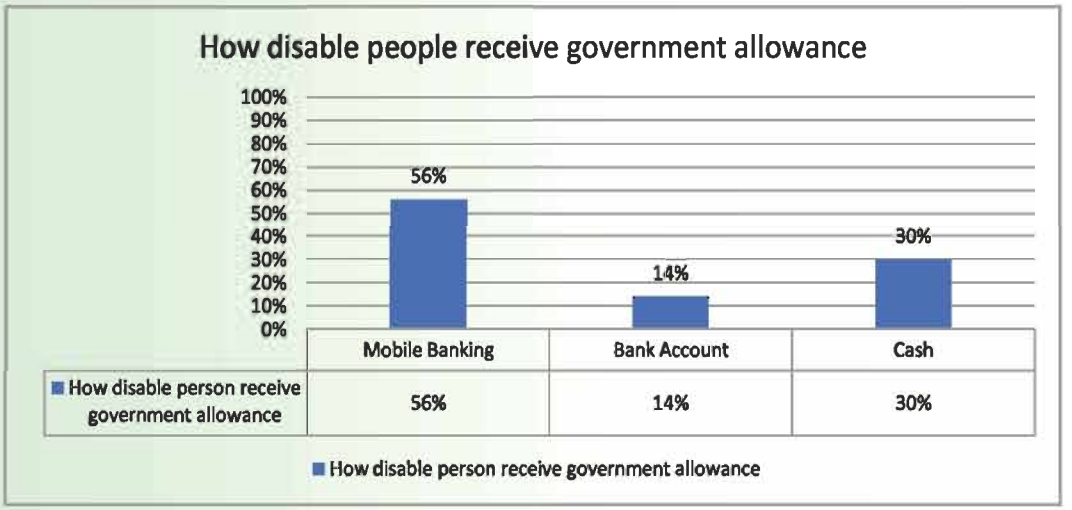


Source: Survey data

Disabled persons are part of our population. It's a common phenomenon all over the world. No government can ignore their existence. That's why government always rendersits help to disable people. These facilities are their right to avail. Financial literacy demands that they should know about their facilities. For example, National Disability Development Foundation disburses almost 12 crore takas for disabled persons every year.

The result of the study found that 71% of the handless people who were interviewed are aware of their benefits from the government. Almost close as handless disabled persons, 68% of the lame person and 65% of blind persons are also aware of the government facilities for disabled persons like them. However, only 45% of deaf-disabled persons are aware of the benefits. The awareness is much worse among dumb people. Only 9% of the dumb peoplewere aware of the government facilities for disabled persons.

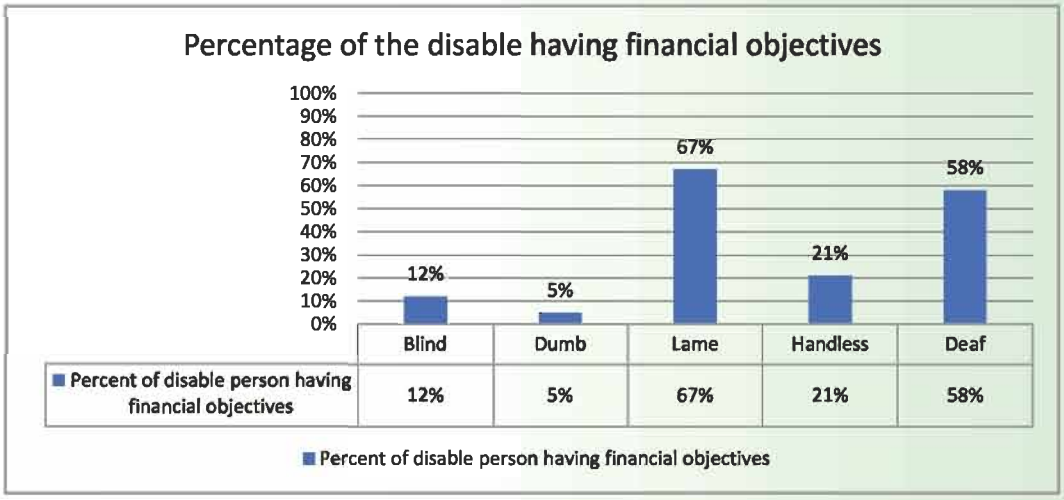
Figure 5.7: How do disable persons receive the government allowance?



Source: Survey data

We know that government helps the disabled person through various social safety net schemes. This helpis rendered through different mediums. Some allowances are going direct to their account and some allowances are being withdrawn by their relatives. They also receive some sort of benefit from other sources. For example, some NGOs also render help to them. During our survey, we found that 56% of the respondents usea Mobile Banking Account to receive aid and grant. On the other hand, only 14% of people get benefits through their bank account. Surprisingly, a cash form of benefit is received by 30% of the respondent. So, we see most people use mobile banking. They use MFS because of their convenience. Because we know if any disabled person wants to use a traditional bank account, they need to face several problems. They need to physically visit the institution. This is very difficult for them. So, they use mobile banking. The use of cash is also very common. Because of liquidity disabledpeople use cash. They can easily purchase their daily necessities with cash.

Figure 5.8 : Percentage of disabled persons having financial objectives



Source: survey data

Financial objectives mean a target while managing one's money. Financial objectives can be various of types. Some people save money for meeting emergency needs. Some people purchase special things with their money. Some have specific objectives like building new homes and meeting other needs. Some people want to support their family with their income. And the rest of the people at least wish not to be a burden upon their families. We see that only 12% of the blind respondent has some sort of financial objectives. Only 5% of dumb people have financial objectives. But surprisingly 67% of the respondents who is lame have some sort of financial objectives. Most of them save money to buy a wheelchair or something that helps them to move around. On the other hand, only 21% of the handless people have some sort of financial objective. Again, surprisingly deafer people have financial objectives. Almost 58% of the deaf respondents have a financial objective. we have asked some of the deaf people about their financial objectives. Most of them want to get rid of their disability through an electronic device. Out of curiosity we also asked about the price of the devices. Those devices are expensive what we learned from them.

Table: 5.9 Challenges faced while taking financial services.

As a supplement to the study, we have asked during our survey regarding the problem they face availing financial services. From the study it reveals that-

Name	percentage
Banks do not want to open a bank account for the disabled persons	35%
Banks do not have wheelchair facilities.	20%
No special officer to serve dumb and deaf people.	15%
Lack of sign language expert.	15%
Lack of directions of Bangladesh Bank in this regard.	5%
Because of the height and location Physically challenged people do not use ATMs.	10%

Source: survey data

From the survey the study finds that abouts 35% respondents claim that Banks do not want to open a bank account for the disabled personsand 20% disclose that they do not get wheelchair facilities in Banks. Again, almost 15% respondents claim that there is no special officer who can serve dumb and deaf people as well as there is lack of sign language expert.

6.0 Major Findings of the study:

Physically challenged people face certain challenges. Because of these challenges they lag behind the community.

- The percentage of people who use a bank account is very low. This means that opening a bank account is still a challenge for the physically challenged people. Only 12% of the respondents said that they have a bank account. So, we can say that disable people are not using the financial services properly.
- Percentage of the disabled people use Mobile banking is 78%. So, we see a high penetration of the mobile banking services among the physically challenged people.
- Lack of Lift system, Braille system, Special Help officers are the common challenges the disabled person faces.
- As part of Bangladesh's digital transformation, every institution, including banks, now offers most of its services via the internet, SMS, or call center. However, these digital methods are not developed with people with disabilities in mind. As a result, the majority of them experienced various obstacles when attempting to use them.

- Focus group discussion revel that if the awareness of the managers of the banks can be increased then the disabled person can get the benefit properly. Besides, Trainedstaff, can be recruited in the banks. Government as well as Bangladesh Bank can come forward to increase the Financial Literacy of the disabled persons.

7.0 Conclusion and Recommendations:

The banking system presents numerous problems for people with disabilities in Bangladesh. Some institutions offer various specialized services for disabled people while others do not. As a result, financial access, one of the effective indicators that shows how much a person benefits from the banking system, is very low among the physically challenged people in Bangladesh. Because disabled persons make up the largest minority in Bangladesh, it's hard to disregard their problems. Therefore, banks should pay attention to their disabled customers or research the subject to improve their banking system for them. If disabled people can effectively manage their financial aspects, then they can remove their hurdles. Which in turn may reduce the poverty rate of them and as well as the country. Thus, it will benefit both disabled consumers and the banks. For this Opening a bank account for a disabled person should be made easy. Banks need to take the initiative to help the disabled person to have a bank account. Disabled people lack knowledge about the banking system, and the bank can arrange programs to educate not only disabled persons but also the mass people of our country. Banking should introduce the latest technology like Talking ATMs, Braille System ATMs, and Wheelchair facilities in their branches. Bank should publish a list of branches having facilities for disabled persons.

8.0 Limitations of the Study

The most difficult work was to interview dumb and deaf people. We have taken help from their attendant in this regard. There are many types of disabled persons. But this study has covered only a few types of disabled persons. The sample has been selected only from Dhaka city. So, it is difficult to get the whole picture of the country from the study. Future research should look into how we can improve the current physical banking system and what problems are encountered by disabled persons when utilizing the Internet banking system. Future research should also focus on finding solutions to these digital barriers so that persons with disabilities can use them without the assistance of a normal person.

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Call for Research Papers

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4. Tables, graphs and maps may be used in the article. The title and sources of such tables, graphs, etc., should be mentioned.

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Introduction to Bangladesh Bank Training Academy (BBTA)

Bangladesh Bank Training Academy (BBTA) is a training wing of central bank of Bangladesh, Bangladesh Bank pursues tasks of capacity building and human capital development in order to prepare skilled human resources in central bank as well as for commercial banks. BBTA organizes different training courses, training workshops, conferences, seminars and other related activities on main topics of economics, banking and finance, financial sector development, human resources development and macroeconomic management. It was established in 1977.

BBTA's Mandate

The purpose of the Academy is to undertake training activities for enabling the officials of central bank and the banking sector to perform their jobs efficiently well-equipped with the latest knowledge of economic, financial and banking developments. To this end, BBTA extends its all-out efforts to facilitate training to personnel engaged in the financial sector. It also works to modernize its library and information center to collect, systematize and disseminate information in the financial arena. Recently, a plan has been adapted to reorganize BBTA library as a Knowledge Management Centre (KMC). This new role puts more weight on BBTA for knowledge creation and application. Since information is important to create new knowledge for educating staff and professionals, we hope that it would contribute to the creation of knowledge and disseminate knowledge for use by others.

BBTA's Strategic Objective's

Bangladesh Bank has adopted its 5-year Strategic Plan 2020-2024 and bestowed responsibilities upon BBTA (Strategic Goal # 7) to adopt all-out efforts to enhance professional excellence and grooming of the officers of Bangladesh Bank. To fulfill the target of the plan document, BBTA has been. employing its full capacity to provide need-based training to the officials both from central bank and commercial banks; continuously striving to diversify the contents of its courses in order to ensure their consistency with evolving training needs; facilitating the practical application aspects of knowledge of economics, banking and finance; and developing training as a scientific discipline.

In order to achieve the above mentioned strategic objectives, BBTA has introduced the following initiatives.

1. Building and enhancing training capacities of the trainers;
2. Improving quality, efficiency, impact and cost-effectiveness of training programs;
3. Linking training with real-world cases and experiences;

4. Building training partnership programs with the public and private sector domestic and overseas training institutions;

5. Building and maintaining the BBTA financial institutions information system,

6. Utilization of the Internet for dissemination of the Academy's biannual Journal 'Thoughts on Banking and Finance';

7. Building a database on trainers and training institutions in the field of banking and finance; as well as

8. Facilitating the digitization of BBTA documents.

Organization

The Executive Director is the head of the Academy. There are seven wings to look after the administration, training and research programs of the Academy.

Location

The Academy is located in Mirpur2, Dhaka1216, Bangladesh.

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