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Contents

Editorial: Banking and Insurance Update

Banking Update

The banking sector of Bangladesh performed more efficiently in FY21 in comparison to that in FY20. In the middle of COVID-19 pandemic, the sector was supported by the prudent and flexible banking policies by the Bangladesh Bank and hence, the performance regarding asset quality, capital adequacy and profitability surpassed the expectations for FY21. Nevertheless, the sector spotted differing movements when compared to the quarter-to-quarter activities, i.e. increase in Non-Performing Loans (NPLs), reduction in capital adequacy, a plunge in maintaining provision, an improvement in profitability, and a progress in liquidity condition in Q2FY21 (Bangladesh Bank, 2021). Due to increased NPLs in both Private Commercial Banks (PCBs) and Foreign Commercial Banks (FCBs), the NPLs in banking sector swelled, in general. All-inclusive gross NPL ratio ascended from 8.07% to 8.18% in Q2FY21 on account of closure of moratorium facility. Likewise, the gross NPL of Private Commercial Banks (PCBs) increased by 0.31 percentage points to 5.44% in Q2FY21. Furthermore, the amount of provision maintained against classified loans improved at the end of Q2FY21.

The industry also experienced marginal decrease in the overall capitalization at the end of Q2FY21, when compared to that of Q1FY21, although it was considered ample. Moreover, the average of capital to risk-weighted assets ratio (CRAR) decreased from 11.67% (at the end of Q1FY21) to 11.57% (at the end of Q2FY21) owing to the Specialized Banks (SBs) and PCBs. Nonetheless, the CRAR of the SCBs modestly increased to 6.82% (at the end of Q2FY21) from that of 6.49% (at the end of Q1FY21). Besides, ascribed to the increase in the TIER-1 capital, the CRAR of FCBs also rose from 28.04% at the end of Q1FY21 to 28.46% at the end of Q2FY21.

Notwithstanding the fact that the banks' deposit grew substantially since Q4FY20, there was a marginal drop in the deposits from 14.0% at the end of Q1FY21 to 13.8% at the end of Q2FY21. In addition, the growth of bank advances dropped a bit from 8.6% in Q1FY21 to 8.5% in Q2FY21, to some extent due to the country-wide strict shutdown started at the end of April 2021 to restrain the second wave of the COVID-19 pandemic. Additionally, the gap between the growth of deposits and advances has experienced a trivial decline from 5.4 percentage points Q1FY21 to 5.3 percentage points in Q2FY21. Regardless of sluggish progression of credit disbursement by the banks, the profitability of the banks improved for the duration of the H2FY21 than that of H2FY20, as indicated by an upsurge in both Return on Assets (RoA) and Return on Equity (RoE). The improvement in RoA and RoE was partly attributable to a fall in interest expenditure originated from the existing lower interest rate on deposits, and a surge in the non-interest income throughout the last two quarters of FY21. Subsequently, the RoA and the RoE of the Bangladesh banking sector surged to 0.50 percent and 8.26 percent in H2FY21 from that of 0.42 percent and 6.68 percent respectively in H2FY20.

The stock of surplus liquidity in the banking sector steeped up nearly 66 percent to Tk 2315 billion at the end of Q2FY21 from that of Tk 1395 billion at the end of Q2FY20, attaining its recent highs. The recent higher growth in excess liquidity was mostly steered by low demand for loans, soaring remittance influxes and, expansionary and accommodative monetary policy stance taken by Bangladesh Bank for regaining economic progress from the COVID-19 pandemic (Bangladesh Bank, 2021). Despite good performance in H2FY21 amidst the covid-19 pandemic, Bangladesh banking sector may confront challenges in improving private sector credit growth, containing the growing NPLs and abating credit risk in the near-term quarters caused by the severity of the second wave of the Covid-19 pandemic.

Insurance Update

Bangladesh insurance sector comprises 46 general insurance companies and 33 life insurance companies including two state-owned insurance corporations-one in the life sector and other in the general sector. As of 2019, insurance penetration measured by insurance premium as a percentage of GDP in Bangladesh was just 0.49% which was lowest in Emerging Asia and has mostly been on a downward trend since 2015. Of total population of the country, only 11.45% have insurance policies, revealing the low penetration. Bangladesh is one of the most underinsured countries of the world. Its insurance premium per capita was just $10.2 which is the lowest in Emerging Asian Countries, implying that people have no insurance at all compared to the Emerging Asian counterparts. This under penetration may be characterized by the shortage of skilled human capital, lack of appropriate insurance product, backdated and inconsistent insurance business model, deficiency of policy support from the government and above all absence of good corporate governance in insurance sector.

Bangladesh insurance sector is dominated by life insurance since this sector constitutes 73.5% of the Bangladesh insurance market whereas non-life insurance constitutes 26.5%. According to Annual Report 2017-2018 of Bangladesh Insurance Association, the total life insurance policies in force reached 10,951,920 at the end of 2017. On the other hand, the total number of insurance policies which contributed to generate gross premium from different sub-classes of general insurance business were 2,418,630 in 2017. Further, the gross premium of life insurance companies in 2019 was Tk 96.1 billion. In contrast, non-life insurance companies grew by 8.6% or Tk 36.8 billion, including the state-owned Sadharan Bima Corporation.

Although Bangladesh experienced lowest insurance penetration, still it can be considered as a land of opportunity that holds huge unmet demand for insurance products. Bangladesh as a disaster-prone country requires disaster insurance products namely catastrophe bonds and Insured Linked Securities to cover the risk arising from climate shocks. Moreover, it should focus on micro insurance as it is one of the major routes to attain financial inclusion through insurance. In this regard, financial literacy specifically digital financial literacy, changing technology and customer management will be the driving force for the progress of insurance sector.

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Firm-Specific and Macroeconomic Determinants of Default Loans in Commercial Banks: Panel Evidence from Bangladesh

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Md. Shahidul Islam[2]

Abstract: This study investigates the determining factors of default risk of commercial banks in Bangladesh considering different bank-specific and macroeconomic variables. The panel study comprised data of twenty conventional commercial banks spanned from the years of 2006 to 2019. Applying the Fixed Effect Model (FEM), the estimated result shows that the growth rate of loans, cost to income ratio, capital adequacy ratio, return on assets, and bank size negatively associates with commercial banks' default loans. On the other hand, the GDP growth rate and inflation rate among macroeconomic variables are positively associated with the default loan ratio. Using Vector Error Correction Model, we have observed a long-run causality, and there is no short-run causality except bank size and inflation on default risk. This paper is also consistent with the analysis of Berger & De Young (1997) hypothesis of bad management, skimping, and moral hazard.

Keywords: Default Risk; Commercial Banks; Maturity Effect; Vector Error Correction; Impulse Response Function

1. Introduction

According to the statement of the IMF (2005) (International Monetary Fund) default loan means the loan whose interest payments or principal payments are overdue and both are overdue for the past ninety (90) days. A loan will be called default loan until the loan is written off permanently, and the interest and principal are received from that loan. In Bangladesh, the banking industry is very competitive now. Alton (2001) stated that a loan will be considered as default loan unless its principal and interest amount are recovered on the maturity date and are not anticipated in future date. The key reasons for high default loans are weak credit procedure, lack of high credit management specialists, high markup spreads, and low level of monitoring systems of the

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borrowers. A weak level of banking system is reflected through the high level of default loans of the banking industry of a country. Overall high level of default loans affects the economic growth of a country and a good predictor of banking crisis (Ivanovic, 2016). A high level of default loan indicates low financial stability in the financial systems on the contrary a low level default loans indicate strong monetary system of a country. The gradual progress of default loan firstly, directly affects the commercial banks in the long run and then it will affect the financial stability of the country (Souza, 2011). The high level of default loan will block the regular interest income of the banks, reduce investment opportunities, develop liquidity crisis in the financial system which result in increasing bankruptcy problem. Thus it is important to identify the factors that affect the default loan to increase or decrease to bring the stability in the financial system of a country (Stijepovic, 2014). The leading cause of economic crisis in many African countries is the high level of default loans in banking industry (Fofack, 2005). A high level of default loan will reduce the employment of credit that ultimately reduces the ability of banks credit creation. According to Berger (1997) cost efficiency can be a good predictor of future default loans and problem banks. In their research, they have four hypotheses; bad luck, bad management, skimping, and moral hazard problems. Under the bad luck hypothesis, it describes due to external events, such failure of the bank's business default loans has increased. To manage these high default loans, banks have to appoint new expertise and efforts to increase the bank's cost. So under the bad luck hypothesis, increased default loans are responsible for lowering bank cost efficiency, but it is not always the same in some cases. Bad management hypothesis; cost of the bank and default loans increase due to improper and unwise decision making of the senior management. Skimping indicates that, a bank whose target is maximizing long-term profit chooses the strategy of skimping by reducing costs in the loan underwriting and monitoring process. This bank has to face more significant problem loans, and in the event of this problem loan, higher costs are incurred. So the cost efficiency of the banks ultimately has reduced. Lastly, moral hazard problem implies the excessive risk-taking behavior of the bank. Especially the small banks (low capital) tend to participate in lending activities aggressively. As a result, higher default loans on average in the future will be increased (Berger, 1997). Higher default loans demand higher provisions for risky debts and therefore affects the gain of banks that could be a matter of concern.

There are 60 listed commercial banks in Bangladesh. Globalization has made it easy to do business in a borderless market. So banks have to face

competition with international banks also. To survive in the market and competition, banks used to take the aggressive lending policy to maximize profit and market share. As a result, banks have not adequately analyzed borrowers to make sound lending to minimize default loans. So the banking sector has huge default loans. Bank insolvency has been a significant problem in the banking industry (Anastasiou, 2016). The total outstanding amount of loan since September 2019 stood at Tk. 9,69,882.22 crore. At the end of June 2019, the total default loans in the banking system were at Tk. 1,12,425.17 crore, or 11.69% of the total disbursed loans. The banking sector faced a combined provisioning shortfall of Tk. 8,129.48 crore as of September, 2019 (Hasan, 2019). Thus, as a result, banks of Bangladesh will go down internationally and will fail to maintain international standards. The objective of this study is to identify the factors of default loans of commercial banks in Bangladesh based on the data available from 2006 to 2019. Recent literature has distinguished two sources of factors responsible for increasing default loans: bank-specific and macroeconomic (Berger, 1997).

This study aims at examining some deterministic bank-specific and country-specific variables that might have significant impact on default loans of commercial banks of Bangladesh. By understanding the banks default loan determinants, bank managers and policymakers will be informed to make the right decisions. We have adopted the panel fixed effect model to measure the default risk probabilities and done several diagnostic checks. We have selected 20 commercial banks of Bangladesh for our study and collected data for 12 years from the bank's annual reports. We have also used VECM (Vector Error Correction Model) to observe short-run and long-run causality effects. Apart from that, the impulse response function is also applied to see the responses of the independent variables to dependent variables in the short and long run.

2. Literature Review

A study conducted on Indonesian banks found that highly profitable banks have a lower level of default loan due to better credit distribution and credit monitoring systems. Another study revealed in UAE that ROA has an insignificant relationship with banks' default risk (Kumar, 2019). A research was conducted in the Tunisian banking sector for ten commercial banks from 2000-2013. The paper focused on the bank, industry, and macroeconomic variables that affect credit risk. Their research findings were that credit risk is significantly influenced by banks' operational efficiency and capital adequacy. On the contrary, a good capital structure and efficient management could significantly reduce the default risk (Ghazouani, 2016).

There is an inverse relationship between banks' default loans and GDP growth rate. When GDP increases, the purchasing power of the people will be increased. The borrower of the banks will be able to repay their loan with interest in time; the portion of the classified loan will be decreased. On the other hand, a positive relation prevails the country's unemployment rate and inflation with default risk, which was also proved (Derbali, 2011). He concluded that due to inflation, the interest rates would be increased that ultimately increase the fund's cost limit the borrower's repayment capacity (Demirguc, 1999). A study found that banks that maintained higher capital adequacy had higher profitability and low default loans (Datta, 2018).

The larger banks have ample resources and expertise management to handle problem loan. Expertise manpower makes good lending decision so that proportion of loan becoming default loan will be reduced (Hu, 2004). A study found a negative relationship between bank size and default risk. As bank size in terms of total assets increases the portion of the default loan to decreases (Micco, 2006). On the other hand, another study found a positive relationship between bank size and default loan ratio (Rajan, 2003). A research on 119 countries and found that state-owned financial institution especially banks had higher default loan ratio compared with private sector banks (Saurina, 2002). The proxy variable of credit risk that is default loan ratio of bank was affected due to liquidity ratio and banks profitability. As a proxy variable of the bank's profitability, ROA (Returns on Assets) is used. When a firms ROA increases the default risk decreases significantly (Manab, 2015). A research conducted on the key determinants of default risk in the developed countries and emerging economies. Japan, France, Australia and United States were selected from the group of developed economies and India, Malaysia, Korea and Mexico were selected from the group of emerging economies. They have chosen eight significant factors of default risk for default loan in the banking sector and found two or four independents variables are statistically significant. The variables were management efficiency, loan loss provision, loan to deposit ratio, leverage ratio, recapitalization, liquidity ratio and Ln of total assets. In their research, liquidity and CAR (capital adequacy ratio) have an inverse relationship with default loan. While the cost-income ratio as a proxy variable of operating efficiency has a positive relationship with default loans. As the research work covered developed and developing countries, it has been found that developed countries have improved default risk management capability than developing countries (Ahmed, 1998). Istanbul Medico University has conducted a research on the determinants of default risk after financial crisis in developing

countries. Total 23 deposit banks in turkey were analyzed, and the default loan ratio was used as the dependent variable and found that the cost-income ratio has significant income on the default loan (Moradi, 2016).

A research conducted on state-owned commercial banks in India showed that the GDP growth, loan growth, increased operating expenses of banks, and the size of the banks' influence worsening the banks' default loan. Panel data were used to conduct the research for the year of 1994-2005. In their research, the independent variables were loan concentration, size of the bank, total deposit to total loans ratio, income to cost ratio, net interest margin as a measure of profitability (Das, 2007).

A broad research on the banking sector was conducted of the middle-east and North African countries. They have chosen 12 banks from each side. The study period was 2001 to 2006. In their research, they have found that foreign participation in the banking industry, increasing the loan growth of the banks and significantly reduces the severity of the default risk scenario of the banking sector in these countries. In their research, they run multiple regression in which the explanatory variables were banks credit growth rate, as a measure of banks health capital adequacy ratio was used, ROA as a measure of banks profitability, foreign banks participation in money market. In macroeconomic explanatory variable they have used legal rights of the corporations, country's unemployment rates and GDP growth rate (Boudriga, 2009).

A research conducted on south Asian countries (Bangladesh, Pakistan, India and Nepal) for the year of 1997-2012 based on some bank-specific, industry-specific and macroeconomic variable. The findings were banks ROA, capital adequacy ratio, growth rate of loans and advances, size of the banks, inflation, GDP has a significant negative relationship with bank's default loan. On the other hand income to loan ratio interest rate has significant positive relation with default loan (Islam, 2016).

3. Research Methods

3.1.1 Econometric Model Selection

This research paper is quantitative in nature. We have adopted pooled OLS (ordinary least square) fixed effect within the groups as well as random effect GLS (generalized least square) regression methods to estimate the factors of default risk of commercial banks in Bangladesh. Additionally, the Hausman test is used to choose the appropriate model between Fixed Effect and Random Effect Model. The model specified in the research is given below:

$$Y_{it} = \sum_{k=1}^{8} \beta_{1_{it}} X_{itk} + \sum_{j=1}^{3} \beta_{2_{it}} Y_{itj} \dots\dots\dots\dots\dots (1)$$

$Y_{it=}$ Ratio of default loans to total loans and advances as dependent variable; C=Intercept; $\boldsymbol{\beta}_1 \sum X_{1\mathbf{it}}$ = Bank specific variables; $\boldsymbol{\beta}_2 \sum Y_{2\mathbf{t}}$ = Macro-economic variables; **ε**it= error term. Here t= time 1,2,3,4,,,,,n and i= bank1, bank 2, bank 3, bank 4,,,,,n. C is a constant term here. **β** is the coefficient for bank-specific and macroeconomic variables. The term **ε**it represent the error term and the effects of extraneous variables.

The model can be broadly expressed by

$DRATIO_{it}=C+\boldsymbol{\beta}_1(LOANTODEP)_{it}+\boldsymbol{\beta}_2(GROWTHLOAN)_{it} + \boldsymbol{\beta}_3(COSTINC)_{it} + \boldsymbol{\beta}_4(CAR)_{it} + \boldsymbol{\beta}_5(ROA)_{it} + \boldsymbol{\beta}_6 (BANKSIZE)_{it} + \boldsymbol{\beta}_7 (EQTA)_{it} + \boldsymbol{\beta}_8 (GDP)_t + \boldsymbol{\beta}_9(INTRATE)_t +\boldsymbol{\beta}_{10} (INF)_t$ ……………..……(2)

Where,

DEFRATIO= Default Loan Ratio

LOANTODEP= Loan to Deposit Ratio

GROWTHLOAN= Growth Rate of Loan

COSTINC= Cost to Income ratio

CAR= Capital Adequacy Ratio

ROA= Return on Assets

BANKSIZE= Natural Logarithm of Total Assets

EQTA= Equity to Total Assets

GDP= Nominal Growth Rate of GDP

INTRATE= Real Interest Rate

INF= Annual Inflation Rate

3.1.2 Panel Causality Test

As our model is co-integrated tested by Augmented Dicky Fuller Test. This is statistically significant. Instead of using VAR we are using restricted VECM (Vector Error Correction Model). So there is evidence of a long run relationship among the variables.

The VE

$$DefRatio_t = \sigma + \sum_{i=1}^{k-1} \beta_1 \Delta Defratio_{t-1} + \sum_{j=1}^{k-1} \beta_2 \Delta \text{LoantoDep}_{t-j} + \sum_{m=1}^{k-1} \beta_3 \Delta \text{GrowthLoan}_{t-m} + \sum_{0=1}^{k-1} \beta_4 \Delta \text{COSTINC}_{t-o} + \sum_{p=1}^{k-1} \beta_5 \Delta \text{COSTINC}_{t-o} + \sum_{q=1}^{k-1} \beta_6 \Delta \text{CAR}_{t-q} + \sum_{r=1}^{k-1} \beta_7 \Delta \text{ROA}_{t-r} + \sum_{s=1}^{k-1} \beta_8 \Delta \text{BankSize}_{t-s} + \sum_{w=1}^{k-1} \beta_9 \Delta \text{GDP}_{t-w} + \sum_{x=1}^{k-1} \beta_{10} \Delta \text{INFRATE}_{t-x} + \sum_{w=1}^{k-1} \beta_{11} \Delta \text{EQTA}_{t-w} + \lambda ECT_{t-1} + u_{1t} \quad \text{.....(3)}$$

Here , k-1= lag length is reduced by 1

$\beta_{1 \text{ to}} \beta_{11}$= short run dynamic coefficients of the models long run equilibrium

λ = speed of adjustment with a negative sign

ECT_{t-1}= The error correction term. (The lagged value of the residuals obtained from the cointegrating regression of the dependent variable on the repressor's)

u_{1t} = The residuals (stochastic error term often called impulses)

3.2 Variables and Expected Sign

Table 1: Description of the variables used in the study

Variables	Description of the variables used in the study		
Dependent Variable	**Notation**	**Description**	**Expected Sign**
Default Loan Ratio	Default loans/Total loans and advances	The ratio of default loan to total loans and advances used as a proxy variable of determinants of default risk	
Independent Variables(Bank specific/ Micro variables)			
ROA(Return on Assets)	Net income/total assets	Return on assets is used how the assets are utilized to generate income. It also means the quality of assets banks hold	-
Bank size (Natural log of total assets) (BANKSIZE)	Ln(TA)	The total size of the bank in terms of total assets is the indicator of good wealth of bank. Large banks tend to have low volume of default loan	-
Equity to total assets(EQTA)	Equity/Total assets	Equity to total asset. Percentage form is used	-
Growth rate of loan(GROWTHLOAN)	L1-L0/L0	Percentage of loan and advances growth rate is used here	+/-

Loan to Deposit ratio (LOANTODEP)	Total loans and advances/ Total deposits	It indicates the percentage of deposits that are sanctioned as loans to the borrowers. A quality loan will reduce default risk on the other hand a bad loan will increase default risk	+/-
Cost to income ratio(COSTINC)	Interest expense/interest income	The ratio of interest expense and interest income is used here. It measures the efficiency of a bank	+/-
Capital Adequacy Ratio (CAR)	Capital of bank/ Risk-weighted assets	The bank takes a greater risk then it must include greater capital to be able to anticipate risks that will occur (Agoba, 2017)	+/-
Macroeconomics variable			
GDP growth rate(GDP)	Annual growth rate of GDP	Percentage form is used	-/+
Rate of inflation(INF)	Percentage of inflation in the country	Annual rate of inflation in percentage	-/+
Real interest rate(INTRATE)	Banks' lending rate minus inflation rate	Real interest rate is used here	+

3.3 Data and Sample Selection

In this study, balanced panel data have been used for the year of 2006 to 2019. A total of fourteen years of data of twenty scheduled banks have been used for data analysis. All the data used in analysis are collected from the scheduled banks own annual reports that have been published from 2006 until 2020. At present in Bangladesh there are sixty scheduled banks. Although the number of banks has increased at present, first, second, third, and fourth-generation banks have been included in the study. In this analysis, banks based on Islamic Shariah have been excluded because they have different modes of doing businesses and different regulations.

4. Results

4.1 Descriptive Statistics

Table 2: Summary statistics of the variables

Variable	Obs	Mean	Std. Dev.	Min	Max
DEFRATIO	280	.0570	.0465	.0082	.3307
LOANTODEP	280	.8147	.0870	.5381	1.18
GROWTHLOAN	280	.1809	.1141	-.1248	.7620
COSTINC	280	.4702	.1376	.2473	.8658
CAR	280	.1172	.0193	0	.1861
ROA	280	.0120	.0087	-.0492	.0582
BANKSIZE	280	11.88	.8010	9.89	13.70
EQTA	280	.0760	.0203	.0189	.1472
GDP	280	.0659	.0082	.0504	.0815
INTRATE	280	.0505	.0102	.0306	.0688
INF	280	.0702	.0158	.0542	.1070

Source: Stata Output

The statistics in the above table represents the numerical summary of all the variables included in this study. It consists of 280 observations in all variables, which is a panel dataset. In this paper, the dependent variable is default loan ratio (DEFRATIO). The mean rate of default loan was about 5.7%, and the standard deviation was almost 4%. The minimum rate of default loan ratio was .0082, and the maximum was 33%. The maximum default loan ratio is quite unnatural, but in Bangladesh, some state-owned banks observed high default rate in some year though. The mean loan to deposit ratio was 81%, which represents that average lending proportion from deposit collection. The maximum loan to deposit ratio was 118%, it is because of aggressive lending of some private commercial banks in Bangladesh. The average cost-income ratio was 47%, which represents banks operating efficiency. The minimum cost to income ratio was 24.73%, on the other hand, the maximum value of the cost-income ratio was 86%. Some private banks are too cost-efficient in delivering banking services on the other hand, state-owned banks have higher cost-income ratio because of their lack of efficiency. Capital adequacy ratio represents the strengths of a commercial banks financial stability of how they have reserve capital for their risk-weighted asset. There is a minimum capital maintenance requirement from the regulatory body like from central bank. Though most of the private banks maintain above the minimum CAR, but some state-owned commercial banks failed to maintain the minimum requirements. That's why the minimum CAR ratio was 0. Janata bank in the year of 2012 had failed to maintain minimum CAR ratio. ROA represents the profitability of a bank. The mean Return of

Assets (ROA) of sample banking sector was 1% and the maximum ROA was 5%. GDP is one of the important indicators to visualize the economic growth of a country. The maximum GDP growth rate was 8.1% in recent years. Bangladesh shows tremendous economic growth in several years even the mean growth rate is about 6.50%.

4.2 Empirical Results

To test the hypothesis Pooled Ordinary Least Square Regression (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM) have been used to estimate the factors of default risk of commercial banks in Bangladesh.

Table 3: Default Risk Factors of Commercial Banks in Bangladesh

Variable	Pooled OLS		Fixed Effect Model		Random Effect Model	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Loan to Deposit Ratio	-.0796*	.0279	.0221	.0309	-.0233	.0296
Growth Rate of Loans	-.0570*	.0214	-.0674*	.0171	-.0614*	.0178
Cost to Income Ratio	.0067	.0182	.0453*	.0183	.0239	.0180
Capital Adequacy Ratio	-.8590*	.1343	-.4023*	.1165	.1199*	.1413
Return on Assets	.5147***	.3008	-.9051*	.2513	-.7925*	.2605
Bank Size	.0127*	.0042	-.0960**	.0046	-.0012	.0044
Equity to Total Assets	-.1403	.1279	-.0041	.1300	-.1339	.1269
Gross Domestic Products	.6067***	.3731	.9199*	.3095	.7222**	.3191
Interest Rates	-.0243**	.2494	-.0155	.1939	.0295***	.2034
Inflation Rates	.0652	.1525	-.3600*	.1339	-.1772	.1347
Constant	.0332	.0680	.1869**	.0647	.1375**	.0653
F Statistic	24.05*		10.19*			
N	260		260		260	
R Square	0.4914		0.4168		.4309	
Hausman Test			$chi^2(10)=46.40$		(Prob>chi^2 =	0.0000)

Source: Stata Output

Coefficients that are significantly different from zero at the 1%, 5% and 10% level are marked with *, **, and *** respectively.

In the above table, three models have been shown respectively with their standard errors. Applying Pooled OLS, the loan to deposit ratio (LOANTODEP) and other control variables can predict the 49.14% variability in the dependent variable default loan ratio while FEM an REM can predict 41.68% and 43.09% respectively. In the Polled OLS Loan to deposit ratio (LOANTODEP), growth rate of loan (GROWTHLOAN), Capital adequacy ratio (CAR), Return on Assets (ROA), size of the bank (BANKSIZE), growth rate of Gross Domestic Product(GDP), real interest rate (INTRATE) have been found statistically significant as the crucial factors of predicting default risk. Other variables rate of inflation (INF), cost income ratio (COSTINC), and equity to total assets (EQTA) have been found statistically insignificant incase of predicting as the factors of default risk.

Loan to deposit ratio which signifies the amount of loans that have been disbursed in proportion of deposits. The estimated result shows that the default risk significantly reduces as the amount of loans increases. It is because of the amount of classified loan usually revealed in the next financial year. That's why in current year default loans reduces significantly.

Applying the hypothesis of the Hausman test, the estimated result accepts the alternative hypothesis that the Fixed Effect Model (FEM) is suitable in this study against Random Effect Model. This study assumes that the Fixed Effect Model is free from both autocorrelation and heteroscedasticity problem as it uses GLS (Generalized Least Squares).

The regression coefficient estimated through Fixed Effect Model (FEM) shows that growth rate of loan (GROWTHLOAN), Capital adequacy ratio (CAR), cost-income ratio (COSTINC), Return on Assets (ROA), size of the bank (BANKSIZE), Gross Domestic Product(GDP) and rate of inflation (INF) are statistically significant. On the other hand, growth rate of loans (GROWTHLOAN), equity to total assets (EQTA), real interest rate (INTRATE) are found statistically insignificant as the factors of default risk of commercial banks.

Cost to total income ratio (COSTINC) is a proxy variable which represents the level of management efficiency. Berger and DeYoung (1997) explained in their ‘bad luck’ and in ‘skimping’ hypothesis that when management expenses are tend to rise, it means the bank has hired more skilled human resources to manage their loan portfolio. On the other hand,

banks who want to gain short term profitability tend to reduce management expense so that banks' profitability increases. As a result, banks future default loans as a whole default risk will be increased. In our findings it has been found that as the ratio of cost-income increases it significantly around 4.5% reduces the non default loans ratio. In Bangladesh, private commercial banks usually spends huge amount of money hiring management personnel.

One of the deterministic variable of default risk is the growth rate of loans and advances. The estimated coefficient is -.067, which implies that the portion of default loans decreases as loans and advances increase. Management usually tries to reduce the ratio of default loans to total loans by increasing the volume of loans and tries to show their efficiency in handling problem loans. Another important variable is capital adequacy ratio (CAR) it has been found statistically significant. This ratio measures the strengths of a bank in terms of regulatory requirement of minimum capital holdings against their asset or loan portfolio. The estimated result shows a coefficient of -.402, which significantly reduces the default risk of commercial banks. It proves that banks are very much cautious while sanctioning loans and have enough capital reserve against their risky assets.

It has been found that ROA significantly reduced the portion of default loan by approximately with a negative coefficient of -.9050. Findings from this coefficient suggests that ROA is a good proxy variable of management quality and efficiency. If the banks' management performed well, then default loans will reduce significantly because ROA shows a negative sign, so that ROA and the ratio of default loans have a significant negative relationship. So according to Berger & DE Young (1997) 'bad management' hypothesis said that poor management leads to default loan. It is evident that high quality management acts as a catalyst of reducing default loans of commercial banks in Bangladesh.

Natural logarithm of banks total assets have been used as deterministic variable of default risk. Banks total asset represents its financial strengths and the ability to diversification. Larger banks are assumed to diversify their loan portfolio. The estimated coefficient imparts that banks size has a negative impact on default loan ratio. The coefficient is -.096, which is also statistically significant.

Though the literature shows that a stable GDP growth rate represents the discipline in the financial system and should have a negative relationship with the default loan. But the estimated result shows a positive coefficient of .919, which is statistically significant. It is evident that due to rapid growth in the

economy demands for bank loan increases significantly. Banks do not properly evaluate the projects properly so that the volume and percentage of default loans increase with GDP growth.

One of the macro-economic deterministic indicators of NPL is inflation. Due to increase in inflation, it induces the nominal borrowing interest rate to increase. It makes borrowers unable to repay their debts so that default loan increases. But the estimated coefficient shows a positive result having a value of -.360, which is also statistically significant at 1% level of significance. The interpretation of this coefficient might be due to an increase in inflation though the recent loans are costly, but it seems cheaper to the past borrowers. To them the previous loan is cheaper so that they feel eager to repay their debt. So that amount of default loans decreases.

4.3 Panel Causality Test

4.3.1 Vector Error Correction Model (VECM)

Long-Run Causality: The above table containing estimated results of VECM reflects that. The adjustment coefficient is negative and statistically significant. It means that the previous year's deviation from long-run equilibrium is corrected at a speed of 24.1%.

Table 4: Output of VECM model estimated by EVIEWS

Dependent Variable	Independent Variable	Lag	Coefficient	p-value
Default Loan Ratio		1	-0.241(error correction term)	0.000
	Loan to Deposit Ratio	1	0.022954	0.042
	Inflation Rate	2		0.008
	Capital Adequacy Ratio	2	-0.232	0.041
	GDP	1	0.340	0.003
	GDP	2	0.359	0.039
	Inflation Rate	1	0.420	0.000
	ROA	1	-0.393	0.009
R squared= 0.656				

Source: Authors' Own Calculation

Short Run Causality: By using Wald test, we have measured the short-run co-integration. The null hypothesis of Wald test is that there is no short-run causality running from dependent variable to independent variable. The estimated result shows that all the variables except bank size and inflation rate are statistically insignificant, so that we cannot reject null hypothesis rather, we have to accept the null hypothesis. So we can say that only the bank size and inflation rate has short-run causality on the dependent variable default loan ratio.

Table 5: Wald Test for short-run causality

Wald Test for Short-run Causality		**Probability**
T statistic	Loan to deposit ratio	.529
	Growth rate of loan	.119
	Cost to income ratio	.095
	Capital Adequacy Ratio	.256
	ROA	.479
	Bank size	.002
	GDP	.206
	Inflation	.011
	Equity to total assets	.163

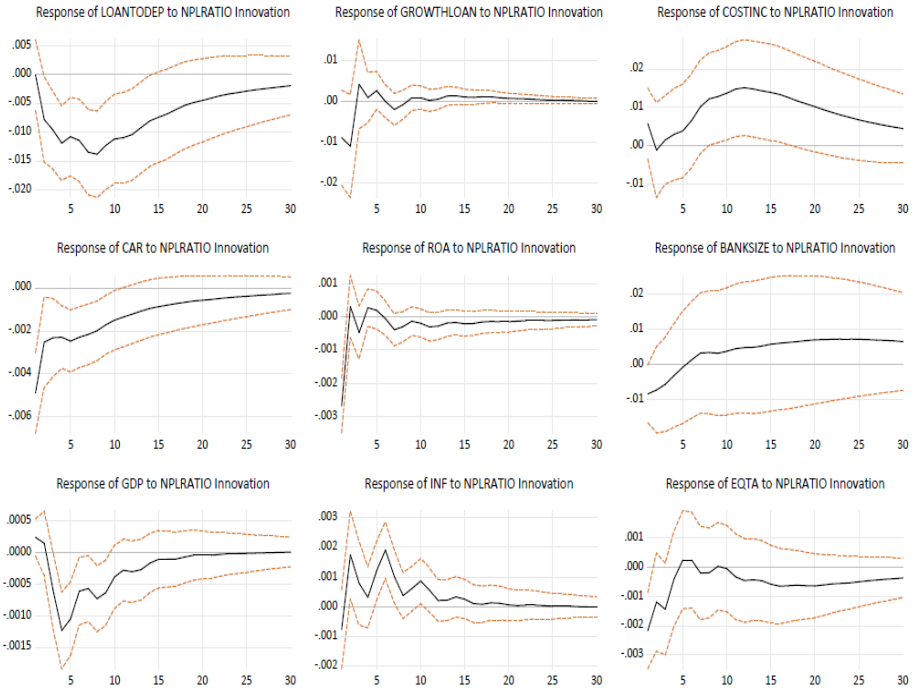
Source: Authors' Own Calculation

4.3.2 Generalized Impulse Responses:

The first graph from the first row shows the loan to deposit ratio to one standard deviation shock (innovation) to default loan ratio. The black line shows the impulse response function and the red line shows the 95% confidence interval. The impulse response function always lies within 95% confidence interval. From the period 0 to 20 there is a negative impulse response of loan to deposit ratio and after that there is a positive response from the period 20 and approaches to zero. So there is a negative impact of loan to deposit ratio in the short term but there is a positive impact of the loan to deposit ratio in the long run.

The second graph from the first row shows the impulse response at one standard deviation. We can clearly see a negative response of the growth rate of loans until period 5 and a sharp increase from period 5. After period 10 there is no significant improvement of the responses. So we can say that there is a negative shock to the default loan ratio and almost no significant positive responses in the long run.

Figure 1: Generalized Impulse responses of the independent variables to dependent variable default loan ratio



Source: Authors' own Calculation

4.4 Model Specification Tests

a) Using Hausman Test (Random effect vs Fixed effect)

The Hausman test is used to determine which model is suitable between Fixed Effect Model (FEM) and Random Effect Model (REM). The hypothesis under this test is (Green 2008)

H_0= The random effect model is suitable

H_1= The fixed effect model is suitable

In fact, it tests whether the unique errors followed by ui are correlated with regressors, the null hypothesis is they are not. The Chi-square value is 46.40, which is statistically significant at 1% level of significance so that we can reject the null hypothesis or random-effect model and accept the alternative hypothesis that means accepting a fixed-effect model.

Table 6: Hausman Test

Varibales	Coefficients		Diff. (b-B)	S.E
	Coef. FE (b)	Coef. RE B)		
LOANTODEP	.0221	-.0233	.0454	.0090
GGROWTHLOAN	-.0674	-.0614	-.0060	.0000
COSTINC	.0067	.0239	-.0172	.0021
CAR	-.4023	-.5151	.1127	.0000
ROA	-.9051	-.7925	-.1125	.0000
BANKSIZE	-.0096	-.0012	-.0083	.0011
EQTA	-.0041	-.1339	.1298	.0000
GDP	.9199	.7222	.1977	.0000
INTRATE	-.0155	-.0295	.0139	.0000
INF	-.3600	-.1772	-.1827	.0281

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$chi^2(10) = (b-B)'[(V\_b-V\_B)^{(-1)}](b-B)$

= 46.40 $Prob>chi^2$ = 0.0000

Source: Authors' Own Calculation

b) Correlation Matrix

In this study, balanced panel data of 20 commercial banks for 14 years (2006-2019) have been used consisting of 10 variables. Multicollinearity is a big issue while dealing with the panel data. From the Pearson correlation matrix, it is evident that there is no significant correlation among independent variables. As the value of correlation of coefficient of all the variables is less than .80.

Table 7: Correlation Matrix

	Loan-todep	Growth-loan	Costing	Car	Roa	Bank-size	Eqta	Gdp	Inte-grate	Inf
Loantodep	1.0000									
Growth-loan	-0.2235	1.0000								
Costinc	0.2182	-0.0883	1.0000							
Car	-0.0364	0.0386	0.0629	1.0000						
Roa	-0.0338	-0.0721	0.0937	0.1769	1.0000					
Banksize	0.1375	0.2788	-0.2351	0.1200	0.2455	1.0000				
Eqta	-0.2215	0.0965	0.1251	-0.3314	-0.2632	-0.2936	1.0000			
Gdp	-0.1830	0.2521	-0.0657	-0.3798	0.1970	-0.1521	0.2542	1.0000		
Intrate	0.1122	0.2861	0.0958	-0.0006	0.0909	0.2005	0.0117	0.4385	1.0000	
INF	0.0447	-0.0326	0.0890	0.2218	-0.1198	0.2581	-0.1113	0.0570	-0.0739	1.0000

Source : Authors' Own calculation

c) Variance Inflation Factor (VIF)

Table 8: Variance Inflation Factor

Variable	VIF	1/VIF
GDP	2.42	0.4138
BANKSIZE	2.33	0.4295
ROA	1.73	0.5769
INTRATE	1.67	0.6001
CAR	1.59	0.6307
EQTA	1.54	0.6486
COSTINC	1.50	0.6646
INF	1.50	0.6658
GROWTHLOAN	1.49	0.6727
LOANTODEP	1.43	0.6970
Mean VIF	1.72	

Source: Authors' own calculation

In addition, to that VIF (Variance Inflation Factor) is tested to conduct whether there is multicollinearity amongst explanatory variables. The table depicts that the model is free from multicollinearity as the VIF value is less than 10 in all variables. This statistic is estimated based on the PLS model.

d) Testing for Heteroscedasticity

The H_o = hypothesis for testing heteroscedasticity is the variance of each disturbance term constant or homoscedastic, and the H_1= is the variance of each disturbance term constant non-constant heteroscedastic. The estimated output from the modified Wald test for group-wise heteroscedasticity is found statistically significant, suggesting that we can reject the null hypothesis and

confer fixed-effect model that suffers from the problem of non-constant error variance.

Table 9: Testing for Heteroscedasticity

Modified Wald test for group-wise heteroskedasticity in the fixed effect regression model
H0: sigma(i)^2 = sigma^2 for all i
chi2 (20) = 1161.04
Prob>chi2 = 0.0000

Source: Authors' own calculation

e) Breusch and Pagan Lagrangian multiplier test (Random Effect vs Pooled OLS)

This LM test is used to decide between a Random effect and Pooled OLS regression. The null hypothesis is that variance across estimates is zero, meaning there is no significant difference across the units. According to the Chi-square value of 151.08 being statistically significant at 1% level of significance, we can reject the null hypothesis, said that there is a significant difference across the panels so that the Random effect is better estimated than Pooled OLS.

Table 10: Breusch and Pagan Lagrangian multiplier test for random effects

Breusch and Pagan Lagrangian multiplier test for random effects		
NPLRatio[Bank,t] = Xb + u[Bank] + e[Bank,t]		
Estimated results:		
	Var	sd = sqrt(Var)
Default Loan Ratio	.0021661	.0465414
e	.0006535	.0255634
u	.0003396	.0184291
Test: Var(u) = 0		
chibar2(01) = 151.08		
Prob > chibar2 = 0.0000		

Source: Authors' own calculation

f) Unit Root Test for Panel Data

We have adopted the LLC (Levin-Lin-Chu) test standing for Levin-Lin-Chu unit root test to know whether the mean, variance, and covariance of series are stationary, assuming the following hypothesis:

H0: The series is non-stationary

H1: The series is stationary

Decision Rule: Reject H0 if the p-value of unit root tests is less than the significance level. Otherwise, don't reject H0.

Table 11: Levin-Lin-Chu Unit Root Test

Levin-Lin-Chu unit-root test for **NPLRatio**

Ho: Panels contain unit roots		Number of panels =	20
Ha: Panels are stationary		Number of periods =	14
AR parameter : Common		Asymptotics: N/T -> 0	
Panel means : Included			
Time trend : Not included			
ADF regressions : 1 lag			
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)			
Variable Name	Statistic		p-value
Default Loan Ratio	Unadjusted t	-8.7724	
	Adjusted t*	-3.9104	0.0000
Loan to Deposit ratio	Unadjusted t	-9.5073	
	Adjusted t*	-4.8577	0.0000
Growth Rate of Loan	Unadjusted t	-10.4226	
	Adjusted t*	-6.2256	0.0000
Cost to Income Ratio	Unadjusted t	-7.0085	
	Adjusted t*	-3.2753	0.0005
Capital Adequacy Ratio	Unadjusted t	-6.2064	
	Adjusted t*	-0.7534	**0.2256**
ROA	Unadjusted t	-7.9824	
	Adjusted t*	-4.0262	0.0000
Bank Size	Unadjusted t	-11.0713	
	Adjusted t*	-10.4703	0.0000
Equity to Total Assets	Unadjusted t	-10.5467	
	Adjusted t*	-5.5307	0.0000
Interest Rate	Unadjusted t	-11.0346	
	Adjusted t*	-7.0382	0.0000
Inflation	Unadjusted t	-10.2541	
	Adjusted t*	-4.5881	0.0000
GDP	Unadjusted t	-7.1171	
	Adjusted t*	0.0021	**.5008**

Source: Authors' own calculation

The above table showed that the adjusted t values are statistically significant at 1% level of significance, so we can reject the null hypothesis and said that the variables are stationary except the GDP and Capital Adequacy Ratio variable at the level. The variables GDP and Capital Adequacy ratio are stationary at the first difference level.

g) Test of Autocorrelation

The estimated Durbin Watson d statistic had a value of 1.2847, which is below the standard value of 2. From that, we can say that the our model is suffering from spatial correlation (correlation in space, not time).

h) Test for Long Run Cointegration

The Kao test for estimating long-run cointegration using the ADF test has t value of -5.33, and the probability is 0%. So we can easily reject the null hypothesis that there is no cointegration. We can conclude that there is a long-run relationship among variables.

Table 12: Kao Residual Cointegration Test

Kao Residual Cointegration Test		
Series: NPLRATIO BANKSIZE CAR COSTINC EQTA GDP GROWTHLOAN INF INTRATE ROA		
Included observations: 280		
Null Hypothesis: No cointegration		
Trend assumption: No deterministic trend		
ADF	t- Statistics	Prob
	-5.339060	0.0000
Residual variance	0.000727	
HAC variance 0.000399	0.000399	

Source: Authors' own calculation

5. Conclusion

This study uses a panel dataset for fourteen years (2006-2019) for twenty commercial banks of Bangladesh without incorporating Islamic banks. This study's empirical findings are consistent with our theoretical analysis and significantly positive persistence of NPLs behavior in the sample banks. Among the bank-specific determinants, statistically significant coefficients of the variables support Berger and DeYoungs (1997) 'bad management', 'skimping' hypotheses and the Louzis et al., (2012) 'diversification' hypotheses. Our study found that the growth rate of loans, cost to income

ratio, capital adequacy ratio, return on assets, and bank size negatively associates with commercial banks' default loans. On the other hand, among macroeconomic variables, GDP growth rate and inflation rate positively associate with the NPL ratio. In vector error correction model, we have observed a long-run causality, and there is no short-run causality except bank size and inflation on default risk.

In this study, only twenty commercial banks have been included. It would be more furnished if all banks are included. This research will help academics, students, and financial institutions understand which factors are the main determinants of default loans in the banking sector. The policymakers can closely examine how banks by increasing the amount of total loans and advances, try to lower the default loan ratio and maintain a fancy figure. Additionally, studies on a number of additional explanatory variables like corporate tax rates, ownership structure, deposit insurance, rate of unemployment, and portfolio effect can be incorporated.

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Do Independent and Female Directors Improve Bank Performance in Bangladesh?

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Abstract: This paper examines the role of independent and female directors on performance of listed commercial banks of Bangladesh. Performance is measured by market perceived value (Tobin's Q) and profitability ratio (Return on Assets) of banks. By applying the fixed-effect estimation and dynamic panel GMM estimation, this study shows that higher proportion of independent directors on bank board does not necessarily cause superior performance. Moreover, proportion of independent directors on bank board has negative influence on market-perceived value of bank. It also appears that percentage of independent directors on bank board has no relationship with financial performance. Finally, this study finds no evidence of significant role of female directors on market-perceived value and financial performance of banks. Instead of merely imposing regulation to appoint a minimum proportion of directors as independent and female directors, regulator should formulate policies to instil real independence in board and to empower independent and female directors to properly execute their responsibilities.

Keywords: Independent Directors; Female Directors; Tobin's Q; Return on Assets; Banks; Bangladesh

1. Introduction

Corporate board, one of the cornerstones of corporate governance, plays significant role in implementing corporate governance throughout the institution. Indeed, poor functioning of corporate governance mechanisms is considered as one of the factors which contributed to the global financial crisis in 2007-08. Hence, Basel Committee on Banking Supervision (BCBS) has recognized the need to study, understand, and improve the corporate governance in banks. Within the corporate governance, board independence and diversity have become most visited research areas in current decade because regulators nowadays require banks to hire specific proportion or number of independent and female directors on the board. This study aims at discerning the effects on the market and financial performance of banks for including greater number of independent and female directors on bank board.

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The role of bank board is critical because there is opacity in the lending function of bank, and it is not feasible for bank shareholders and debt holders to implement governance in banks effectively. For its part, BCBS enumerated principles for enhancing sound corporate governance in 2010 and revisited the principles in 2015 to reinforce the responsibilities of the board. Enron and WorldCom scandals made regulators more skeptical about the composition and characteristics of board of directors because their board did not monitor the firm activities prudently. In recent decades, regulators have advocated the well-known proposal that more independence is always better for governance and performance by requiring board to hire a specific proportion of directors as independent. Besides, bank boards, like other corporate boards, are under rising pressure from regulators and influencing bodies to appoint more female directors to board.

A number of studies have tried to unearth the role of independent directors and female directors on governance and performance of corporate firms including banks. However, these studies document mixed evidence of the role of independent directors on performance of firms. Prior studies show that outside directors increase firm value by removing bad management (Weisbach, 1988), by bringing higher abnormal returns for bidding firms (Byrd and Hickman, 1992), and by making better decisions (Dahya and McConnell, 2005), etc. Moreover, Dahya et al., (2008), Bruno and Claessens (2010), Liang et al., (2013), and Liu et al., (2015) show that board independence positively affects firm performance. In contrary, Adams and Mehran (2012) and Hermalin and Weisbach (2001) document that board independence is not related to the performance. However, Andres and Vallelado (2008) find an inverted U-shaped relation between the proportion of outsiders and firm value which challenge the dominant recommendation of policymakers to increase presence of independent directors. In the context of Bangladesh, several studies have concluded that board composition is not related to corporate performance (Rahman and Saima, 2018; Rashid, 2018).

Consequential influence on governance and performance of increasing presence of women in the boardroom is now being explored in the corporate governance studies. Unlike the mixed evidence of the impact of independent board directors on firm performance, the evidence of the impact of female directors on firm performance is somewhat consistent. Prior studies find a positive relation between the gender diversity and corporate performance. For example, Klein (2003), Adams and Ferreira (2009), and Liu et al., (2014) show that greater presence of female directors have a significant positive impact on firm outcomes and market-perceived value because female

directors in comparison with male directors are more likely to contribute to improving the governance quality. With respect to bank board, García-Meca et al., (2015) show that performance of banks get improved with the presence of gender diversity in boardroom. In contrary, Adams and Ferreira (2009) note that due to over-monitoring by women directors, firm performance is likely to deteriorate. As the area of gender diversity is an evolving area in Bangladesh, the existing literature provide inadequate evidence on the role of gender diversity on corporate boards in Bangladesh.

This study explores the effect of board independence and gender diversity on bank performance in the listed commercial banks of Bangladesh, one of the fastest growing economies in the world. There is opacity in the role of board independence and gender diversity on bank performance in Bangladesh because unlike developed countries, banking sector of Bangladesh is characterized by weak governance practices, weak institutional environment for investors, and male dominated corporate board. Hence, it is not worthwhile to generalize the findings of the studies on the role of independent and female board directors on firm performance based on the developed or developing countries. The most distinctive feature of commercial banks in Bangladesh is that the ownership of the banks is heavily concentrated which cultivate weak governance mechanisms. In the wake of failure of several commercial banks in recent years, Bangladesh Securities and Exchange Commission (BSEC) has taken initiatives to strengthen the governance practices by issuing Code of Corporate Governance 2018.

I use hand-collected data set covering all publicly traded commercial banks on the Dhaka and Chittagong stock exchanges from 2008 to 2019 to test the role of board independence and gender diversity on bank performance. The results show that board independence does not improve the market-based performance and financial performance of commercial banks in Bangladesh. This paper fails to find any significant influence of gender diversity on the performance of commercial banks. This negative influence of board independence can be attributed to the absence of real independence in bank board. It is observed that independent directors are often selected based on prior affiliation with board members and they are not given adequate scope to exercise their authority in board meetings. Moreover, the weak relationship between gender diversity and bank performance can be attributed to the practice of tokenism which prevent them from influencing corporate outcome positively.

This study is largely inspired by the current state of the literature on board independence, gender diversity, and firm performance in Bangladesh. To the

best of my knowledge, only three studies have been conducted to assess the role of board independence and gender diversity on firm performance. First, Dutta and Sudipta (2006) document a paradoxical relationship between presence of women on the bank boards and financial performance of commercial banks. Their study is based on a very limited sample and application of Kruskal-Wallis H Test. Second, Rahman and Saima (2018), using linear regression model and lag model, document that board independence and female directors have no significant relationship with firm performance. Finally, Rashid (2018), documenting board independence and firm performance are not interdependent on each other, contends that board independence is an illusion in Bangladesh. It seems that empirical studies on the role of independent and female directors on the firm performance is limited in both scope and depth. This study aims at improving this deficiency in literature by making in-depth analysis of role of board independence and gender diversity on bank performance. Specifically, this study employs firm fixed-effect estimation and dynamic generalized method of moments (GMM) estimation to explicitly address the endogeneity issues. Moreover, the existing studies concentrate on the manufacturing firms excluding banks and financial institutions. Probably, this study is the first attempt to explore the board independence and gender diversity in banking industry of Bangladesh which is drawing attention of policymakers in recent years due to failure of some bank boards to ensure adequate vigilance. Finally, this study extends the existing literature on corporate governance by exploring the impact of board dependence and gender diversity on banks of an emerging country – Bangladesh.

Findings of this study have major policy implications because this study offers useful empirical guidance to financial market regulators of Bangladesh on the issue of board independence and gender diversity. The issue of appointing more independent directors and female directors for improving the governance and performance of firms has become a major issue in Bangladesh after the issuance of corporate governance guideline by BSEC in 2006 for the first time. The guideline was revised later in 2012. Now the Code of Corporate Governance 2018 is being enforced which requires listed firms including commercial banks to hire at least one-fifth (1/5) of the total number of directors as independent. However, there is no minimum requirement of appointing female directors to board. Though the appointment of female directors to board is optional, the regulatory authorities always encourage female participation in corporate boards. Over the period from 2008 to 2019,

there has been a significant shift of bank board composition specifically in the proportion of independent directors. For example, average proportion of independent directors and proportion of female directors on board were 4% and 11%, respectively in 2008. However, average proportion of independent directors and proportion of female directors on board had increased to 19% and 12% in 2019, reflecting the outcome of regulatory requirement. Though regulators and government are pushing firms to hire more independent and female directors to improve performance, the findings of the study raise questions on the effectiveness of the quantitative requirement of hiring independent and female directors. For improving internal governance practices, the regulator should take measures to require firms to create flexible environment for independent directors to exercise their independence in board meeting. Regulator also should formulate policies to appoint independent and female directors based on their attributes which will help the firms to improve performance.

The remainder of the paper is structured as follows. In section 2, existing literature is reviewed to develop the hypotheses of the study. In section 3, methodology of the study has been illustrated. Section 4 provides the empirical results on the influence of board independence and gender diversity on bank, and finally and Section 5 provides conclusions.

2. Background and hypotheses development

2.1 Review of prior studies

Bank boards are expected to be different from boards of manufacturing firms since banks are the most regulated institutions in any country. The board size in the banking sector is likely to be relatively bigger and banks boards tend to be more independent relative to boards of non-financial sector (de Andres *et al.*, 2012). Bank board directors are likely to be more scrutinized by stakeholders than the non-bank board directors. They are not only accountable to shareholders but also to the regulators including securities and exchange regulators, and banking sector regulator. Since individual bank failure triggers spillover effects in the banking industry, bank directors need to be accountable to depositors. Compared to directors of manufacturing company, directors of banking company bears more responsibility spans from monitoring the management to advising management regarding appropriate strategy identification and implementation (de Andres *et al.*, 2012).

Independent directors are expected to play significant role in a principal agent setting by curving the incentives of managers to exhibit opportunistic

behavior and to misappropriate resources. Conventionally they are considered as better monitors compared to other directors as one of their key objectives is to uphold a good reputation in the directorship market (Fama and Jensen, 2019). Similarly, female directors are expected to add value for the companies with better monitoring capability than male counterparts. Female board directors are more diligent with respect to monitoring and carry out more efforts than male directors for auditing (Adams and Ferreira, 2009; Gul, Srinidhi and Tsui, 2011). Recognizing these roles of independent and female directors, regulators across the nations are proposing explicit recommendations for the board composition which prescribe minimum proportion that independent directors and female directors should hold in board. Apart from the regulatory requirements for proportion of independent and female directors, there is an increasing tendency among the companies to increase the proportion of independent directors on their board. Gordon (2007) reported that 20% of directors of large global corporations of USA were independent in 1950, but this number had risen to 75% in 2005. Similarly, the proportion of female directors of large corporations has increased over time. So, the structural shift in board composition is very evident.

Despite the abundant research in the area of board composition and firm performance, there is opacity in the evidence of relationship between board structure and firm performance (Hermalin and Weisbach, 2001). Liu et al., (2015) note that studies based on the non-U.S. data have consistently showed positive association between board independence and firm performance. It supports the evidence of possible complementarily between internal and external governance mechanisms. It appears that board composition has significant consequence on corporate outcome in countries in which legal protection and institutional environment are not strong. A number of studies (for example: Bruno and Claessens, 2010; Dahya and McConnell, 2005) have documented positive association between board independence and corporate performance based on the global data. Dahya and McConnell (2005) contend that boards with more outside directors tend to make better decisions while Bruno and Claessens (2010) find that independence of board committees positively influence firm performance in any country legal regime. Additionally, Dahya et al., (2008) show that board independence is positively associated with firm performance, especially in countries with weak levels of investors protections. Moreover, studies which show positive relations between board independence and corporate performance based on national

level data include but not limited to Black and Khanna (2007), Dahya and McConnell (2005) and Liu et al., (2015).

In contrary to the positive relationship between board independence and firm performance, several studies document either null or negative relationship between these two variables of interest. For instance, Bhagat and Black (2002) document insignificant correlation between independent directors on board and the long-term performance measures. Similarly, Ferris and Yan (2007) document no relationship between mutual fund performance and board independence. Surprisingly, Agrawal et al., (1996) and Bhagat and Black (2002) show a negative relation between the proportion of independent directors on board and firm's operating performance. Based on the U.S. firms, Hermalin and Weisbach, (2001) fail to get evidence of a robust association between board composition and firm performance. Performance of firms is likely to determine the proportion of independent directors on the board. For the interest of shareholders, poorly performing companies hire more independent directors and well performing companies hire fewer independent directors on their board. Kim and Lim (2010) stress that quality of independent directors affects the share price not the number of directors. Inclusion of independent directors in bank board with professional experience is likely to cause higher stock prices.

Despite the growing concern of gender diversity across the world, relatively little research has been devoted to measure association between gender diversity and their role on corporate performance. Though a number of studies have been conducted in recent years to assess the effects of female directors on firm performance, the studies provide inconclusive evidence and most of the studies are based on data of developed economies. For instance, Campbell and Mínguez-Vera (2008) and Carter et al., (2003) show a positive association between the proportion of female directors on corporate board and firm performance. More diverse board tends to hold CEOs accountable for weak performance of stock price and hence, women appear to have significant impact on board governance.

Notwithstanding the evidence of positive role of vigilant monitoring by female directors for improving governance and performance, too much monitoring by women directors is likely to bring detrimental effect on firm performance. Documenting a negative relation between gender diversity and corporate board, Adams and Ferreira (2009) stress that over-monitoring by women directors is responsible for under performance of firms. Moreover, Ahern and Dittmar (2012) claim that imposing a minimum requirement of

40% female directors on corporate boards in Norway's listed companies caused lower value of firms as the recruited female directors were mostly young and inexperienced. Based on the evidence, it can be inferred that the mandatory requirement of hiring a certain portion of directors as female does not ensure good outcome always.

2.2 Formation of Hypotheses

The aforementioned evidence does not lead us to make a clear conclusion on the role of independent and female directors on the firm performance of Bangladesh. As previously mentioned, the empirical studies available in Bangladesh context do not provide adequate evidence on the relation of board independence and gender diversity with the bank performance. Specifically, Dutta and Sudipta (2006) analyzed the data of 25 listed commercial banks but reached no conclusion regarding the relations between gender diversity and bank performance. Moreover, the findings of the studies conducted by Rahman and Saima (2018) and Rashid (2018) based on manufacturing firms cannot be generalized to understand the role of independent and female directors on bank performance. Hence, do inclusion of more independent and female directors really improve the bank performance in Bangladesh is a worthy question. It leads us to develop our first and second hypotheses.

Hypothesis 1: Higher proportion of independent directors on bank board leads to higher level of market and financial performance.

Hypothesis 2: Higher proportion of female directors on bank board leads to higher level of market and financial performance.

The main hypothesis of this study is to see the impact of the independent and female directors on the performance of the banks separately. However, firms which are concerned with board independence, are tend to be concerned with the gender-balanced boards (Terjesen, Couto and Francisco, 2016). Moreover, Hillman et al., (2002) note that having no female director in the board provides an unethical signal about the company. In this regard, Terjesen, Couto and Francisco (2016) document positive effect of boards which have both independence and gender diversity. Therefore, third and fourth hypotheses are as follows.

Hypothesis 3: Higher proportion of both independent directors and female directors on bank board leads to higher level of market and financial performance

Hypothesis 4: The positive effect of higher proportion of independent directors is greater when board is more gender diversified.

3. Methodology

3.1. Population and sample

The sample of the study consists of 360 observations for 30 publicly-traded commercial banks, including conventional and shariah-based banks, listed in both Dhaka Stock Exchange and Chittagong Stock Exchange. The period of the study is from 2008 to 2019. Out of the total 49 scheduled state-owned and private commercial banks currently operating in Bangladesh, 30 publicly-traded commercial banks represent more than 60% of the population. It is to be noted that 49 state-owned and private commercial banks include more than 10 fourth-generation banks which has operating history of less than the study period of 12 years. Hence, we exclude the fourth-generation banks to make the data-set balanced.

The share price data is from the Dhaka Stock Exchange (DSE) while financial performance data, corporate governance data, board characteristics data, and accounting data are from the annual reports of the respective banks. In case of missing data for few observations, extrapolation technique has been used to estimate missing data using available data.

3.2 Measures of bank performance

Bank performance is measured from two dimensions – market-based performance measure and financial accounting-based measures. For market-based performance measure, Tobin's Q is used, while for financial accounting-based measure, return on assets (ROA) is used. Tobin's Q is calculated as book value of total assets minus the book value of equity plus the market value of equity, then divided by the book value of total assets while ROA is calculated as annual net income after taxes, divided by the book value of the bank's total assets. Existing literature on effectiveness of corporate board extensively use these two measures to proxy bank performance (Carter, Simkins∗ and Simpson, 2003; García-Meca, García-Sánchez and Martínez-Ferrero, 2015; Liu *et al.*, 2015). As these measures estimate performance from two different dimensions with different numerators and denominators, researcher find significant relationship of board effectiveness with one measure but no relationship of board effectiveness with another measure. Since, each measure complements another measure, it is worthwhile to use both variables for quantifying performance. Tobin's Q measures market value of firm relative to book value and better reflects the unstructured and volatile bank performance (García-Meca, García-Sánchez and Martínez-Ferrero, 2015). If it is less than one, it indicates market is

perceiving less value of firm assets relative to the value enumerated in the balance sheet. In contrary, return on assets (ROA) indicates how profitably firm is using the assets. This accounting-based measures overcomes the constraints of Tobin's Q as Tobin's Q is likely to be less reliable for market anomalies when share price does not reflect the true performance of the entity.

3.3 Measures of board composition

In addition to the variables used for measuring bank performance, proportion of independent directors and proportion of female directors are used to represent the extent of independence and the extent of gender diversity in the bank board, respectively. These are estimated as the percentage (%) of independent directors and percentage (%) of female directors on boards, respectively. Besides, a dummy variable based on the presence of female on bank board is used to examine the effect of including at least one female on bank board. Female director (dummy) is a dummy variable that takes the value one if the bank board consists of at least one female director and zero otherwise. Prior studies use the above approach in their studies to examine effect of board independence and gender diversity on corporate performance (Liu, Wei and Xie, 2014; García-Meca, García-Sánchez and Martínez-Ferrero, 2015).

3.4 Control variables

This study includes a set of control variables based on the prior research to estimate unbiased results (Liu *et al.*, 2015; Terjesen, Couto and Francisco, 2016). Board size and number of board meetings are bank board related control variables while debt to asset ratio, assets, and age of bank are bank structure related control variables. Board size is defined as the total number of directors on the bank board, number of board meetings is defined as the number of board meeting held during the year, and debt to assets is the ratio of total liabilities to total assets. Logarithmic forms of board size, assets, and age variables are used for normalization purpose.

Table 1 represents the summary statistics of the variables: the dependent variables (Tobin's Q and Return on assets), independent variables (% Independent directors, % Female directors, and ≥ 1 female director (dummy)), and control variables (Board size, Number of board meetings, Debt to asset ratio, Assets, and Age). Revenue is included in the set of instrumental variables. In terms of Tobin's Q value, the average market-perceived value of the banks is higher relative to the book value of their assets. However, average performance of banks in terms of ROA is not quite satisfactory as the

mean ROA is less than 1%. On average, the sample banks' board consists of 14 directors and 20 meetings per year. The mean presence of independent directors is 14% while the mean presence of female directors is only 11%.

Table 1: Summary statistics

Variable	N	Mean	Median	Std. dev.	Min	Max
Tobin's Q	360	1.070	1.010	0.195	0.937	2.310
Return on assets	360	0.009	0.010	0.014	-0.109	0.051
Number of independent directors	360	1.810	2.000	1.230	0.000	8.000
% Independent directors	360	0.137	0.133	0.098	0.000	0.500
Number of female directors	360	1.500	1.000	1.410	0.000	6.000
% Female directors	360	0.111	0.091	0.104	0.000	0.429
≥ 1 female director (dummy)	360	0.703	1.000	0.458	0.000	1.000
Board size	360	14.200	14.000	4.160	5.000	27.000
Number of board meetings	360	19.600	19.000	8.200	5.000	57.000
Debt to asset ratio	360	0.944	0.922	0.138	0.846	2.010
Revenue (log)	360	10.000	10.100	0.355	8.550	10.900
Assets (log)	360	11.200	11.200	0.342	10.100	12.100
Age (years)	360	22.300	19.000	10.600	7.000	54.000

The average percentage of independent directors on bank board – 14% is below the minimum requirement of 20% set by BSEC. Relative to the average number of independent directors on the bank board, average number of female directors on the bank board is lower. However, the standard deviations of both the % independent directors and the % female directors variables are quite high which reflects that some banks are hiring more independent directors and female directors on board while some banks are not inviting more independent directors and female directors to their board. 70% of sample bank boards are formed with at least one female director which is encouraging in the country of male dominated corporate boards. The average age of sample banks is 22 years which indicate that the sample banks have operating history of more than two decades.

Table 2 shows the correlation matrix of all the variables used in the regression analyses of the study. Correlation matrix confirms that econometric models are free from potential multicollinearity problem as none of the pairs of independent variables have correlation coefficients are greater than 0.60 in absolute terms. In addition, VIF test is also examined to diagnose potential multicollinearity problem (See Appendix A). Results of both the correlation matrix and VIF test confirm that proposed models are free from potential multicollinearity problem.

Table 2: Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Tobin's Q	1										
(2) Return on assets	-0.49*	1									
(3) % Independent directors	-0.23*	-0.06	1								
(4) ≥ 1 female director (dummy)	-0.04	0.12*	0.00	1							
(5) % Female directors	0.02	0.01	0.15*	0.70*	1						
(6) Board size (log)	-0.36*	0.40*	-0.33*	0.02	-0.17*	1					
(7) Number of board meetings (log)	-0.39*	0.27*	0.02	0.04	-0.08	0.23*	1				
(8) Debt to asset	0.84*	-0.67*	-0.01	-0.03	0.05	-0.39*	-0.38*	1			
(9) Revenue (log)	-0.77*	0.40*	0.47*	0.02	0.03	0.29*	0.31*	-0.64*	1		
(10) Asset (log)	-0.67*	0.26*	0.52*	0.00	0.01	0.22*	0.33*	-0.50*	0.96*	1	
(11) Age (log)	0.04	-0.17*	0.10	-0.07	-0.13*	-0.05	0.35*	0.12*	0.23*	0.39*	1

* indicates significance at the 5% level.

3.5. Model of analyses

The analysis consists of four different models. Analytically, the regression model with linear relation on performance is:

$$Performance_{it} = \beta_0 + \beta_1 \%\ of\ Independents + \beta_2 \%\ of\ Female + \beta_3 Control + \eta_i + \upsilon_{it}$$

Performance of bank i in year t is proxied by Tobin's Q and ROA in separate models. β_0 parameter is estimated coefficient for constant, β_1, $\beta_2, and\ \beta_3$ are estimated coefficients for independent directors, female directors, and control variables respectively. η_i captures the unobservable heterogeneity and υ_{it} captures the disturbance. Since this is a panel data analysis, fixed effect method is chosen to capture the unobserved heterogeneity. Moreover, Hausman test (See Appendix A) confirms that fixed effect is more appropriate regression for the models. Moreover, regression is estimated with cluster robust standard error to reduce the disturbance arising from heteroskedasticity and serial correlation. Primarily, fixed-effect linear regression is estimated as an identification strategy with firm fixed effect to materialize the proposed hypotheses. Although endogeneity issue can also be addressed by fixed-effect estimates, hypotheses are tested with the generalized method of moments (GMM) regression proposed by Arellano and Bond (1991). GMM estimation has the advantage of directly computing standard errors that are robust to heteroskedasticity of unknown form

(Wooldridge, 2001, 2002). It can also better control the endogeneity problems which might appear in the proposed models. Furthermore, since all board-related variables, such as board size and number of board meetings are considered to be endogenously related to firm performance, they are included as instrumental variables in the regression (Hermalin and Weisbach, 2001; Terjesen, Couto and Francisco, 2016).

The combination of these instruments should be correlated with the endogenous variables being instrumented and not be correlated with the error term (Terjesen, Aguilera and Lorenz, 2015). Hence, the rational of the dynamic model from Arellano and Bond (1991) is followed because it uses the lagged levels of the endogenous regressors as well as other potential exogenous variables to guarantee the validity of the instruments (Terjesen, Aguilera and Lorenz, 2015). Lag of percentage of independent directors, lag of percentage of females directors, lag of board size, lag of number of board meetings, debt to equity ratio, and log revenue are used as the initial set of instruments following the existing literature (García-Meca, García-Sánchez and Martínez-Ferrero, 2015; Liu *et al.*, 2015; Terjesen, Couto and Francisco, 2016). The model will then choose the best linear combination of each independent variable which are instrumented. Hansen test is used for the over identification of restrictions.

4. Empirical results

4.1. Do independent and female directors improve bank performance

The analysis of the board composition and bank performance relations is particularly challenging because of the presence of endogeneity problem which is likely to appear from the unobserved heterogeneity, reverse causality, and simultaneity (Wintoki, Linck and Netter, 2012; Liu *et al.*, 2015). In the context of relationship between board composition and bank performance, the issue of unobserved heterogeneity may arise when the observed relationship between bank board composition and bank performance is driven by one or several latent variables. For instance, high-skilled top management may prefer more independent boards or more gender diversified boards and those skilled management generate superior performance. Then, the issue of reverse causality arises when banks with certain level of financial performance are likely to ensure a preferred percentage of independent directors or female directors on the board. Finally, the issue of simultaneity arises when banks tend to choose a desired level of independence or gender

diversity in board with the aim of obtaining certain levels of financial performance.

To robustly estimate the effect of independent and female directors on bank performance, two estimation methods are proposed in a panel data regression framework: (1) firm fixed-effects estimation, and (2) the dynamic generalized method of moments (GMM) estimation. The firm fixed-effect model accommodates the unobserved, time-invariant heterogeneities while the dynamic GMM accommodates simultaneity, reverse causality, and time-variant heterogeneities (Wintoki, Linck and Netter, 2012; Liu *et al.,* 2015). Table 3-6 present the estimation results from two econometric models used for analyzing data.

To test the hypotheses of this study - to examine the influence of independent directors and female directors on bank performance, four separate but related models have been designed. In the first model, I consider the percentage of independent directors and the percentage of female directors simultaneously. In the second model, I consider only the percentage of female directors. In the third model, I include the percentage of independent directors and an interaction variable by multiplying both the percentage of independent directors and percentage of female directors to assess the effect of independent directors in presence of more female directors on bank board. In fourth model, I include a dummy variable for presence of at least one female director on bank board and test the effect of independent directors on performance in a board where at least one director is female. All four specified models are estimated for both Tobin's Q and return on assets (ROA).

4.2. Fixed effects estimations

Table 3 shows the estimated results from the fixed effect estimations which tests the effect of board independence and gender diversity on Tobin's Q. The results for the first model show that bank board independence measured by the proportion of independent directors is significantly associated with Tobin's Q. However, in contrary to the predicted positive relationship, the relationship between Tobin's Q and proportion of independent directors on bank board is negative which indicates that greater percentage of independent directors on the board causes underperformance of banks. For commercial banks, a 1% increase in proportion of independent directors in board is associated with 0.29% decrease in Tobin's Q.

Table 3: Fixed-effect of multiple linear regression of Tobin's Q

Explanatory variables	Dependent variable: Tobin's Q)			
	(1)	(2)	(3)	(4)
% Independent directors	-0.292**		-0.358***	-0.291**
	(-2.61)		(-2.96)	(-2.63)
% Female directors	-0.064	-0.064		
	(-0.83)	(-0.76)		
% Independent directors x % female directors			0.464*	
			(1.83)	
≥ 1 Female director (dummy)				-0.018
				(-1.05)
Board size (log)	0.336***	0.383***	0.331***	0.349***
	(4.85)	(6.19)	(4.84)	(4.74)
Number of board meetings (log)	-0.021	-0.039	-0.027	-0.021
	(-0.33)	(-0.54)	(-0.42)	(-0.33)
Debt to assets ratio	0.531***	0.460***	0.518***	0.528***
	(5.58)	(5.82)	(5.94)	(5.56)
Assets (log)	-0.288***	-0.338***	-0.281***	-0.294***
	(-4.09)	(-5.18)	(-4.34)	(-4.19)
Age (log)	0.436**	0.384**	0.421**	0.453**
	(2.22)	(2.16)	(2.25)	(2.35)
Constant	2.916***	3.532***	2.876***	2.954***
	(4.64)	(5.81)	(4.95)	(4.71)
Number of observations	360	360	360	360
Adjusted r-squared	0.5018	0.4826	0.5042	0.5040

Heteroscedastic robust standard error in parentheses.

*, ** and *** indicate significance at the 10%, 5%, and 1 % levels respectively.

More specifically, with a bank board size of 10 directors, including 10% directors as independent, which is equivalent to hiring 1 independent director on the board, leads to a statistically significant decrease of Tobin's Q by 29-basis point. This effect is meaningful in economic sense as the mean value of Tobin's Q is 1.07. It suggests that investors do not perceive banks more valuable for having greater proportion of independent directors on board. These findings support the existing studies which document negative relation between the proportion of independent directors and firm performance (Agrawal *et al.*, 1996; Bhagat and Black, 2002). Both third and fourth model

also indicate that greater proportion of independent directors on the board affects Tobin's Q negatively. This evidence corroborates the findings in prior studies which analyze the influence of board independence on firm performance. With respect to control variables, board size (log), debt to assets ratio, and age (log) have positive effect on Tobin's Q, while assets (log) has negative effect on it. These influences are statistically significant at different significance levels. Nevertheless, the number of board meetings (log) has been found insignificant for analyzing performance.

Contradicting the hypothesis that proportion of female directors on bank board has positive effect on the performance, the results show that proportion of female directors does not have any significant effect on bank performance measured by Tobin's Q in any model. It suggests that presence of gender diversity has no significant impact on bank performance. However, when Tobin's Q is regressed for the effect of % of independent directors and the interaction term of % of independent and % of female directors in model 3, it turns out that presence of both independent directors and female directors have positive effect on bank performance. It indicates that interaction of both board independence and gender diversity has positive influence on the bank performance. As the coefficient of % of independent directors is negative and statistically significant, it indicates that when a board has no or few women, the presence of independent directors hurts bank performance. In fourth model, as the coefficient of dummy variable for at least one female director is insignificant and hence, it does not allow us to infer that the board independence given the presence of women on the board reduces the performance further. This evidence is consistent with the findings of the studies which document null relationship between gender diversity and performance. For instance, Smith et al., (2006) document that there is no statistically significant relationship between proportion of women on the board and financial performance measures. In contrary to the hypothesis of resource dependency theory, this paper indicates that gender diversity is not an important determinant of bank performance.

Table 4 represents the estimated results from the fixed effect estimation which tests the effect of board independence and gender diversity on return on assets (ROA). From the estimated results for all four models, it appears that none of the variables of interest - the proportion of independent directors and the proportion of female directors - have any significant effect on the financial performance of bank measured by return on assets (ROA). However, except

third model, all models show that board independence and gender diversity have positive impact on bank performance which is in support of first and second hypotheses. However, the coefficients are not statistically significant. Therefore, it cannot be concluded that financial performance of banks gets improved or worsened for hiring more independent directors or more female directors. It is evident that there is no significant effect of board independence and gender diversity on the financial performance measures. These results corroborate the findings of existing literature on board composition and firm performance (Bhagat and Black, 2002; Smith, Smith and Verner, 2006; Ferris and Yan, 2007).

Table 4: Fixed-effect of multiple linear regression of ROA

Explanatory variables	Dependent variable: ROA			
	(1)	(2)	(3)	(4)
% Independent directors	0.001		-0.002	0.001
	(0.19)		(-0.26)	(0.19)
% Female directors	0.016	0.016		
	(0.72)	(0.73)		
% Independent directors x % female directors			0.022	
			(0.68)	
≥ 1 female director (dummy)				0.002
				(0.95)
Board size (log)	0.023***	0.023***	0.023***	0.021***
	(3.59)	(3.64)	(3.52)	(3.61)
Number of board meetings (log)	-0.003	-0.003	-0.003	-0.003
	(-0.82)	(-0.80)	(-0.58)	(-0.65)
Debt to assets ratio	0.042***	0.042***	0.045***	0.044***
	(5.55)	(5.17)	(4.41)	(4.70)
Assets (log)	-0.015***	-0.015**	-0.015***	-0.015**
	(-2.78)	(-2.74)	(-2.77)	(-2.73)
Age (log)	0.008	0.008	0.007	0.005
	(0.50)	(0.52)	(0.44)	(0.33)
Constant	0.109**	0.106**	0.105**	0.103**
	(2.22)	(2.13)	(2.20)	(2.13)
Number of observations	360	360	360	360
Adjusted r-squared	0.3173	0.3192	0.3070	0.3148

Heteroscedastic robust standard error in parentheses.
*, ** and *** indicate significance at the 10%, 5%, and 1 % levels respectively.

Regarding the control variables, board size (log) and debt to assets ratio have positive impact on ROA, while assets (log) has negative effect on it. These influences are statistically significant at different significance levels. Nevertheless, the number of board meetings (log) and age (log) are not statistically significant for determining financial performance.

4.2. Dynamic GMM estimations

Table 5 and 6 depict the results from the dynamic GMM estimations of the models with respect to Tobin's Q and ROA, respectively. In table 5, Model 1 shows that both the proportion of independent directors and the proportion of female directors are negatively associated with Tobin's Q when both variables are considered simultaneously. However, the association of female directors with Tobin's Q is not statistically significant at 5%. It can be argued that all other things remaining same, 1% increase in proportion of independent board directors is associated with 29-basis point decrease in Tobin's Q. If it is conjectured that the model is correctly specified, investors in market do not pay higher prices for the banks which have higher proportion of independent directors on board.

The association between board structure and Tobin's Q is examined further in model 2, 3, and 4. The results for model 2 shows that the coefficient for % of female directors is positive but statistically insignificant. This finding does not support the hypothesis that banks with greater percentage of female directors will achieve superior market performance. However, this statistical weak relation between proportion of female directors and bank performance is prevalent in existing literature in the context of Bangladesh. Hence, this finding is corroborated by the existing studies (Dutta and Sudipta, 2006; Rahman and Saima, 2018), which also find the insignificant influence of gender diversity on the firm performance in Bangladesh. Moreover, in model 3, where the interaction factor between independent and female directors is included, I get negative coefficient for proportion of independent directors and positive coefficient for interaction factor. Though the interaction factor is not statistically significant, positive coefficient of interaction factor indicates that presence of both independence and gender diversity in corporate board has positive association with market performance of firm. In addition, the higher coefficient value of independent directors in model 3 compared to the coefficient value of female directors in model 2 signals that the marginal effect of the proportion of independent directors is greater than that of the proportion of female directors. In model 4, the coefficient for independent directors is significant but the dummy factor for the presence of at least one female director is not significant which implies that association of bank's market performance with the proportion of independent directors on board is independent of the degree of gender diversity in board.

Table 5: Two-step difference GMM estimation of linear regression of Tobin's Q

Explanatory variables	Dependent variable: Tobin's Q			
	(1)	(2)	(3)	(4)
% Independent directors	-0.294**		-0.320*	-0.294**
	(-2.53)		(-1.99)	(-2.30)
% Female directors	-0.020	0.027		
	(-0.21)	(0.23)		
% Independent directors x % female directors			0.325	
			(0.95)	
≥ 1 female director (dummy)				-0.003
				(-0.14)
Board size (log)	0.279**	0.333***	0.278**	0.284**
	(2.43)	(3.08)	(2.59)	(2.38)
Number of board meetings (log)	-0.018	-0.054	-0.025	-0.033
	(-0.23)	(-0.83)	(-0.35)	(-0.44)
Debt to assets ratio	0.461**	0.455***	0.430*	0.520***
	(2.55)	(3.08)	(1.94)	(3.83)
Assets (log)	-0.314*	-0.345**	-0.274**	-0.285*
	(-1.91)	(-2.18)	(-2.40)	(-1.94)
Age (log)	0.470	0.380	0.357	0.397
	(1.01)	(0.81)	(1.04)	(0.96)
Number of observations	330	330	330	330
Over-identification test (Hansen's j)	28.80 (243)	29.71 (244)	28.76 (243)	29.51 (243)
AR(1) of first-differenced residuals	0.001	0.002	0.002	0.002
AR(2) of first-differenced residuals	0.697	0.494	0.657	0.630

Heteroscedastic robust standard error in parentheses.

*, ** and *** indicate significance at the 10%, 5%, and 1 % levels respectively.

1. To avoid endogeneity problems, we use lags t-1 to t-2 of % independent directors, % female directors, board size (log) variables and number of board meetings (log) as instruments. Additional instruments include debt to equity ratio and revenue (log).
2. AR (AR(1) and AR(2)) is a serial correlation test of which H_0 is no serial correlation.
3. Hansen's J test statistic is used for testing the over-identifying restrictions, of which H_0 = is no correlation between the instruments and the error term.

Based on the prior studies, I assume that % independent directors, % female directors, board size (log) variables, and number of board meetings

(log) are potentially endogenous. Additionally, two instruments - debt to equity ratio and revenue (log) have been included. For avoiding endogeneity problem, I use lags t-1 to t-2 of above-mentioned variables, except debt-to-equity ratio and revenue (log), as instruments. The statistical tests confirm the validity of the model and the exogeneity of the instruments considered. For each model, p value of F statistic is significant at 1% significance level which expresses the reliability of the model. For testing exogeneity of instruments, I consider Hansen test which is a reliable test to confirm the exogeneity of the instruments. The P value of this test statistic is insignificant in each model under Tobin's Q regressions which indicates that instruments are exogenous. The significance level of AR(1) indicates that residuals are correlated in the first differences while the significance level of AR(2) the residuals are not correlated in the second differences.

Regarding the control variables, board size (log) and debt to assets ratio have positive effect on Tobin's Q, while assets (log) has negative effect on it. These influences are statistically significant at different significance levels. However, the number of board meetings (log) and age (log) have been found as insignificant for analyzing performance.

In order to assess the robustness of the analysis, I test the previous model by measuring bank performance in terms of ROA. Table 6 shows the results for the proposed model to explain the impact of board independence and gender diversity on ROA – financial-accounting based performance measure. As expected, the results for the models with ROA as bank performance indicator uphold the results previously obtained. Specifically, it appears that the board independence and gender diversity do not have any significant influence on bank profitability. However, the positive coefficients of the proportion of independent directors and proportion of female directors are in line with the expectations. It appears that independent and female directors of commercial banks in Bangladesh do not possess the desirable characteristics which would contribute to attaining superior financial performance. The findings corroborate the evidence documented by existing literature on board independence and gender diversity that there is no significant relationship between board composition and financial performance (Bhagat and Black, 2002; Dalton et al., 1998; Ferris and Yan, 2007).

Table 6 : Two-step difference GMM estimation of linear regression of ROA

Explanatory variables	Dependent variable: ROA			
	(1)	(2)	(3)	(4)
% Independent directors	0.013		0.006	0.008
	(0.84)		(0.46)	(0.60)
% Female directors	0.025	0.026		
	(0.99)	(0.99)		
% Independent directors x % female directors			0.006	
			(0.10)	
≥ 1 female director (dummy)				0.004
				(1.25)
Board size (log)	0.036***	0.036***	0.036***	0.040***
	(3.13)	(2.86)	(2.93)	(3.02)
Number of board meetings (log)	0.005	0.005	0.004	0.007
	(0.68)	(0.60)	(0.51)	(0.94)
Debt to assets ratio	0.057***	0.059***	0.055***	0.065***
	(3.42)	(3.50)	(3.96)	(4.57)
Assets (log)	-0.019*	-0.022*	-0.019*	-0.016
	(-1.83)	(-1.94)	(-1.97)	(-1.50)
Age (log)	0.005	0.021	0.009	0.002
	(0.17)	(0.65)	(0.33)	(0.06)
Number of observations	330	330	330	330
Over-identification test (Hansen's j)	27.50 (243)	26.88 (244)	25.89 (243)	26.39 (243)
AR(1) of first-differenced residuals	0.064	0.067	0.073	0.061
AR(2) of first-differenced residuals	0.888	0.937	0.971	0.984

Heteroscedastic robust standard error in parentheses.

*, ** and *** indicate significance at the 10%, 5%, and 1 % levels respectively.

1. To avoid endogeneity problems, we use lags t-1 to t-2 of % independent directors, % female directors, board size (log) variables number of board meetings (log) as instruments. Additional instruments include debt to equity ratio and revenue (log).
2. AR (AR(1) and AR(2)) is a serial correlation test of which H_0 is no serial correlation.
3. Hansen's J test statistic is used for testing over-identifying restrictions, of which H_0 = is no correlation between the instruments and the error term.

With respect to the control variables, board size (log) and debt to assets ratio positively impact Tobin's Q, while assets (log) negatively influence it.

These influences are statistically significant at different significance levels. Nevertheless, the number of board meetings (log) and age (log) have not been found statistically significant for determining financial performance.

Based on the above results, this study intends to raise question to the effectiveness of regulations related to the corporate governance such as prescribing minimum proportion of independent directors on the board or minimum number of female directors on the board. Though inclusion of more independent directors has significant impact on the market performance of banks, the impact is negative which indicates that investors do not believe that independent directors have the right set of knowledge and skills to improve the monitoring and governance in banks. Alternatively, it might be the case that independent directors have the desired set of knowledge and skills, but they cannot exercise their independence in the board of directors dominated by sponsors. It is to be noted that even after having the individual ability, they are likely to suffer from informational deficits which might contain their ability to contribute to improving performance (Cavaco *et al.*, 2017). With respect to the financial performance, the evidence of no significant relationship between board independence and return on assets supports the findings of existing literature based on US firms (Hermalin and Weisbach, 2001). Moreover, the nonrelevance of proportion of female directors to the performance of banks, either market perceived value or financial performance, poses the regulators in a challenging position as they often encourage banks to include more female directors on corporate board to enhance the gender diversity. It might be the case that recruited female directors on the corporate board do not possess the characteristics claimed by the existing literature on gender diversity. Otherwise, if they do have the appropriate skills, they do not get adequate flexibility in male dominated bank board to play role to improve governance and monitoring.

5. Conclusion

Different nations have enacted regulations to make sure that corporations are keeping minimum number of independent and female directors on the board. In order to investigate whether this shift in board composition has any impact on performance of firms, I use a panel data set covering 360 bank-year observations of listed commercial banks in Bangladesh. Using two econometric techniques namely fixed-effects estimation and dynamic GMM estimation, which can address the endogeneity issue in the board composition and performance relations, this study concludes that proportion of independent directors on board negatively affects the market-based performance - Tobin’s Q and proportion of female directors on board does not

have any relationship with Tobin's Q. In addition, there is no significant influence of either the proportion of independent directors or the proportion of female directors on financial performance of banks. When performance is measured with Tobin's Q, it is observed that greater presence of independent directors on bank board slashes market value of the banks. Similarly, greater presence of independent directors on bank board dampens financial performance measured by return on assets. I also document that proportion of female directors on board does not result in either better market value or better return on invested assets for banks.

Findings of this study can be sensitive to the endogenous factors not considered in the estimations, to inclusion of foreign banks and financial institutions, and to the study period in which some banks faced financial problems due to rising classified loans. Nevertheless, this study has major policy implications for board independence and gender diversity in the context of Bangladesh. More specifically, I like to stress the fact that emphasizing on the number of independent directors will not improve governance and performance. It is imperative to check the presence of real independence in boardroom. It is a common trend that the regulator is concerned with requiring the minimum proportion or minimum number of independent directors on board, but regulator most often is not adequately concerned to investigate that whether independent directors are really empowered to exercise their independence. It is not unlikely, in country with weak institutional environment, to observe that nominated independent directors has affiliation with board chairman or influential shareholder directors. Hence, they are not enough empowered to debate on any issue or to opine differently in board meeting. There is evidence that board of directors nominate independent directors in terms of personal relationship which does not violate the conditions for appointing independent directors, but this type of nomination is unlikely to bring any positive outcome. On the other hand, some objective criteria should be placed to nominate female directors. Skilled and experienced females should be nominated as female directors on board ignoring any kind of subjective judgement. Consequently, it will be possible for female directors to improve governance and performance of banks.

Our overall findings offer empirical guidance to Bangladesh Securities and Exchange Commission (BSEC) which require listed firms' board to have at least one-fifth (1/5) of the total number of directors as independent directors. Even though this paper provides robust evidence of the influence of board independence and gender diversity on performance of listed commercial banks, there are several crucial research questions to be

answered. We need to explore the potential channels through which independent directors cause negative performance and the reasons for which female directors do not have significant impact on improving performance. Further research can concentrate on assessing the characteristics of independent directors and female directors, optimal proportion of independent directors and female directors on board, and directors' incentives to execute the monitoring and advising responsibilities.

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Appendix A. Diagnostic test results

(i) Multicollinearity test [Model 1]

Tobin's Q regression		
Variable	VIF	1/VIF
LogA	3.73	0.27
DA	2.32	0.43
PIM	2.3	0.43
Log(Age)	2	0.50
LBS	1.63	0.61
LBM	1.47	0.68
PFM	1.07	0.93
Mean VIF	2.08	

ROA regression		
Variable	VIF	1/VIF
LogA	3.73	0.27
DA	2.32	0.43
PIM	2.3	0.43
Log(Age)	2	0.50
LBS	1.63	0.61
LBM	1.47	0.68
PFM	1.07	0.93
Mean VIF	2.08	

ii. Hausman test for panel model specification [Model 1]

	chi^2	Prob>chi2
Tobin's Q Regression	70.59	0.0000
ROA Regression	744.22	0.0000

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Predicting Financial Distress of the Islamic Banking Sector of Bangladesh

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Abstract: Islamic Banking is widely considered to be the most thriving component of the Islamic Financial System (IFS) and it's getting popularity around the world. In this context, this study aims to measure the financial performance of the Islamic Banking sector of Bangladesh by predicting the level of bankruptcy risks inherent in the major Islami banks. This study has taken 7 out of 11 full-fledged Islami Banks as sample and covered the study period from 2014 to 2019. Altman Z-score model and Emerging Economy Z-score model have been used to measure the financial distress of the major Islami Banks in Bangladesh. The analysis of the study found that 3 out of 7 banks fall in the safe zone while other 3 banks are in the grey area according to the Altman Z-score cut-off value. Interestingly, 86% of the banks fall in the category of safe zone in consideration to the Emerging Economy Z-score model. However, another bank of our sample, ICB Islamic Bank Ltd (ICBIBL) is in the distress area irrespective of the method in use.

Keywords: Islamic Banking; Financial Distress; Altman Z-Score

1. Introduction

Islamic Financial System (IFS) is attracting considerable interest around the world due to its risk sharing, comprehensive and real assets-based transactions structures (Bangladesh Bank, 2020). Over the last two decades, there has been a rapid rise in the practice of Islamic financial system in Asia, notably in South Asia. Despite holding only 1.8 percent share in the global Islamic banking assets, Islamic banking system in Bangladesh is gradually on the way to becoming major players in the world (The Asean Post, 2020).

In 1983, through the establishment of Islami Bank Bangladesh Limited (IBBL), Bangladesh started its Islamic Banking activities and now one-fourth of the Bangladesh banking industry is dominated by Islamic banking sector.

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According to the report published by Bangladesh Bank (2020), as of June 2020, Bangladesh Islamic banking industry comprises 8 full-fledged Islamic Banks with 1274 branches, 19 Islamic banking branches of 9 conventional banks and 155 Islamic banking windows of 12 conventional banks. However, at present eleven full-fledged Islamic banks are operating in Bangladesh as three banks have recently converted to Islamic banks and started their operation from January 2021.

To build a sustainable financial system, the soundness of the financial institutions is a crucial factor. In recent years, Bangladesh's banking sector including the Islamic banking is suffering from the rise in non-performing assets and default rates. Though, the recent non-performing scenario of the banking sector shows noticeable improvement due to loan rescheduling facilities provided by Bangladesh Bank, but then again the situation can get worse soon owing to the economic crisis arising from corona virus pandemic (The Business Standard, 2020). Accordingly, the dramatic rise of non-performing loans is a signal of poor financial health and lack of governance in the banking sector. Transparency International Bangladesh (2020) reported that the entire Banking industry of Bangladesh is now facing the risk of probable collapse due to rise in non-performing loans and call for immediate actions from the supervisory authorities. In this context, it is very important to measure the financial soundness of the banks to protect the interest of the shareholders and the economy.

Table 1: Default Loan (Tk in Crore)

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
22,644	42,725	40,513	50,156	51,371	63,365	74,303	93,911	94,313	88,734

Source: Annual Report of Bangladesh Bank, 2020

In consideration to predict financial distress in the Bangladesh banking industry, researchers have focused profoundly on Private Commercial Banks (PCBs) and State-Owned Commercial Banks (SOCBs). Besides, there prevails a perception that Islamic banks are financially sound due to having large liquidity bases and following conservative financing approaches. However, it is inevitable to study the financial health of the banks following Islamic Sariah because of the unique nature that makes them susceptible to financial insolvency. Taking this into consideration, the purpose of this research paper is to predict bankruptcy risk and to measure the financial performance of the Islamic Banking sector of Bangladesh by applying Altman

Z-score model and Emerging Market Z-score model. The findings of this study could be considered as an early warning of any upcoming distress in the Islamic Banks operating in Bangladesh.

This research paper is separated into four sections. The first part deals with relevant literature to find out what we know about financial distress and how it could be measured specifically in the Islamic banking sector. Part two begins with addressing the theoretical dimensions of the research and outlines how the research is being carried out. The third section presents the findings of the research paper, focusing on two key themes: Z-score of the selected banks for study period and ranking and placement of the banks to the safe and distress zone based on the financial position. Finally, the conclusion includes a summary of the findings and portrays the areas to carry out future research in this arena.

Though Altman Z score model is an effective technique for measuring the financial distress, but a few potential limitations need to be considered. First, the most important limitation lies in the fact that we couldn't manage to take all the Islami banks operating in Bangladesh which could give a better idea of the overall financial performance. Second, the study period was limited to 2014 to 2019 (six years) while a long period can provide a more generalized result. Finally, this paper has only focused on the Altman Z-score model where there remain several other methods such as the Bankometer model for predicting bankruptcy.

2. Literature Review

Global financial crisis of 2007-08 has awakened the need to focus on the financial soundness or liquidity risk of the financial system worldwide. Therefore, in recent years, there has been an increasing number of literatures on measuring financial health and predicting financial distress of the banking industry worldwide. The term "Financial Distress" has been used by Outecheva (2007) refers to the performance deterioration, failure, insolvency, and default risk of the firms. Financial distress can bring negative effects on the bank's overall financial situation, working capital, ability to meet financial obligations and long-term growth. Altman (1968) describes how financial distress can lead the path to bankruptcy and developed the Z-score model for predicting bankruptcy for the manufacturing firms. Since the introduction, the Z-score model has been improvised multiple times to make it a more dependable measure of projecting bankruptcy which has made it the most widely used research tool for analysts. The recent addition to the model

specifically for emerging economy has been developed after Altman reexamined it from 1969 to 1975 on 86 financially challenged firms, from 1976 to 1995 on 110 bankrupt firms, and lastly from 1996 to 1999 on 120 bankrupt firms. In that study, Altman achieved 82% - 94% accuracy which proved to be more effective than the existing model. Besides, Altman (2013) also proposed a grey area for having Z-score value of 1.21 to 2.90 which is theoretically safe but possess high alert (Jan and Marimuthu, 2015).

In the literature, there are many examples that have accepted the Altman Z-score model for analyzing the bankruptcy of the Banking industry. For instance, Chaitanya (2005) traced the financial distress related to after merger effect on Industrial Development Bank of India (IDBI) using the Altman Z-score model. Later, Chotalia (2012) has also applied the service sector Altman Z-score model on six private sector commercial banks from Indian banking industry for the period 2007 to 2012. Likewise, detailed examination of financial soundness of the 36 Indian banks comprising 20 public sector and 16 private sector banks by Sharma and Mayanka (2013) showed that Altman Z-score model is effective enough to predict bankruptcy. Similarly, Pradhan (2014) demonstrated the standing of Altman Z-score as a tool for assessing the credibility of the selected public sector banks in India. His study also used Back Propagation Neural Network (BPNN) to estimate the internal parameters of the Z-score model which he used to forecast the Z-score value of the sample banks up to 2020 (Pradhan, 2014). Sanjaya, Lindrianasari, & Aminah (2015) studied the relevance of the Altman model in predicting bankruptcy in Indonesian Banking industry. Their research paper selected those banks that ceased their operation between 2000 to 2012 as sample data and reaffirmed that the Altman model is applicable for predicting financial distress in banks (Sanjaya, Lindrianasari, & Aminah, 2015). Ashraf and Tariq (2016) also applied Altman z-score and Bankometer S-score on all banks listed in Pakistan Stock Exchange and found the same results. Then, Rahman (2017) used the Bankometer model to measure the financial soundness of 24 selected banks over the period 2010 to 2015 and reported sound financial health according to S-score.

In a recent study which set out to determine effectiveness of Altman Z-score model, Kittur (2019) found that Z-score can marginally capture the distress caused by the non-performing assets in Indian banking sector. Similarly, Joshi (2020) found the effectiveness of Altman Z-score model in an analysis of financial performance of the public sector banks having highest gross non-performing assets in India.

To date, little evidence has been found that focused on the effect of financial distress on the performance of Islamic banking industry. Few research papers have investigated the financial performance of the Islamic banks by using the Altman Z-score model. Endri (2009) used Altman Z-score model on three sample Islamic banks from Indonesia from 2007 to 2009 and predicted bankruptcy. Later, Al Jaabi (2011) carried out a research to find the bankruptcy risk of the Islamic Banks in UAE by applying the emerging economy Z-score model. In a recent study, Jan and Marimuthu (2015) examined the bankruptcy profile of Islamic Banking industry with Altman Z-score model on five Islamic banking countries and for comparative analysis applied ANOVA Post Hoc Scheffe test. In a different study, Khaddafi et. al. (2017) used Altman Z-score model for predicting financial distress in the banking companies listed in Indonesian Stock Exchange.

A growing body of literature has evaluated financial distress of banks operating in Bangladesh. A comparative study by Parvin, Rahman and Nitu (2013) discovered the financial health of the banking industry in Bangladesh and stated that state owned banks possess better financial health than the private commercial banks. In a different study, Qamruzzaman (2014) analyzed the financial position of 20 selected private commercial banks in Bangladesh for five year period (2008 to 2012) by using both Altman Z-score model and Bankometer S-score model and experienced similarities in the findings of bankruptcy prediction. In a recent study, Mostofa, Rezina and Hasan (2016) considered the financial performance of randomly selected 25 banks with the use of Altman Z-score model and reported that 20 percent of the selected commercial banks belong to the distress zone.

Traditionally the financial distress of service sector companies has measured using the Altman Z-score model. In 1968, However, different authors measured probable bankruptcy in a variety of ways. Some researchers (e.g. Chotalia, 2012; Sharma and Mayanka, 2013) applied the modified service sector Z-score to predict the bankruptcy risks in the banking sector. Conversely, Erari et. al. (2013) reported Altman Z-score model inappropriate for measuring financial distress. Similarly, Budiman, Herwany, & Kristanti (2017) also claimed Z-score as inefficient tools to measure bankruptcy in the banking sector. In this context, in most recent research papers, the banking sector's financial health has been measured in different techniques such as the Bankometer S-score approach that considered CAMEL rating (Erari et. al., 2013; Ashraf and Tariq, 2016; Rahman, 2017; Budiman, Herwany, & Kristanti, 2017).

There is a considerable amount of literature on the measurement of financial distress in the Banking industry (Chaitanya, 2005; Chotalia, 2012; Sanjaya, Lindrianasari, & Aminah, 2015; Ashraf and Tariq, 2016; Rahman, 2017). Together these studies provide an important insight into the fact that the Altman Z-score model can be applied to measure bankruptcy risk in banks. Moreover, there has been a disagreement regarding the application of Altman Z-score model in profiling Bank's financial health (Erari et. al., 2013). However, it has not yet been established that the Altman Z-score model is ineffective in measuring the bankruptcy profile of the banking industry. Previous work on financial distress of Bangladesh's banking industry has been limited to bankruptcy prediction in conventional banks (Parvin, Rahman and Nitu, 2013; Qamruzzaman, 2014; Mostofa, Rezina and Hasan, 2016). Despite this interest, no one to the best of our knowledge has studied the bankruptcy profile of Islamic banks operating in Bangladesh. In this context, the purpose of our research is to extend the existing knowledge of predicting financial distress explicitly in Bangladesh's Islamic banking sector.

3. Methodology

This research is descriptive in nature and follows a quantitative research approach to predict the financial distress of Islamic banking sector of Bangladesh. In most recent studies, financial distress in the banking sector has been measured in two different ways including Altman Z-score approach and Bankometer S-score approach. In this paper, the Altman Z-score model is chosen because it is one of the most useful methods to predict bankruptcy. The criteria for selecting samples are: (1) listed on the Dhaka Stock Exchange; (2) published annual reports for the study period (2014-2019); (3) in Islamic banking operation for at least five years. Accordingly, 7 banks were selected from 11 full-fledged Islamic Banks operating in Bangladesh. three (3) banks were excluded from the study based on their existence in the Islamic Banking operation for less than five years; these banks converted into full-fledged Islamic Banks in the year 2020. Further, Union bank was excluded from the study because it was not listed in Dhaka Stock Exchange.

The research data is drawn from two main sources: annual reports of the respective banks and Bangladesh Bank database. As the required data is collected from published annual reports of the listed Islami banks, it ensures data reliability and validity for research purposes. This research paper covers 6-year data from 2014 to 2019. Altman Z-score model for non-manufacturing companies and Emerging economy Z-score are used to infer about the financial soundness of the Islamic Banking Sector. In the first phase, ratios

related to the Altman Z-score coefficient were calculated by using the data from financial statements of the sample banks. Afterwards, Z-score was calculated by using the ratios for a six-year period. Finally, the ranking was done to allocate the banks in different zones according to their financial position. The overall calculation was carried out using Excel.

Description of the Variables

X_1 = Working Capital/ Total Assets

This variable examines the firms' ability to manage the net liquid assets. A higher value indicates banks' availability of funds to invest and grow after meeting short term financial obligations.

X_2 = Retained Earnings / Total Assets

This ratio helps us to identify whether the cumulative profit is enough to recoup the asset of the firm. If the company has low retained earnings, then it has to finance the expenditure through borrowed funds which increases the possibility of bankruptcy.

Table 2: Model for Financial Distress

Z Score = $6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$		
Emerging Economy Z Score = $3.25 + 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$		
Variables	**Description**	**Coefficient**
X_1	Working Capital/ Total Assets	6.56
X_2	Retained Earnings / Total Assets	3.26
X_3	Earnings before Interest and Taxes / Total Assets	6.72
X_4	Market Value of Equity / Total Liabilities	1.05
Cut-off Value		
$Z > 2.6$ "Safe Zone (Good Financial Health)"		
$1.1 < Z < 2.6$ "Grey Zone"		
$Z < 1.1$ "Distress Zone (High Bankruptcy Risk)"		

Source: Altman (2013)

X_3 = Earnings before Interest and Taxes / Total Assets

This parameter assesses the capacity of generating profit from the operation of the firm. It highlights the banks' productivity of borrowed funds. This ratio

might misrepresent the situation for the new firms which did not have enough time to strengthen their cumulative profit situation. As our sample does not include any new banks this consideration does not affect the study.

X_4 = Market Value of Equity / Total Liabilities

This ratio helps to measure the extent to which firms' assets can decrease in value before that firm becomes insolvent with liability exceeding the asset. At the same time, it depicts higher investor confidence in the financial strength of the company.

4. Findings and Analysis

The calculated z score of the Islamic banks listed in the Dhaka Stock exchange can be seen in Table 3. In the Table, we can see most of the banks fall in the grey zone according to the calculated Z score. It is not surprising that IBBL holds the highest score every year and ICBIBL holds the position in the other extreme end. The net profit after tax of IBBL decreased for the years 2018 and 2019 which caused the decreasing Z score. On the other hand, ICBIBL which was started as Al Baraka bank back in 1987 was identified as a problematic bank since 1994. In 2004 it started operating under the name of Oriental bank and soon found to be a center of corruption involving the board of directors. The model was introduced to predict the possibility of declaring bankruptcy in the next two years. The studies have proved to be accurate in 72% of the cases of predicting the distress of companies.

Table 3: Altman Z-Score Model for Service Industry

$Z\ Score = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$

	2014	2015	2016	2017	2018	2019	Average
IBBL	5.5675	6.0514	4.1737	4.4877	3.7573	3.8796	4.6527
EXIM	2.6579	2.8103	1.8237	2.1065	2.9655	3.2662	2.6050
AIBL	3.0477	2.7634	3.0130	2.8826	2.4165	2.8546	2.82963
FSIBL	2.3993	2.0004	1.9408	2.1813	2.4979	2.7707	2.2984
SIBL	2.6211	2.6019	1.1375	1.4026	1.0298	1.3377	1.6884
SJIBL	2.5326	3.1468	3.1304	3.6869	3.7916	3.7649	3.3422
ICBIBL	-12.0554	-5.8468	-5.8502	-8.8794	-8.4849	-9.3684	-8.4142

Source: Authors' own Calculation

Though in this study we can see even the ICBIBL has unusually negative z scores in all the years, it is still operating. The basic measures of this bank, such as deposit collection, investment position, the value of capital, classified

loans, and net loss are in a very unfavorable position for a long time. The bank can still operate only because Bangladesh Bank is trying to get the bank on track under the reconstruction scheme. The banks having comparatively lower Z scores is attributed to the factor having lower retained earnings and working capital. Working capital and retained earning help to boost the total sales and profit of banks.

Table 4: Emerging Economy Altman Z-Score Model

Emerging Economy Z Score = $3.25 + 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$

	2014	2015	2016	2017	2018	2019
IBBL	8.8175	9.3014	7.4237	7.7377	7.0073	7.1296
EXIM	5.9079	6.0603	5.0737	5.3565	6.2155	6.5162
AIBL	6.2977	6.0134	6.2630	6.1326	5.6665	6.1046
FSIBL	5.6493	5.2504	5.1908	5.4313	5.7479	6.0207
SIBL	5.8711	5.8519	4.3875	4.6526	4.2798	4.5877
SJIBL	5.7826	6.3968	6.3804	6.9369	7.0416	7.0149
ICBIBL	-8.8054	-2.5968	-2.6002	-5.6294	-5.2349	-6.1184

Source: Authors' own Calculation

Changes in the financial performance were compared using the Emerging Economy Z-score model developed by Altman. Table 4 depicts that the all the banks except ICBIBL comes into the safe zone following the emerging economy model.

Table 5 shows the different scores calculated from the Z-score model and Emerging Economy Z-score to answer the question of how consistent these two models for our sample set in forecasting financial distress.

Table 5: Average Z-Score Vs. Emerging Economy Average Z-Score

	Average Z-Score	Rank	Zone	Bank	Avg. EM Z-Score	Rank	Zone
IBBL	4.652882	1	Safe	IBBL	7.902882	1	Safe
SJIBL	3.342199	2	Safe	SJIBL	6.592199	2	Safe
AIBL	2.829627	3	Safe	AIBL	6.079627	3	Safe
EXIM	2.605001	4	Grey	EXIM	5.855001	4	Safe
FSIBL	2.29838	5	Grey	FSIBL	5.54838	5	Safe
SIBL	1.688411	6	Grey	SIBL	4.938411	6	
ICBIBL	-8.41419	7	Distress	ICBIBL	-5.16419	7	Distress

Source: Authors' own Calculation; Note: EM = Emerging Economy

We can see that the three banks falling into the grey area have stepped into the safe zone in the Emerging Economy Z-score model (Table 5).

Table 6: Three Year Average Z-Score

	3 Year Avg. Z-Score (2014-16)	Rank	Zone		3 Year Avg. Z-Score (2017-19)	Rank	Zone
IBBL	5.2642	1	Safe	IBBL	4.0415	1	Safe
AIBL	2.9413	2	Safe	SJIBL	3.7477	2	Safe
SJIBL	2.9366	3	Safe	EXIM	2.7793	3	Safe
EXIM	2.4306	4	Grey	AIBL	2.7178	4	Safe
SIBL	2.1201	5	Grey	FSIBL	2.48328	5	Grey
FSIBL	2.11348	6	Grey	SIBL	1.2566	6	Grey
ICBIBL	-7.9174	7	Distress	ICBIBL	-8.9109	7	Distress

Source: Authors' own Calculation

The three-year average score of the banks shown in the Table 6 are to examine if there are any changes in the scores of the banks between these two time periods. This period has been chosen as in 2015 the third capital market reform program has been introduced to build a sustainable market.

5. Concluding Remarks

The global financial crisis caused by the pandemic has brought the Islamic banking system under the limelight as an alternative business model. This research paper aims to predict the financial soundness of the Islamic Banking Sector of Bangladesh using Altman Z-score model for predicting financial distress. These model results can assist the management of the banks to solve any insolvency issues if they have by controlling their operations properly. The widespread argument that our central bank lacks timely guidelines to keep track of the activities of Islamic banks cause these banks to be more scrutinized. In recent years Islamic banking is growing more and turned to the money and capital market for raising money by selling financial instruments. This paper finds difference in the Z-score of financial distress and the evidence implies that the Emerging Economy Altman Z-score model is efficient enough to predict the financial distress of Bangladesh Islamic banking industry. Despite having limitations, this paper can be used as a base

for future studies on financial distress. Further work needs to establish which model is effective to measure bankruptcy in the banking sector. On a wider level, research is also needed on the cross-country analysis of Islamic banking sector in Asia.

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Appendix

Table 7: Islami Bank Bangladesh Limited

IBBL	X_1	X_2	X_3	X_4	Z-Score
2019	0.549005	0.000106	0.016835	0.156843	3.879637
2018	0.533638	8.84E-05	0.016609	0.137808	3.757268
2017	0.659949	0.001789	0.01346	0.059236	4.487743
2016	0.611594	0.002018	0.012911	0.065075	4.173726
2015	0.89562	0.005616	0.012561	0.069965	6.051448
2014	0.818009	0.003702	0.016142	0.076943	5.567473

Table 8: Export Import Bank of Bangladesh Limited

EXIM	X_1	X_2	X_3	X_4	Z-Score
2019	0.472263372	0.00507893	0.011260156	0.072277808	3.266164981
2018	0.42432431	0.005832026	0.011401414	0.082192869	2.965499889
2017	0.286641358	0.007413305	0.015946025	0.09028921	2.106495646
2016	0.240242936	0.008376661	0.017169007	0.100004285	1.823681801
2015	0.393408417	0.008203192	0.013819845	0.104665457	2.810269711
2014	0.363759408	0.008681936	0.018961662	0.110389712	2.657896389

Table 9: Al-Arafah Islami Bank Limited

AIBL	X_1	X_2	X_3	X_4	Z-Score
2019	0.409030992	0.00375236	0.0131031	0.067660315	2.854572168
2018	0.341317116	0.005268061	0.012204826	0.074554146	2.41651244
2017	0.405910267	0.006817775	0.017543578	0.075895023	2.882579913
2016	0.419377	0.007970091	0.021851078	0.084819776	3.012995622
2015	0.382695117	0.007003855	0.019918539	0.091656816	2.763404773
2014	0.424070613	0.007164417	0.021320144	0.094443354	3.047696112

Table 10: First Security Islami Bank Limited

FSIBL	X_1	X_2	X_3	X_4	Z-Score
2019	0.409232987	0.002023599	0.00615682	0.036303339	2.77065766
2018	0.366748927	0.002157319	0.006865502	0.037025692	2.49791897
2017	0.321470202	0.002107414	0.00426164	0.035148473	2.181258814
2016	0.2780846	0.002443495	0.010404162	0.036836456	1.94079502
2015	0.282256551	0.001959411	0.015062959	0.039209877	2.000384112
2014	0.339661136	0.003140798	0.01728563	0.042560184	2.399263676

Table 11: Social Islami Bank Limited

SIBL	X_1	X_2	X_3	X_4	Z-Score
2019	0.184758293	0.00285251	0.009082665	0.052691048	1.337674691
2018	0.134081636	0.002857551	0.012522692	0.054020189	1.029764838
2017	0.190635789	0.00284818	0.012792269	0.054032783	1.402554305
2016	0.140669342	0.006505597	0.018410684	0.066448292	1.137489632
2015	0.360547681	0.007825934	0.019316692	0.077471776	2.601858869
2014	0.359684604	0.00827248	0.021514065	0.08576194	2.621123839

Table 12: Shahjalal Islami Bank Limited

SJIBL	X_1	X_2	X_3	X_4	Z-Score
2019	0.548311938	5.36245E-05	0.01463394	0.06613888	3.764887032
2018	0.554173849	0.000315236	0.01299134	0.064617186	3.79155797
2017	0.540060418	0.001549026	0.010000673	0.068443586	3.686916454
2016	0.449263057	0.00096943	0.013788155	0.083277198	3.130423456
2015	0.447544789	0.00699988	0.012751142	0.097551267	3.146829931
2014	0.36053632	0.006002204	0.006121815	0.101673106	2.532580807

Table 13: ICB Islami Bank Limited

ICBIBL	X_1	X_2	X_3	X_4	Z-Score
2019	-0.48496	-1.6596	-0.037	-0.50297	-9.36841
2018	-0.37919	-1.595	-0.04226	-0.4893	-8.48493
2017	-0.49571	-1.50454	-0.03412	-0.47001	-8.87945
2016	-0.09496	-1.41338	-0.02183	-0.4504	-5.85016
2015	-0.14616	-1.33713	-0.01092	-0.43384	-5.84677
2014	0.061899	-1.20581	-1.20581	-0.40712	-12.0554

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Mobile Financial Services in Bangladesh: Trends and Driving Forces

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Abstract: Mobile financial services (MFS) are effective means of enhancing the level of financial inclusion in a country and thereby promoting economic development. This study examines the current usage trends of MFS in Bangladesh and attempts to identify the driving forces that influence the usage of MFS platforms in Bangladesh. The study adopts a cross-sectional survey research approach to collect data from 400 respondents. A factor analysis of the responses shows that the main driving forces behind MFS usage in Bangladesh are "Lack of complexity in availing MFS", "Relative advantage of MFS", "Convenience facilitated by MFS", and "Perceived risks of using MFS platforms". Moreover, the study reveals that there is a growth trend evident in the usage of MFS, number of MFS accounts, and value of MFS transactions in Bangladesh. The paper concludes with relevant policy suggestions to bolster the usage of MFS in Bangladesh.

Keywords: Mobile financial services; financial inclusion; diffusion of innovation

1. Introduction

"Mobile financial services have brought major changes in financial products and institutional structure. It can reach excluded low-income and micro and small entrepreneurs, which will have a wider impact including growth and poverty alleviation. It has a positive role on financial inclusion." (Akhter and Khalily, 2017, p. 20).

The economic growth of a country is hugely influenced by the level of financial inclusion within that country (Demirguc-Kunt and Klapper, 2012). The past decade has been an economically auspicious one for Bangladesh. The country has exhibited remarkable progress with respect to economic indicators such as economic growth, per capita income, the inflow of foreign direct investment, etc. (Bangladesh Bureau of Statistics, 2020). Inward

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remittance has grown at an impressive rate and the level of foreign exchange reserve is at its peak (Bangladesh Bank, 2020). However, one aspect in which there is still much room for improvement is the extent of financial inclusion in Bangladesh.

A recent background study conducted as part of developing the National Finance Inclusion Strategy- Bangladesh (2019-2024) draft claimed that 25% of the country's adult population remains financially excluded (National Finance Inclusion Strategy- Bangladesh, 2019). This is partly due to several factors such as the relative costs of opening and maintaining bank accounts, lack of banking outlets in rural regions, limited financial literacy of individuals, etc. These obstacles adversely affect the level of financial inclusion and consequently impede the economic growth of the country (Akhter and Khalily, 2020). Consequently, it is imperative for policymakers to undertake initiatives to promote financial inclusion in Bangladesh. One such initiative is to promote the adoption and usage of mobile financial services.

Mobile Financial Services (MFS) refers to the provision of financial services and transactions through any mobile device (Alliance for financial inclusion, 2021). It includes both mobile banking services and mobile payment services. In Bangladesh, there are several mobile financial service providers with Bkash, Nagad, DBBL rocket, etc. being the more prominent ones. In addition, some commercial banks also have licensed proprietary platforms to facilitate mobile financial services. For example, DBBL has Rocket, EBL has Sky banking, One bank has OK, etc.

To enhance the usage of mobile financial services, one must first understand the dynamics of the MFS industry in Bangladesh and the key factors that influence an individual's propensity to use MFS platforms and to avail MFS services. This paper will aid in facilitating the above-mentioned understanding by realizing several key objectives. Firstly, the study will examine the mobile financial services usage trends in Bangladesh in order to provide an overview of the current situation of MFS in Bangladesh and to review the implications that MFS usage has on financial inclusion. Secondly, the study will attempt to identify and analyze the main driving forces of mobile financial services usage at the household level in Bangladesh. Finally, the study will generate insights and policy suggestions with the view of enhancing the usage of mobile financial services in Bangladesh.

The significance of this study lies in its ability to fill a crucial research gap that is extant in the existing literature regarding MFS in Bangladesh. Most contemporary researches have focused on the impact of mobile financial services on different spheres of the economy. Nabi et al., (2012) discussed the impact of MFS on market development in Bangladesh. Similarly, Akhter and Khalily (2020) exhibited the impact that MFS has had on the financial inclusion and thereby economic development of Bangladesh. Kabir (2013) examined the determining factors of mobile banking usage but did not include the usage of mobile payment platforms which are probably the more dominant participants of the MFS ecosystem in Bangladesh. As a whole, there is limited research focusing on the identification of factors that influence and drive the usage of MFS by individuals and households in Bangladesh even though it is important to identify the driving factors which are relevant in the cultural, behavioral, and socio-economic context of Bangladesh. This paper is significant because it explores the factors which influence usage of mobile financial services in Bangladesh whereby MFS platforms include both mobile banking platforms and mobile payment platforms. The outcomes of the study will serve to provide recommendations aimed at improving the mobile financial service industry of Bangladesh.

The remainder of this paper is structured such that section 2 contains a thorough review of existing pertinent literature and the theoretical framework. Section 3introduces the theoretical framework used to guide this study. Section 4 describes the methodology used for this study. Section 5 contains the analysis and discusses the results of the analysis. Finally, Section 6 makes relevant recommendations and concludes the paper.

2. Literature Review

Mobile Financial Services (MFS) refers to financial transactions and services facilitated through mobile wireless networks (Bangladesh Bank, 2011). According to Kang et al., (2018), MFS includes the entire ecosystem comprising of mobile banking, mobile payment, and mobile remittance processing. The advent of mobile financial services has brought about numerous positive benefits in the economy. Sihvonen (2006) claimed that mobile financial services bolster financial inclusion by providing people access to a wide range of financial services. For example, MFS platforms initially provided only money transfer facilities. However, many additional services such as bill payment, remittance receipt, insurance premium payment, etc. are now facilitated by MFS providers. Kanobe, Alexander, and Bwalya (2017) stated that mobile financial services have greatly contributed

to increasing the level of financial inclusion in developing countries. In particular, mobile financial services have enabled the marginal population of underdeveloped countries to access services that were previously not possible through the traditional banking channel.

Such enhancement of financial inclusion is important as it expedites the pace of economic development of a nation (Demirguc-Kunt and Klapper, 2012). Akhter and Khalily (2020) postulated that mobile financial services are extremely important for the economic development of Bangladesh because of their ability to bring the low-income population and Micro, Small & Medium Enterprises (MSME) entrepreneurs inside the formal financial system. Moreover, they have shown that MFS positively contributes towards economic development and poverty alleviation. Similarly, a 2011 study by the Boston Consulting Group also found a positive relationship between MFS adoption and economic development. According to the study, MFS is likely to enhance the GDP of Bangladesh by approximately 2%. Moreover, a proliferation of MFS is likely to promote financial inclusion and reduce income inequality by increasing opportunities for the poorest segments of society to benefit from access to financial services. Similar observations were made by Yesmin, Paul and Mohshin Uddin (2018) as they studied the impact of Bkash on the Bangladeshi economy.

Another way in which MFS platforms helps reduce income inequality is by providing governments' access to more efficient channels to use while spending on the social safety net. For example, the Bangladesh government is now disbursing the pensions to millions of senior citizens through MFS channels. Jacolin, Massil Joseph and Noah (2019) used parametric and non-parametric methods on panel data from 101 countries to show that MFS negatively affects the size of the informal sector in an economy while strengthening the size of the formal sector. They hypothesize that such a switch from informal to formal sector is likely to curb income inequality in society. Sahay et al., (2015) showed that MFS platforms enable smoother financial intermediation, enhance the breadth and depth of the financial system and thereby contribute towards greater financial stability. Such improved financial stability, in turn, auger greater economic growth and reduced unemployment rate.

Ouma, Odongo and Were (2017) in a cross-sectional study conducted on several African countries showed that MFS plays a positive role in the economy by boosting savings mobilization. They have provided evidence that an increase in the usage of mobile financial services leads to a greater

tendency to save among the users. Moreover, they have also shown that MFS usage tends to increase the average amount saved by households by as much as 8%. Jack and Suri (2011) conducted a study in Kenya and showed that M-Pesa (MFS platform) users were more likely to save due to the ease of use and safety. A similar relationship between MFS usage and increased savings level was also found extant in the Kenyan economy by Demombynes and Thegeya (2012) who showed that individuals in Africa with access to MFS accounts were 32% more likely to have savings than non-MFS users. Labie et al., (2015) argued that the formal banking systems often treat the extremely poor and marginalized segments of a country's population with prejudice. The MFS platforms are a much more conducive platform for savings to these segments of the population.

Jack and Suri (2014) have argued that a robust MFS ecosystem characterized by the presence of numerous MFS providers, high adoption rate among people, and sound regulatory framework, provides impetus in the economy by boosting the level of consumption. MFS's impact on consumption level was also studied by Ahmed (2018) who showed that the offers and incentives that are often provided by MFS providers to customers, impact the customers' buying behavior by encouraging them to purchase more. He argued that many customers, who under normal pricing conditions would not have made any purchase indeed do so when provided with the reduced price by the MFS providers. Diba et al., (2013) argued that customers nowadays tend to purchase more when there is an option for digital payment. Since MFS platforms provide digital payment platforms that engender greater ease of shopping and thereby increase the level of consumption in the economy. Hasan and Tani (2020) showed that MFS has a positive impact on the profitability of certain business organizations, especially commercial banks.

The various benefits of MFS in the economy discussed above have naturally resulted in greater scholarly interest regarding the factors which drive the usage of mobile financial services. Kabir (2013) conducted a study identifying the determinant factors of usage of mobile banking- a component of mobile financial services- in Bangladesh. In the study, he showed that perceived risks associated with operating MFS platforms discourage adoption of said platforms whereas factors such as relative ease of use and relative usefulness promote the use of mobile banking. This finding conforms to the technology acceptance model developed by Davis (1989) and modified by Venkatesh and Bala (2008).

Karnani (2009) showed that the cost of availing MFS was a key influencer of an individual's decision regarding whether to adopt MFS or not. A similar finding was made by Mittila (2010) who showed that the high cost of transactions in MFS platforms acts as a deterrent to MFS usage and vice versa. However, Jünger and Mietzner (2020) conducted a study on German customers and showed that customers' "price/cost perception" did not have any significant impact on their decision to adopt novel financial technologies including MFS.

Rogers (1983) in his renowned study, developed the "diffusion of innovations" theory and showed that five factors namely relative advantage, compatibility, complexity, trialability, and observability of innovation influence its adoption rate by the intended users. Since MFS are a form of innovation, the authors expect that the factors listed under the "diffusion of innovations" model could also be pertinent influencers of MFS usage in Bangladesh.

Kotler et al., (2019) described "relative advantage" as the capability of an innovation to provide superior benefits and services than its competitors. Mobile financial services have numerous advantages over traditional payment channels according to Akhter and Khalily (2020) and thus it makes sense to examine whether "relative advantage" influences usage of MFS in Bangladesh. Deb and Agarwal (2017) identified that output quality and personal innovativeness facilitated by MFS enhanced the perceived usefulness and thus relative advantage of MFS over conventional financial services and this influenced the usage of MFS in India. "Compatibility" refers to the degree to which an innovation's users find it consistent with their values and experience (Karjaluoto et al., 2019). Burgeoning growth in the youth and middle-aged demographic segment in Bangladesh has meant that a large chunk of the country's population is quite tech-savvy. According to Rahman and Islam (2020), there are 165.572 million cell phone users in Bangladesh of which 93.681 million users use the internet through smartphones. A report published by GSMA also stated that there are 17 crores mobile connections in Bangladesh of which 9 crores are unique subscribers (Daily Star, 2021). As such, it can be expected that these segments of the population will find digitally-enabled mobile financial services to be "compatible" with their lifestyle. "Complexity" is the degree to which the innovation is easy or difficult to use and experience (Min, So and Jeong, 2018). If users find operating MFS platforms difficult then it can be expected that usage rate will decline and vice-versa. Zhang, Lu and Kizildag (2018) found that perceived ease of use was one of the main driving forces behind the adoption of mobile

financial services. Trialability refers to whether users have the option to experience the innovation on a limited scale before having to make any full-fledged commitment (Kotler et al., 2019). Finally, observability refers to whether the impact and benefits of the innovation are easily observable and communicable (Rogers, 1983). If the benefits of MFS usage can be easily observed by users and communicated among users, then it should lead to a greater rate of adoption of MFS in the country.

In addition to the above factors, the authors believe that the strength of the MFS ecosystem in Bangladesh, the level of education among Bangladeshi people, and the level of women empowerment can be relevant contextual factors that influence the usage of MFS in Bangladesh. According to Mowla and Amin (2020), the MFS ecosystem includes the MFS providers, the mobile network operators, MFS agents, MFS customers, and MFS regulators. The level of women empowerment is reflected through an increase in the female population in the workforce, increase in female education rate, increase in female income level, etc. As these factors rise, it is expected that more and more female customers will start engaging in transactions and will avail mobile financial services in the process.

3. Theoretical Framework

Based on the literature review, the authors have developed a theoretical framework to guide the analysis conducted in this study. The theoretical framework used in this study is based on the postulations of the technology acceptance model developed by Davis (1989) and another variant of the technology acceptance model put forward by Venkatesh and Bala (2008).The theoretical framework is represented below in Figure 1.

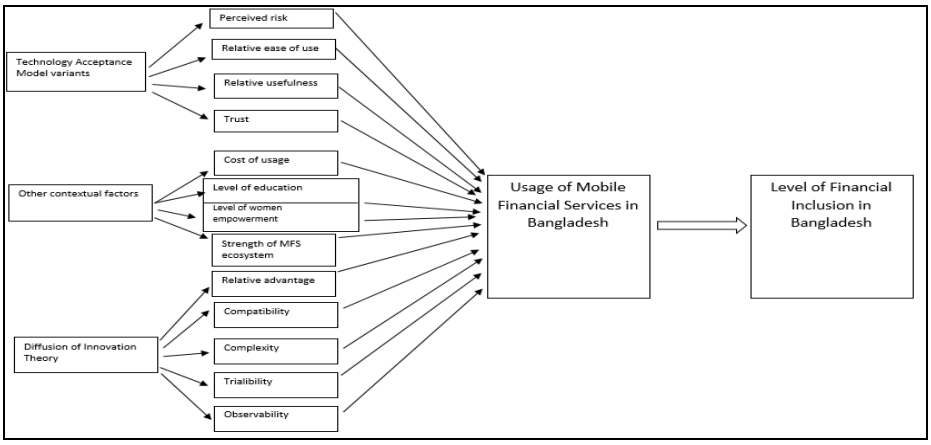


Figure 1: Theoretical framework developed by the authors

4. Methodology of the Study

4.1 Nature of the study

This study is of a quantitative and exploratory nature as the main purpose of the study is to identify and describe the key driving factors that influence the usage of MFS platforms in Bangladesh. Hair et al., (2007) suggested that using quantitative research methods is justified under situations where the data is collected and analyzed in a structured manner and that is the case in this study. A cross-sectional survey research approach has been used in this paper whereby data has been collected from the sample using a 5 point Likert scale questionnaire.

4.2 Sources of Data

A mixture of primary and secondary sources of data has been used in this study. The current situation of the MFS industry in Bangladesh has been assessed by obtaining data from secondary sources such as the Bangladesh Bank, Bangladesh Bureau of Statistics, and the Global Findex Database. Another key source of secondary data used in this study was the websites of the major MFS platforms in Bangladesh. In order to identify the main factors influencing the usage of MFS platforms in Bangladesh, primary data was collected by conducting a survey. For this purpose, a questionnaire was developed as the survey instrument. The questionnaire was structured on a five-point Likert scale ranging from 1 to 5 where 1= strongly disagree, 2= disagree, 3= neither agree nor disagree, 4= agree, and 5= strongly agree. The five-point Likert scale has a higher response rate and better response quality (less "random" responses) compared to a seven-point/nine-point Likert scale (Buttle, 1996; Nemoto and Beglar, 2014). This serves as the rationale for using a five-point Likert scale for this study. The questions incorporated in the questionnaire reflected the theoretical framework used in this paper. The questionnaire was first applied on a pilot basis to test its reliability and validity.

4.3 Sample Size and Sampling method

There are different tools that can be used to calculate the sample size and each of these tools hasits respective merits and demerits. Rao (1985) suggested setting the sample size equal to those set in similar studies. Glenn (1992) developed tables that can be used to determine the sample size based on the population size and level of confidence sought. Moreover, Glenn (1992) also developed a formula to ascertain the sample size of an extremely large population. This formula has been used as the sample size calculation tool for

this study. This tool is more appropriate than other tools for calculating the sample size of this study for several reasons. Firstly, the tool incorporates the level of precision, the confidence level, and the degree of variability while calculating the sample size (Singh and Masuku, 2014). These three factors are essential in determining accurate sample size and considering them makes the resultant sample size more capable of capturing the essence of the entire population. Secondly, this tool can determine the sample size when the population size is very large. Finally, this tool has been widely used to calculate sample size in survey-based research designs. The formula is represented as follows:

$$n=\frac{p(1-p)z^2}{E^2} \quad (1)$$

where,

n is the required sample size

P is the percentage occurrence of a state or condition

E is the percentage of maximum acceptable margin of error

Z is the value corresponding to the level of confidence required

The value of P is considered to be equal to 0.5 as per the recommendation of Bartlett et al. (2001). The acceptable margin of error is 0.05 and the level of confidence is 95%. This is equivalent to a Z value of 1.96. By application of the above formula, the sample size (n) is calculated to be 384.16 or 385 people. Based on this calculation and the discretion of the authors, the sample size used in this study is set to be 400. The non-probabilistic convenience sampling method has been used for this study. The authors took conscious steps to minimize the sampling bias and promote the representativeness of the sample, thereby addressing the common drawbacks of the convenience sampling technique. For example, the survey questionnaire was distributed to respondents belonging to different age groups, gender demographics, geographical locations, etc. with the view of enhancing sample representativeness. The relatively large sample size and the presence of the COVID pandemic and its concomitant complexities (lockdown, transport shutdowns, etc.) precluded the use of alternative sampling methods and thereby justifies the use of convenience sampling.

4.4 Data Analysis

The data collected through the survey has been analyzed using the SPSS package of IBM. Initially, descriptive statistics of the responses were collected to understand the demographic composition of the respondents.

Thereafter, the reliability of the responses was measured using the Chronbach's Alpha technique. The adequacy of the sample was assessed by application of the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity (Kaiser and Rice, 1974). Furthermore, the factors impacting usage of MFS are identified from the responses through factor extraction. The principal component analysis was conducted using varimax rotation for this purpose.

5. Results and Discussion

5.1 Assessment of the current situation of Mobile Financial Services in Bangladesh

At present, the MFS ecosystem in Bangladesh includes mobile financial services provided by several banks through their MFS platforms and at times through their M-banking platforms. Moreover, Bangladesh Post Office also has its mobile financial services platform named Nagad. The different MFS platforms in Bangladesh are listed below in Table 1. Of these platforms, Bkash is the undisputed market leader in terms of the percentage of the market share held, followed by Nagad and Rocket.

Table 1: Mobile financial service providers in Bangladesh

MFS provider	Platform Name
Bangladesh Commerce Bank	Sure Cash
Bangladesh Post Office	Nagad
BRAC Bank Limited	bKash
Dutch Bangla Bank Limited	Rocket
Eastern Bank Limited	Sky Banking
First Security Islami Bank	Sure Cash
IFIC Bank	IFIC Mobile Bank
Islami Bank Limited	Mcash
Mercantile Bank Limited	MyCash
National Credit & Commerce Bank Limited	Sure Cash
ONE Bank Limited	OK
Prime Bank Limited	Prime Cash
The City Bank Limited	City touch
Trust Bank Limited	Trust Bank Mobile Money
United Commercial Bank Limited	Ucash

Source: Authors

The mobile financial services sector in Bangladesh has experienced rapid growth as apparent from the growth in the number of MFS agents and accounts over the past year. This rise in the number of MFS accounts and agents represents the continuation of a growing trend of MFS accounts in Bangladesh exhibited over the past few years.

Table 2: Number of MFS agents and accounts in Bangladesh

Mobile Financial Services Agents and Accounts	Nov 2019	Nov 2020	Growth rate
No. of MFS Agents	965390	1044521	8.20%
No. of MFS Male accounts	40210605	50783221	26.29%
No. of MFS Female accounts	38375311	46825273	22.02%
No. of MFS other accounts	38038	228861	502%
No. of MFS total accounts	**78623954**	**97837355**	**24.43%**

Source: Bangladesh Bank

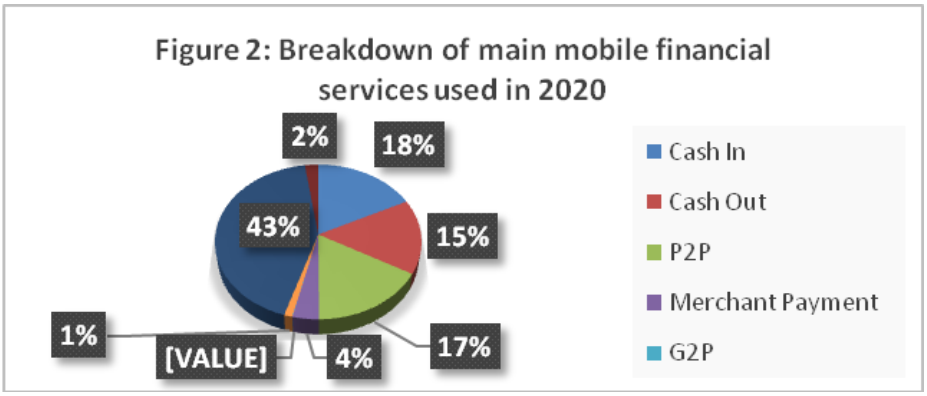
As evident from Table 2, the total no of MFS agents facilitating MFS services across the country has experienced a growth rate of 8.20% in the last year. This signifies a growing reach of the MFS services in Bangladesh and such an increase in MFS agents will only contribute towards making MFS even more pervasive in the country. The number of MFS accounts held by male adults increased by 26.29% and the number of MFS accounts held by females increased by 22.02% during the same period. This growth rate is significant as it shows that the MFS adoption in Bangladesh is increasing for both gender demographics and is not limited only to the male population. The most rapid proliferation of MFS accounts has been in the "Other accounts" segment which has grown 5 folds over the last year. These "other accounts" include MFS accounts opened by business entities, government and non-government institutions. All in all, the total number of MFS accounts has grown by 24.43% from 2019 to 2020 and this is impressive by all standards. The growth of MFS adoption in Bangladesh is expected to continue in the foreseeable future as technological improvements persist in the country, characterized by a rise in the number of smartphones, improvements in 3G and 4G networks, reduction in the cost of internet access, etc. Moreover, the COVID-19 pandemic has also increased dependency on digital payments among the people and this is also likely to fuel MFS adoption in Bangladesh. In addition to the rise in the number of MFS agents and MFS accounts, the total number of MFS transactions and value of MFS transactions has also experienced a steep rise over the past year.

Table 3: Number and volume of MFS transactions

Type of Transaction	Nov 2019		Nov 2020		Growth Rate	
	No.	Volume	No.	Volume	No.	Volume
Cash In	42606758	13407.9	49247254	16353	15.59%	21.97%
Cash Out	45400390	12605.7	43421276	14826.2	-4.36%	17.62%
P2P	26765348	9099	46762421	16108.8	74.71%	77.04%
Merchant Payment	4637879	511.9	10527404	1879.2	126.99%	267.10%
G2P	7273385	294.4	93065	33.4	-98.72%	-88.65%
Salary Disbursement	2110837	870.0	3291857	2023.6	55.95%	132.60%
Talktime purchase	98290527	409.9	119793421	582.6	21.88%	42.13%
Utility Bill Payment	2890446	465.4	6343724	831.4	119.47%	78.64
Total	230422358	37826.9	281307626	53598.3	22.08%	41.69%

Source: Bangladesh Bank

As evident from Table 3, the total number of transactions and total volume of transactions for most MFS services exhibited a steep growth during the past year. The only exception being government to person (G2P) payments using MFS platforms, which decreased by 98.72% in terms of the number of transactions and decreased by 88.65% in terms of the volume of transactions. Among the reported mobile financial services, merchant payments growth is note worthily significant (126.99% in terms of the number of transactions and 267.10% in terms of the volume of transactions). This is probably due to the impact that the COVID pandemic has had on customers buying behavior by encouraging customers to shop more using e-commerce platforms and pay using digital payment platforms. All in All, the total number of MFS transactions grew by 22.08% from 2019 to 2020 and the total volume of transactions grew by 41.69% during the same period. The figures also provide insight regarding the MFS usage trends of individuals and households in Bangladesh.



Source: Bangladesh Bank

It can be seen in figure 2, that individuals in Bangladesh used mobile financial services platforms most frequently to recharge their mobile talk time (43%). "Cash In" accounted for 18% of all transactions, "P2P" transactions accounted for 17% of all transactions, and "Cash Out" accounted for 15% of all transactions. The remainder of the transactions can be attributed to "merchant payment" transactions, "Utility bill payment", "Salary disbursement" and "G2P" transactions.

Table 4: Comparative Summary Statement of mobile financial services in Bangladesh

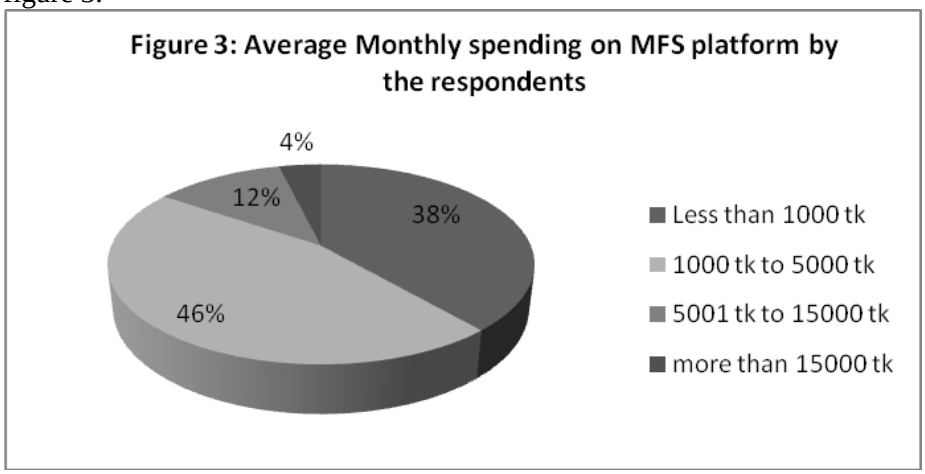
Description	Amount as of November 2020	Amount as of December 2020	% Change (November 2020 to December 2020)
No. of Banks currently providing the Services	15	15	
No. of agents	1,044,521	1,058,897	1.4%
No. of registered clients in Lac	978.37	993.36	1.5%
No. of active accounts in Lac*	316.74	323.27	2.1%
No. of total transaction	281,307,626	299,506,884	6.5%
Total transaction in taka(in crore BDT)	53,598.31	56,556.88	5.5%
No. of daily average transaction	9,376,921	9,661,512	3%
Average daily transaction (in crore BDT)	1,786.61	1,824.42	2.1%

Source: Bangladesh Bank

Table 4 is a comparative summary statement of mobile financial services in Bangladesh. It shows that the number of active MFS accounts in December 2020 was 323.27 lac which carried out average daily transactions valued at BDT 1824.42 crores.

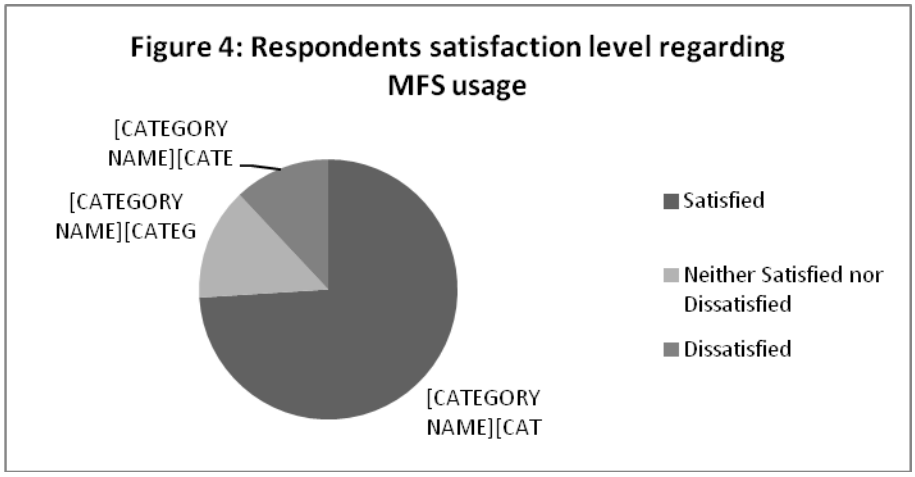
5.2 Factors influencing the usage of MFS platforms in Bangladesh

The questionnaire used as the survey instrument in this study resulted in the collection of 453 responses. Of these responses, 37 had to be dropped due to incompleteness. Another 13 were dropped to arrive at the sample size of 400 that was decided upon. Of the 400 respondents, 52% were male and 48% were female. The average monthly spending of the respondents is illustrated in figure 3.



Source: Authors

The main services availed by the respondents was "Cash out" (83.2% of all respondents) followed by Talk time recharge (75.5% of all respondents), Merchant payment (43.9% of all respondents), bill payment (26.9% of all respondents) and Inward remittance (2.9% of all respondents).



Source: Authors

As per figure 4, 78% of the respondents stated that they were satisfied with their MFS experience. 14.6% of the respondents stated that they were neither satisfied nor dissatisfied with their MFS experience. The remaining 7.4% of the respondent claimed that they were dissatisfied with their MFS experience.

5.2.1 Reliability of the responses

Since primary sources were used to collect data from various respondents, it is essential to establish the reliability of the responses before conducting factor extraction. In this study, the Cronbach's Alpha has been used to assess the internal consistency of the responses. This was previously practiced by numerous scholars including Gliem and Gliem (2003).

Table 5: Cronbach's Alpha

Cronbach's Alpha	N of Items
0.633.	14

The computed Cronbach's alpha for this study was initially 0.609 for 16 items. However, two items were later excluded and this resulted in an alpha of 0.633 for 14 items as seen in Table 5. This is a satisfactory alpha score as interpreted using the benchmark given by Nunnally and Bernstein (1995) who stated that a Cronbach's alpha greater than 0.50 is representative of the internal consistency of the responses.

5.2.2 Sampling adequacy

The adequacy of the sample is measured through the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity. The KMO test assesses the proportion to which the variance in the variables in the study is caused by underlying factors. Bartlett's test of Sphericity tests the null hypothesis that the correlation matrix has an identity matrix. Thus, in this study, Bartlett's test of Sphericity will test the following null and alternate hypotheses.

H_0: There is no statistically significant interrelationship between the variables influencing the usage of mobile financial services platforms in Bangladesh

H_1: There may be a statistically significant interrelationship between the variables influencing the usage of mobile financial services platforms in Bangladesh

Table 6: KMO measure of sampling adequacy

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.711
Bartlett's Test of Sphericity	Approx. Chi-Square	790.873
	Df	91
	Sig.	0.000

A KMO statistic of 0.711 signifies that the responses obtained in this study are well suited for factor analysis. It is much higher than the benchmark of 0.50 deemed as sufficient for factor analysis by Hair et al. (2018). Bartlett's test of sphericity for this study has returned an approximate Chi-square of 790.873 with a degree of freedom of 91. The p-value is 0.000 which is less than 0.05. Consequently, the null hypothesis is rejected and it can be claimed that there can exist a statistically significant relationship among the variables examined in this study.

5.2.3 Factor Analysis

Identification of the driving forces that influence mobile financial services usage in Bangladesh is the prime objective of this study. In order to facilitate this objective, factor extraction is performed by using the principal component analysis. Principal component analysis is a potent method for data reduction. In this study, the Kaiser normalization method advocated by Kaiser (1960) is utilized. Factors with an Eigen value of more than 1.00 are extracted. Variables are then loaded onto the extracted factors based on the factor loadings.

Table 7: Total Variance Explained

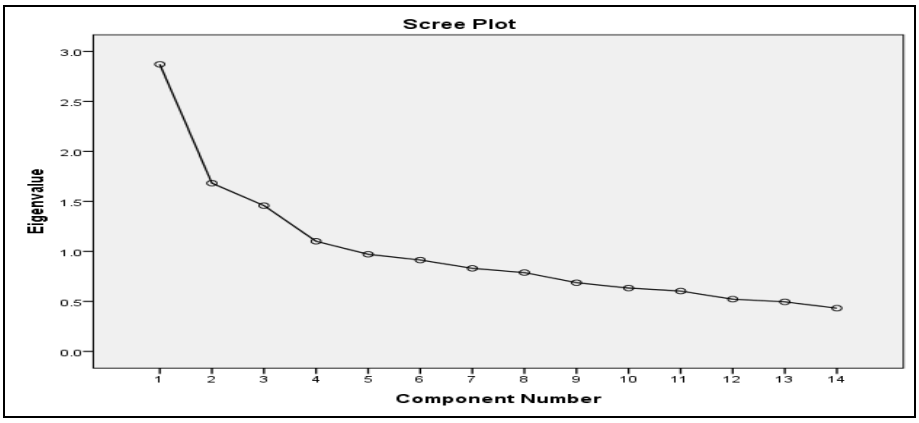
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.872	20.514	20.514	2.872	20.514	20.514	2.167	15.479	15.479
2	1.683	12.023	32.537	1.683	12.023	32.537	1.796	12.826	28.305
3	1.458	10.417	42.954	1.458	10.417	42.954	1.672	11.946	40.251
4	1.102	7.870	50.824	1.102	7.870	50.824	1.480	10.573	50.824

Extraction Method: Principal Component Analysis

A total of 16 variables were examined in this study representing the 12 constructs identified in the theoretical framework with certain constructs measured using multiple variables. Of these 16 variables, 2 were omitted following the KMO test. From the remaining 14 variables, four factors were extracted using the principal component analysis as shown in Table 7. These

four variables explain 50.824% of the total variance with the remaining variance arising due to the rest of the 10 variables. A graphical representation is made in figure 5 using the scree plot which shows that four factors had an eigenvalue in excess of 1.00 and thus were extracted.

Figure 2: Scree plot of extracted components



The four extracted components and the individual factors that constitute those components are represented below in table 8.

Table 8: Rotated Component Matrix using Varimax Rotation

Factors	Components and factor loadings			
	1	2	3	4
MFS accounts are easy to open	0.752			
It is easy for users to learn MFS platforms/apps	0.730			
MFS platforms are easy to operate and users can avail mobile financial services easily	0.604			
Financial transactions can be performed much more quickly through MFS platforms compared to banking channels		0750		
Opening accounts on MFS platforms is cheaper than opening bank accounts.		0.728		
The maintenance cost of MFS accounts is cheaper compared to traditional bank accounts.		0.610		
The range of services offered through MFS platforms is adequate and raises the standard of living			0.757	
The number of merchant partners of various MFS platforms is satisfactory			0.742	
MFS can be availed from anywhere and anytime			0.634	
The security risk is significant in MFS transactions				0.639
The technological risk is significant in MFS transactions				0.588

Individual factors have been loaded onto extracted components based on the factor loadings extracted. Ertz, Karakas and Sarigöllü (2016) stated that for a factor to be loaded onto a particular component, it must possess a factor loading of atleast 0.40. Truong and McColl (2011) suggest 0.50 should be the minimum factor loading. In this study, only those factors with loading of more than 0.60 have been loaded onto the extracted component. Based on this criterion, a total of 11 factors were loaded onto the four components.

The first extracted component can be termed as "Lack of Complexity in availing mobile financial services" and refers to the degree to which users find it easy or not difficult to operate MFS platforms and avail mobile financial services. This component accounts for 20.514% of the total variance. This component suggests that users' decision to use the MFS platform is hugely influenced by the ease of opening MFS accounts, ease of using MFS platforms, and the extent to which the user can learn how to operate MFS platforms by themselves. The easier it becomes to operate MFS platforms the greater will be the usage of MFS platforms.

The second extracted component is "Relative advantage of MFS". This component explains 12.023% of the total variance. This component signifies that a major driving force behind the usage of MFS platforms by users in Bangladesh is the relative advantage that the platform offers compared to traditional banking channels. These advantages include the fact that financial transactions can be performed much quicker through MFS platforms compared to traditional banking. This is understandable since traditional banking often requires much more documentation, adherence to strict procedures, risk mitigation policies, etc., and these increase the transaction processing time in banks. Moreover, another advantage of MFS over traditional banking is the lower cost of opening and maintaining accounts. In fact, it doesn't cost any money to open MFS accounts and there isn't any annual maintenance charge imposed by MFS operators. This is contrary to banks, where there are numerous charges associated with opening and maintaining accounts.

The third extracted component is termed as "Convenience facilitated by MFS" and this component explains 10.417% of the total variance. According to this variable, a key factor that influences users' decision to use MFS platforms is the convenience that results from using such platforms. Mobile financial services make people's lives easier and more convenient. Firstly, a wide range of services can now be availed through MFS platforms such as transfer of money, utility bill payment, talk time recharge, etc. This has made

people's life easier and encouraged them to use MFS platforms. Secondly, MFS platforms have entered into agreements with an impressive number of merchants and vendors and this number of enlisted merchants is always growing. Consequently, users of MFS platforms can now shop while paying through the digital platform without having to carry cash. This has added to the convenience. Finally, mobile financial services can be availed at any time and from any place subject to the availability of internet access. This is contrary to traditional banking channels which facilitate financial transactions only within a limited transaction hour every day and only for 5 days each week. Thus, MFS has once again improved the standard of living of users.

The fourth and final extracted component is "Risks associated with using MFS platforms" and it is a crucial factor that drives the usage of MFS as evident from its ability to explain 7.870% of the total variance. This component suggests that many individuals feel hesitant to conduct financial transactions through MFS platforms due to fear that their money will be lost due to fraud, hacking, and other technological risks. Moreover, users are also wary of providing their sensitive information such as NID number, fingerprints, etc. while opening MFS accounts and this also influences their decision to use MFS platforms. Thus, mitigating the risk factors will drive usage of MFS in Bangladesh and vice versa.

5.2.4 Descriptive Statistics of the Factors

Table 9: Descriptive Statistics of the Factors

Factor	Mean	Std. Error	Std. Deviation
Lack of complexity in availing mobile financial services	3.82	0.03	0.28
Relative advantage of MFS	3.65	0.06	0.51
Convenience facilitated by MFS	3.22	0.04	0.36
Risks associated with using MFS platforms	3.45	0.03	0.41

Table 9 shows the mean values, standard errors, and standard deviation for each of the factors extracted. As evident from the table, the mean value of the first extracted factor "Lack of complexity in availing MFS" is 3.82 which corresponds to a response of "Agree" from the participants in this study. The standard deviation is 0.28 which indicates that the dispersion of the responses for this factor is acceptably low. The mean value for the second, third, and fourth factors are 3.35, 3.22, and 3.45 respectively. The standard deviation for the second, third, and fourth factors are 0.51, 0.36, and 0.41 respectively.

5.2.5 Hypothesis testing

The factors identified above and their capability to impact the usage of MFS in Bangladesh have been tested for statistical significance by formulating hypotheses and applying the t-test.

Table 10: Hypothesis testing

Hypothesis	Statement	P-value
H_1	There may be a statistically significant interrelationship between "lack of complexity in availing MFS" and the usage of mobile financial services platforms in Bangladesh	0.000
H_2	There may be a statistically significant interrelationship between "relative advantage of MFS" and the usage of mobile financial services platforms in Bangladesh	0.03
H_3	There may be a statistically significant interrelationship between "convenience facilitated by MFS" and the usage of mobile financial services platforms in Bangladesh	0.000
H_4	There may be a statistically significant interrelationship between "risks associated with using MFS" and the usage of mobile financial services platforms in Bangladesh	0.000

The results of the hypothesis testing show that there exists a significant relationship between "lack of complexity in availing MFS", "convenience facilitated by MFS", and "risks associated with using MFS" and the usage of MFS in Bangladesh at a confidence level of 99%. This is because the P-value is less than the alpha (0.000<0.01). There also exists a significant relationship between the "relative advantage of MFS" and the usage of MFS in Bangladesh at a confidence level of 95% (P-value of 0.03< alpha value of 0.05). Thus, all four alternative hypotheses are accepted.

6. Policy Recommendations and Conclusion

The main forces which drive the usage of mobile financial service platforms in Bangladesh are identified in this study. This provides many intriguing insights regarding measures that can be taken on a policy level to enhance the pervasiveness of MFS in Bangladesh.

Firstly, the regulators and MFS operators must adopt strategies to minimize the complexity associated with availing MFS. To do this, the

interface of MFS platforms can be redesigned keeping minimalism in mind. Video tutorials can be embedded within the MFS platforms to educate novice users regarding the operation of the platforms. Both English and Bengali language options must be made available to users etc.

Secondly, the relative advantages and benefits offered by MFS must be enhanced even further to encourage more usage of MFS platforms. One way to do this could be to reduce the transaction fees charged by the MFS operators. At present, the charge for "Cash out", "Bill payment" etc. is deemed by many users to be quite high and this suggests that there is room for economization of these charges. Moreover, the transaction fees charged varies based on the MFS operator. Bangladesh Bank, as the regulator, may streamline these charges so as to ensure greater consistency among the different MFS operators. However, this must be done in a manner that does not encroach upon the competitiveness of the individual MFS operators. Furthermore, inter-operator transactions could be introduced.

Thirdly, steps to increase the range of services offered through MFS can increase its usage by users. For example, some MFS platforms have now enabled the option to transfer money from the MFS platform to users' bank accounts. Other MFS platforms can also introduce this feature. Similarly, on boarding more partner merchants could be another way to enhance the convenience that MFS provides to users and can thereby bolster the usage of MFS platforms. The daily transaction limits, maximum transaction value ceiling, etc. can be increased to facilitate higher value MFS transactions.

Fourthly, robust measures need to be taken to reduce the risks associated with availing MFS. MFS operators must invest heavily in improving and fortifying their IT infrastructure to reduce technological and security risks. Similarly, regulators must develop and enact strict laws to punish malfeasance associated with MFS transactions to discourage illegal acts such as fraud, hacking of MFS accounts, etc. Moreover, measures need to be taken to curb transactional risks. For example, remitting money to the wrong account by mistake is a common phenomenon among MFS users in Bangladesh. At present, there is no systematic assistance provided by the MFS platforms to the users in such scenarios. The MFS providers can introduce protocols that facilitate the retraction of wrongly transferred funds.

Fifthly, initiatives must be taken to increase the number of MFS agents all across Bangladesh and particularly in rural regions where banks are not present. For example, the value of bank guarantee required to be provided by

a prospective agent to the MFS platform to get the agency can be reduced. Similarly, other criteria that must be fulfilled to become an agent can be relaxed by the regulators. Moreover, liquidity at the agent level must be increased to ensure smoother transaction processing for the users. This can be done through efficient cash management practices.

Finally, the government can make more of its payment (G2P) using MFS platforms so as to prompt users to adopt MFS. At present, the government is already using MFS to remit pension to pensioners. In conclusion, it is evident that there is plenty of scopes to enhance the usage of MFS in Bangladesh. The policy recommendations made in this study might assist in driving the usage of mobile financial services in Bangladesh. Such enhancement of usage, if facilitated, will surely contribute to greater financial inclusion and thus more economic development of the country. This paper makes potent theoretical contributions by strengthening existing literature focusing on MFS usage. It does so by verifying the applicability of certain driving factors like "lack of complexity in availing MFS", "relative advantage of MFS", and "convenience stemming from MFS usage" in Bangladesh. The results of this paper indicate that "cost of usage" is an important determining factor of MFS usage in Bangladesh. Moreover, this paper provides insight into the satisfaction level of MFS users in Bangladesh. This might be of use for the MFS platforms in Bangladesh. The study identifies that an upward trend is present in MFS usage in Bangladesh.

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Factors Influencing the Adoption of Crop Insurance in Bangladesh: A Survey Analysis

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Abstract: The presence of myriad forms of risks has given noteworthy motivation to the development of a number of agricultural risk management tools and strategies. Crop insurance is recommended as a useful instrument for the farmers to manage the diverse crop related risk while covering the pertinent losses. This study aims to investigate particularly the factors influencing farmers adoption of crop insurance as a risk management strategy in Bangladesh. This paper has investigated the results of a survey of 100 farmers. Ten explanatory variables have been chosen based on extensive literature and logit model have been employed to analyze the determinants. The analysis has revealed that variables including education, opportunity of extension education, awareness of crop insurance, perception of risk, risk experience, and monthly income positively influence farmers' adoption of crop insurance. Whereas, variables such as farming experience, co-operative farming, and application of alternative risk management strategies has negative influence. This paper has also examined the importance and effectiveness of crop insurance in the context of Bangladesh. The findings are expected to guide the government of Bangladesh, insurance companies, and the policymakers in implementing crop insurance in Bangladesh.

Keywords: Crop Insurance; Risk Management; Farmer's adoption

1. Introduction

Risk has always been inherent to the agricultural sector. Farmers face different types of market and production risks which makes the income of farmers very much unstable and unpredictable from year to year. The dangers and impact of agricultural losses can be very devastating. So, the stakeholders have employed several structures and schemes in order to prevent and manage this fearful and painful phenomenon. Several factors can affect the returns from farming and many of which are beyond the control of the farmers

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(Shashikiran & Umesh 2015). Because of climate change, the frequency of risks in farming has drastically increased in some past years. Frequent exposure to risks makes the income of farmers less predictable and significantly affects their livelihood security (Birthal et al. 2015). Crop insurance can be the most useful instrument in helping farmers to cover the crop loss. But it is mentionable that, insurance in the agriculture sector is very much challenging. The insurance market works perfectly if the underlying risks are independently distributed, risk position of the insured is properly known and the insured has no control over the event or the claim. In crop insurance, rarely these conditions are met and result in market failure (Ahsan et al. 1982). Crop insurance is an important adaptation tool for managing economic and environmental risk in the agricultural sector. Many developing countries, including Bangladesh, often face agricultural disasters (Ahsan, 1985; Goodwin and Smith, 1995; Boyd et al. 2011). Crop insurance is significantly useful and an essential risk tool to manage risk with flood disasters (Goodwin and Smith 1995; Goodwin and Mahul, 2004) and has been recommended as the best emerging tool for adaptation to climate change (Falco et al. 2014). As Crop-based insurance is a new business arena in Bangladesh, there has not been sufficient research on this topic yet. Besides, previously any research hasn't shown any direct relation among influencing factors and their contribution to the adaptation of Crop based insurance. The findings of this research will help insurance businesses and representatives in selling crop insurance to the target customer. This research is intended to focus on this particular topic and thus fill the gaps in the literature. Crop insurance performs a significant role in the insurance segment as well as in the entire economy of Bangladesh by backing up the risks associate with crop cultivation. It drives the farmers into a formal risk management web with proper subsidiary by the government. For Bangladesh, the proper application of crop insurance can stabilize economic growth and development by ensuring agricultural prosperity.

Our study has some major contributions. Such as, we employ data from an emerging economy country, whereas most empirical studies are based on data mainly addressed developed countries. Also, in emerging economies, insurance industry and agriculture sector are very important for accelerating economic growth and creating employment opportunity. Therefore, we believe that this research can convey significant implications to most emerging markets in which distinctive types of insurance companies function simultaneously. However, this study has some limitations. First is data constraint. Because of time and budget constraints, data couldn't be collected from more farmers.

The study is constructed with main four parts. First part includes introduction, literature review, objectives and methodology. An analysis of present condition and contribution of agriculture in Bangladesh economy is presented in second part of the paper. In the third section, effectiveness and importance of crop insurance have been discussed. Fourth section is confined with a demographic analysis of the respondents. An analysis of the factors influencing adoption of crop insurance has been given in the fifth section of this paper. Finally, the paper is closed with some concluding remarks based on the result found from the study.

2. Review of Literature

Crop insurance is globally renowned as engines of financial inclusion of the farmers by dragging them into formal insurance programs as a risk management strategy. The universally superficial advantages frequently emphasized for their advancement of crop insurance particularly in developing countries like Bangladesh. Globally this model is practiced to reduce the risks associated with crop farms and increase the productivity of crops with efficiency. As far as to cope with the global trend, Bangladesh has also launched the crop insurance approach into the economy. Though it's a contemporary module in the global economy, ample paperwork is concluded throughout the world.

Akinola (2014) conducted a study on the factors affecting farmers' adoption of crop insurance in Nigeria and has used ten variables as influencing factors for crop insurance adoption. He reported that, farmers' experience in agriculture business and use of alternative risk management strategies negatively and significantly influenced adoption of crop insurance. He also reported that, the significant and positive determinants of adoption of agricultural insurance include formal education, extension education, awareness of insurance policy, perception of risk and experience with risk. Colson et al. (2014) discussed the feasibility of a substitute strategy for crop insurance by farmer-owned accounts that are controlled, supervised, and slightly aided by the state. They stated that farmer-owned savings accounts could play a significant role in managing agricultural risks without government subsidization programs. It will also aid to reduce complications like adverse selection and moral hazard. Compared to the contemporary crop insurance program, farmer-owned accounts eradicate the premium evaluation hitches that deteriorate actuarial reliability and initiate the necessity for ample external subsidies. Moreover, reduction of administrative cost, as well as avoidance of pricing farm-level risk, can be possible outcomes of practicing

savings account scheme. Coble & Barnett (2012) provided economic justification about the revenue insurance and subsidizing farm crop program in the USA. They expressed that risk protection commonly expressed as a "safety net" has become the chief grounds for federal farm programs, which can be protected by subsidizing in Crop Insurance. According to Vilenchuk (2017) to maintain a reasonable equilibrium between the agents and insurance businesses, three different insurance principles are introduced including fundamental insurance principles, principles to neutralize monetary and financial risks of insurance firms, and agricultural insurance principles. This paper has also focused on the importance of insurance principles in the agricultural division to maintain growth for commonly advantageous insurance associations. These principles act as guidelines for all the stakeholders associated with the insurance business and provide a proper framework of codes and functions to reconcile collective and economic welfares. On the other side of this research, the relationship between agricultural associations and insurance businesses is built on various principles including voluntary participation, actuarial steadiness, convenience and subsidiarity, and insurance shield motivation, etc. It assists to generate fundamentals for well-organized distribution of jeopardies, easing the pursuit of insurance, and responsibilities among insurance stakeholders.

As per Colovic & Mrvic-Petrovic (2014) crop insurance is very significant as a risk administration tactic from a variety of risks and their consequences. In this paper, the authors also explained the different models of insurance programs introduced in different EU countries along with supporting insurance premiums by the government. The contemporary portrait of crop insurance in the USA as well as in Serbia and the fundamental question about the insurer is demonstrated through this paper. According to the context, there exists three alternative insurance distribution approaches like government-controlled insurance companies, fully commercial insurance firms, as well as public-private, owned insurance companies. Capitanio et al. (2011) represented factors affecting crop insurance choice in France and Italy. The two-stage empirical model was used to figure out the elasticity of demand and the major determinants of crop insurance. The study revealed that both the country offers identical insurance products in terms of insurance products and their capacity to indemnify and farmers across the Alps were highly sensitive about crop insurance.

Sarker & Jaim, (2015) discussed the optimal distribution of grange resources to upsurge crop productivity with efficiency and farm revenue

based on a nominated coastal part of Bangladesh. Through the survey, this paper considers factors like inputs, farm size, harvest actions, and land categories to cultivate linear programming illustrative farm approaches. The paper illustrated the misallocation of resources as well as the scope for the proper utilization of resources for greater productivity. The authors also debate the significance of the reallocation of resources and government initiatives on boosting productivity. Reallocation will assist to raise additional income for the farm and uphold the employment opportunity as well. Policies authorized by the government addition to guidelines from NGOs for coastal areas' farmers can resolve the issue proper allocation of resources and promote the overall financial conditions of these farmers. Boyd et al. (2011) showed that a number of variables explain crop insurance purchase decisions by farmers in China. They used eight variables to explain crop insurance purchase decision, which are: knowledge of crop insurance, previous purchases of crop insurance, trust on the crop insurance company, amount of risk taken on by the farmer, importance of low crop insurance premium, government as the main information source for crop insurance, role of head of village, and number of family members working in the city and found that other than the variable of government as the main information source for crop insurance, all other variables are statistically significant.

3. Research Objectives

The researchers are particularly interested to explore and gain insights of the following aspects with specific attention to mass-level adoption of crop insurance by farmers for dynamic management of risks relevant to farming and how their behavior have been shaped with the introduction of the awareness programs and policy changes at their favor.

- To analyze the determinants of farmers' adoption of crop insurance in Bangladesh.
- To identify the effectiveness of crop insurance as a risk management strategy in Bangladesh.

4. Methodology

This research, in its true nature, is a noble one since there has been no such works done previously using the field-level survey. The paper undertakes both quantitative and qualitative study based on the relevant literature necessary to investigate the factors affecting farmers' adoption of crop insurance in Bangladesh. This is an exploratory study in which the method followed in data collection is depending on primary data. Primary data has been collected

through questionnaire prepared by the authors. The survey has been carried out under actual field condition carried out on a sample size of 100 farmers on the basis of simple random sampling method to capture their unbiased opinion. The details of the sample size determination have been discussed in the sample design section. The study concentrates mostly on data collected from the survey and reports of the Insurance Development Regulatory Authority (IDRA), Bureau of Statistics, and Bangladesh Insurance Association (BIA).

4.1 Sample Design

The authors have adopted a random sampling method and conducted the study based on the structured questionnaire. The number of the total farmer using crop insurance is approximately 5,000 (Bangladesh Insurance Academy). Thus, the requisite sample size was determined using the Cochran's sample size formula: $n = Z^2pq/d^2$, where n= desired sample size, Z=the standard normal deviation (usually set at 1.96, which reveals to 95% confidence interval level), p=proportion in the target population estimated to have alike characteristic (here p= 50% which is set more conservative than the results of the from the pilot study), $q = 1–p$ (proportion in the target population not having the similar characteristics) and d= degree of accuracy required (usually set at the 0.10 level). Therefore, the size of the desired sample size is 96[3] considering all the relevant factors, and the authors have used a 100-sample for this study. The 100 respondents are gathered from different regions of Bangladesh who are farmers by occupation and grow crops and vegetables.

4.2 Pilot study

A pilot study has been conducted by the authors among interviewees in order to make sure that the terminologies used in the questionnaire were correct, appropriate, clear and understandable to the respondents. Interview was conducted in person by the authors because it helps the interviewer to ask relevant questions, which were not included in the interview guide depending on the answers received from respondents. Moreover, pilot study helps to verify how the responses might vary among the respondents.

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[3]The desired sample size considered for this study also corresponds to the table 1 constructed by Israel G.D., 1992 in his work titled as 'determining sample size.'
Authority (IDRA), Bangladesh Insurance Academy, Bangladesh Bank, journals, books, websites, newspapers and case studies.

4.3 Sources of Data Collection

Primary Data: In order to gather the required first-hand information and to provide reflective insights into the research topic, primary data has been collected by the authors by using questionnaire. A structured questionnaire was prepared by the authors for this purpose. 100 structured questionnaires were used to collect data through in-depth personal interviews of farmers of Bangladesh from different regions such as Patuakhali, Chandpur, Comilla, Gazipur, Kishoreganj, Tangail, Kushtia, Natore, Kurigram, Habiganj, and Sunamganj.

Secondary Data: Secondary data has been collected from different annual reports of the insurance companies, reports of Insurance Development Regulatory.

4.4 Data Analysis

At first, questionnaire was tested by the researchers using reliability test. Data reduction was undertaken after completing the interview to identify the patterns and themes for gaining insight and better understanding of the research topic. Data collected from secondary sources have been processed on the basis of different tools such as trend analysis, growth analysis and presented on relevant graphs. Data was being coded, scrutinized, paralleled, and categorized grounded on the queries. Answers of the close-ended questions were scored and summed up to get an overall understanding of the opinions of respondents. Data has also been segmented by age, gender, and geographical location. Descriptive analysis, cross-tabulation has been conducted. The following logistic regression model has been used to find out the factors persuading the adoption of crop insurance in Bangladesh.

Equation 1: Potential Model of Factors Influencing the Adoption of Crop Insurance in Bangladesh

$$\boldsymbol{Ln\,\{P_i/(1-P_i)\} = \beta_0 + \beta_1 X_1 + \ldots\ldots + \beta_{10} X_{10} + e_i}$$

Where: P_6 = probability of farmer's adoption of crop insurance $(1-P_6)$ = probability of not adopting crop insurance. β_9= Intercept, $\beta_{:}$ (1,2,3...,10)= Regression coefficients, $X_{:}$ (1,2,3...,10) = Independent variables and e_6 = error term. The independent variables specified as factors affecting the adoption of crop insurance and are defined below:

X_1 = Educational status (years)

X_2 = Working experience (years)

X_3 = Household size

X_4 = Extension education (Yes=1, No=0)

X_5 = Awareness of agricultural insurance (Yes=1, No=0)

X_6 = Participation in Cooperative membership (Yes=1, No=0)

X_7 = Perception of risk (High=1, Low=0)

X_8 = Past experience with risk (severe=1, mild=0)

X_9 = Income level (N)

X_{10} = Use of alternative risk management t strategies (Yes=1, No=0)

For the prediction of the probability of farmers' adoption of crop insurance based on different characteristics the logit model has been used. As the dependent variable of our probability model is a dummy variable, logit is the most appropriate model to predict the probability.

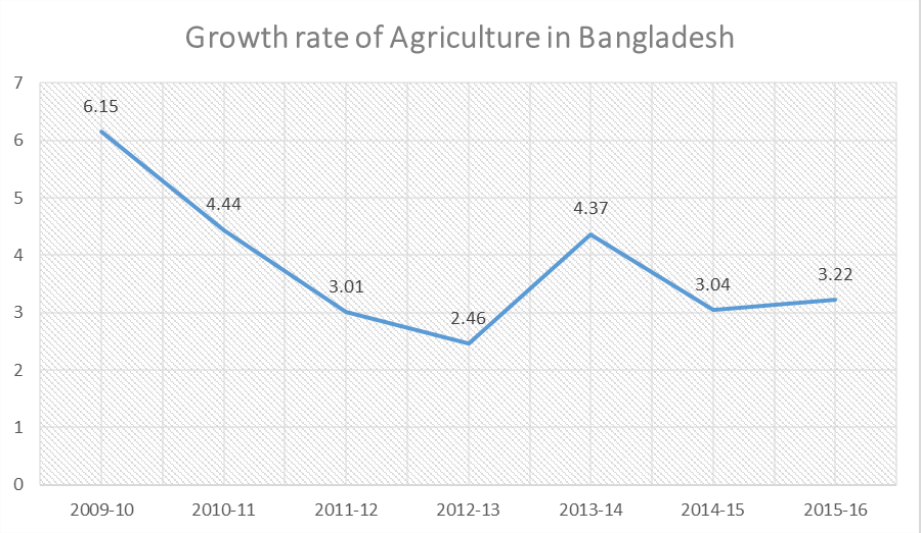
5. Present Condition and Contribution of Agriculture in Bangladesh Economy

Bangladesh, with an area of 147,570 square kilometers, is primarily considered as an agro-based developing country. Agriculture is the fundamental segment of Bangladesh's economy by contributing around 22% in its GDP and providing employment opportunities for 48% workforce. Approximately 85% of rural people directly and indirectly connected with and depending on the agricultural sector (Bangladesh Agricultural Development Corporation, 2020). Moreover, it is considered as the principal source of food security, employment, and probability for the mainstream of rural people and raw materials for agro-based industries. Though the contemporary economy is mainly reliant on industrialization, agriculture is treated as the lifeblood for Bangladesh. Over some time, the portion of farming in GDP has ominously deteriorated in Bangladesh. The following content is to draft a transitory situation of agronomy in Bangladesh.

The area of agricultural land is gradually decreasing due to the growth of industrialization and urbanization as well as the demand for residences for the increasing population. The farming land was 90% in 1976, 87.6% in 2000, and nearly 83.53 in 2010. High Yield Variety (HYV) seeds, automated cultivation, pesticides, biochemical fertilizer, and irrigation ensure the sustainability of productivity of this sector. But the production and contribution of the agricultural sector are still very poor compared to the increasing growth rate of GDP. Farmers of our country heavily depend on very few varieties of crops like rice, potatoes, jute, sugarcane, tobacco, cotton, bananas, tea, and various harvests. Over the last 3 decades' over-all trade of chemical fertilizers has been augmented by almost 3 doubles and the region

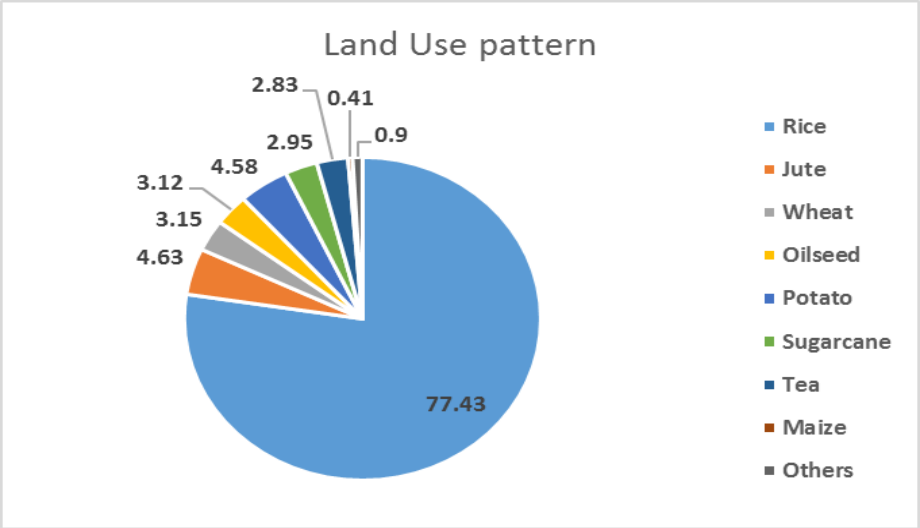
under irrigation rose by more than two doubles with a decrease in cultivation land by nearly 10%. The cropping intensity rate was 190% in 2015-16 which was 173% in twenty years ago (International Monetary Fund, 2020). The agriculture of our country still depends on nature and due to the majority of small-scale farmers; it is the most obstacles to introduce up-to-date technologies in the farming sector of Bangladesh.

However, the contributions of livestock and fisheries over the decades are remarkable.



Source: World Bank Open Data, 2020

The agronomic segment has been frolicking a crucial character in the inclusive socioeconomic growth of Bangladesh since the liberation of the nation. The division contributes to an enormous employment generation, GDP growth, and the progress of other businesses. According to the study of Bangladesh Bureau of Statistics (BBS) constantly almost 50% of the total employment of our country is directly and indirectly connected with the agriculture, forestry, livestock, and fisheries sector for the last couple of decades. The lion share of agriculture output is the production of rice. Out of the total food grain capacity, rice holds approximately 90.5%. In 2014-15 out of total 384.19 lakh, MT varsities of rice (Aus, Aman, Boro) hold 347.10 lakh MT. The land use pattern also follows the trend that a major portion of land covered by the cultivation of rice (Ministry of Agriculture, 2020). In FY 2015-16 rice cultivation accounts for 77.43% whereas jute cultivation holds 4.63%, wheat with 3.15%, and oilseed 3.12%.



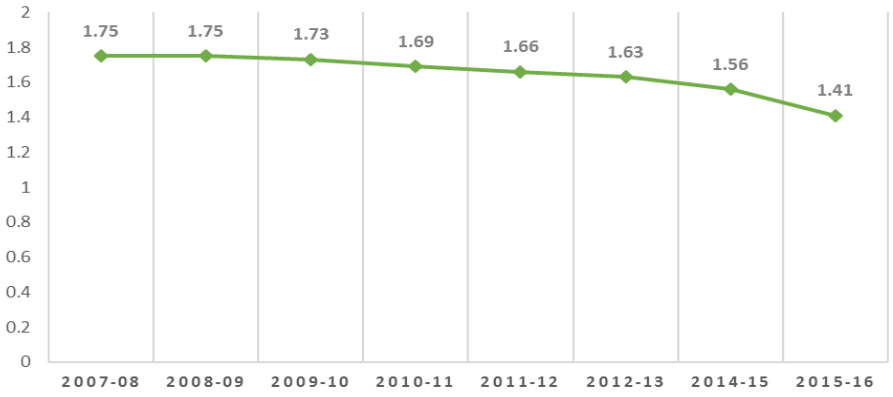
Source: Ministry of Fisheries and Livestock, 2020

In Bangladesh, fisheries solely supply approximately 63% of the total protein of our diet. The production of fish in Bangladesh is increasing day by day. In 2013-14 it holds the credit of production of 35.48 lakh MT which was amplified up to 37.03 lakh MT in the next year (Bangladesh Agricultural Research Institute (BARI) Government of The People's Republic of Bangladesh, 2020). Regardless of the constant growth rate, the government banned all kinds of fishing during March and April. These initiatives remarkably amplified the production of the fisheries sector. The contribution of livestock and poultry in the national economy is deprived (1.73% in FY 2014-15). But this sector helps to fulfill the demands of everyday vital animal protein. A stable agricultural sector ensures food security which is considered as one of the chief glitches faced by the developing countries. As per the Department of Livestock Services (DLS), Total livestock (Cattle, Goat, Buffalo, and Sheep) numbered 539.72 lakh and the poultry sector numbered a total 3122.92 lakh in FY 2014-15 with a growth rate of less than 5% (Hossain, Sarker and Haque, 2015).

Forestry is one of the most vital components of the agriculture of a country. But the contribution of forestry in our country is quite low and gradually decreasing over the period. In Fiscal Year (FY) 2007-08 the contribution of 1.75% of GDP which stands at almost 1.41% in FY 2015-16 (Bangladesh Bureau of Statistics-Government of The People's Republic of Bangladesh, 2020). Agriculture and forestry accounted for the contribution of 12.27% of total GDP in 2014-15 whereas fisheries contributed to 3.69% of

total GDP. The alarming factor is the gradual decrease in the contribution of these farming sectors to GDP.

Figure 3: Contribution of Forestry in Bangladesh's GDP



Source : Finance Division, Ministry of Finance, 2020

A great number of industries (Agro industry) is solely dependent on the production of agriculture. However, agricultural products like jute, rice, and leather, tea, sugarcane, shrimps and wheat are the major input for several industries. Agricultural products contributed 3.70% of total export earnings amount of USD 1,154.80 million with the increasing trend of export of non-traditional agricultural merchandise (Office of The Chief Controller of Imports and Exports-Government of The People's Republic of Bangladesh, 2020). Safeguarding the extensive food safety for people of this country the Ministry of Agriculture is executing diverse improvement schemes and agendas covering agronomic research and education, farming allowance and training, marketing of cultivated goods, farming funding and rehabilitation, agricultural input, and equipment modernization.

6. Effectiveness and Importance of Crop Insurance

With the increase in population, the demand for food is increasing on this planet. It imposes the ultimate pressure on food production and food security. For this purpose, farming and agriculture are becoming more commercialized along with a greater level of financial investment and technological advancement. Agriculture of a country is the solitary most affected subdivision by droughts, absorbing all the financial influence. Natural disasters have a severe impact on agriculture including permanent loss of crops, reduced agricultural production, spoil the fertility of lands for further farming, destroy the financial strength of farmers, increase the unemployment

within the farming industry as well as hinder the economic development of a country (Ahmed, et al. 2019). Therefore, the application of innovative financial and technical mechanism is mandatory to protect the agriculture investment. For reducing the risks associated with agriculture the introduction of agriculture and crop insurance brings a revolutionary phase in the economy. Generally, the government of any country subsidizes agriculture directly to cope with the risks of natural and other calamities. But the World Trade Organization (WTO) discourage governmental subsidy to the agriculture sector directly and prefer the subsidization of agricultural insurance premiums. Different agriculture insurance protects farmers' interest as well as ensures economic improvement. It also protects farmers' interest from unforeseen impediments by protecting their crops, livestock, and harvests.

- **Economic development:** Application of insurance and its penetration ratio helps to indicate the economic status of any nation. Agriculture insurance also contributes to economic development and growth for a country. It is considered an anti-inflammatory approach that assists to control the price of commodities. It helps to reduce the burden of a direct subsidiary by the government for the farmers in case of natural disasters. It is also linked with the sound financial system of any country. Different micro-credit organizations, NGOs, and lending institutions that provide a fund to farmers get the assurance of repayment with the presence of insurance policies.
- **Stabilizing Income:** Agriculture insurance offers preventing production process and production security as well as protection against production losses of farming. This practice creates awareness among farmers and educates farmers about different strategies to fight against these crop and market risks. Strategies to protect farmers' interest in market risks and other associated risks promote the income of farmers from farming. Insurance programs also educate and aware farmers of advanced methodologies of farming which helps to take precautionary initiatives in the farm business. These initiatives help to stabilize the income level of farmers.
- **Financial Stability:** Insurance programs usually ensure financial stability. Especially in the agricultural sector the crop and other agriculture insurance also uphold the financial stability among the farmers in different ways. By stabilizing the income of farmers, offering

protection against different risks as well as reducing rural indebtedness among farmers' insurance program ensures financial stability (Husain and Amin, 2018). Due to crop failure farmers are unable to repay the loan amount and in severe cases, they have to sell all their belongings and commit suicide. Crop insurance protects the farmers by stabilizing their financial condition and supports them in crisis.

- **Compensation of losses:** Agriculture and farming are associated with huge risks as the farmers must have to arrange different types of resources in front of severe natural disasters and market instability. Due to the riskiness of the agriculture business insurance protection can play a vital role. Farmers can exploit the opportunity of insurance by compensations against the losses of livestock, harvest, and yields. This practice helps to recover their losses due to uncertain events.
- **Technological advancement:** For boosting farm productivity and progress in agriculture the investment in technology has massive influence. Every year new technologies are introduced in the farming sector for the advancement of agriculture and ensure a high level of yield form Agricultural investment. Different agriculture insurance and crop insurance encourage farmers' investment in technological advancement by offering insurance coverage against several dimensions or risks. Farmers invest and operate the farming business effectively as losses could be transferred to insurance companies in exchange for premium payments.

7. Empirical Analysis and Results

In this section, the outcomes of the survey data has been outlined and interpreted. The authors also presented the insights gained while pursuing this study.

7.1 Profile and Socio-economic background of the Respondents

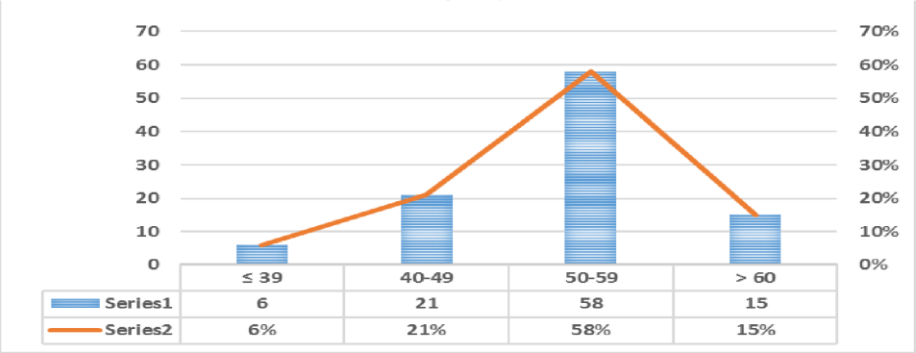
The authors have interviewed farmers of Bangladesh from different regions. Interviewed farmers include both gender of different age groups with diversified educational background. Farmers from the rural areas were interviewed. All of the interviewed farmers have 5 years plus working experience in the farming industry. These farmers were selected from Patuakhali, Chandpur, Comilla, Gazipur, Kishoreganj, Tangail, Kushtia, Natore, Kurigram, Habiganj, and Sunamganj.

7.2 Demographic analysis of the Respondents

7.2.1 Gender and Age

The study is conducted on 100 sampled farmers to analyze the pattern of adoption of crop insurance among them. In the survey of 100 sample farmers, 29 are female whereas the remaining 71 belongs to the male group. Among the 100 respondents, only 6 belong to the age category less than 39 years old. The largest category of age group is the range of 50-59 years old which accounts for 58% of total sample respondents. The second highest segment is the age range of 40-49 years old holding 21 respondents. However, 15 farmers are older than 60 years old in the survey. According to the survey information, most of the females belong to 40-59 years old.

Figure 4: Ranges of Respondents' Age

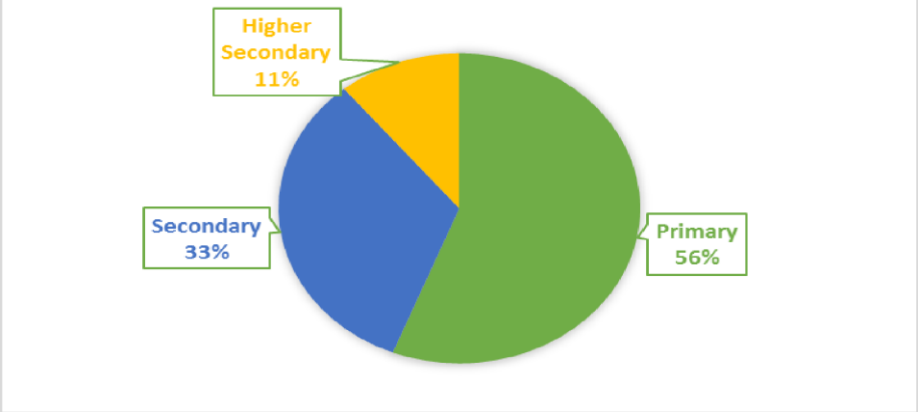


Source: Prepared by Authors

7.2.2 Education

The education level is categorized mainly in three segments including primary, secondary, higher secondary, and more. According to the raw data of the survey, only 11% have crossed the boundary of secondary education level and perceive higher secondary education whereas 33 respondents belong to the group of secondary education level. The majority of the respondents belong to the primary educational experience. For the prediction of the adoption of crop insurance among the farmers, the educational experience is adjusted as the number of years in education the farmers have. Farmers with primary education are considered to have few years of educational experience whereas for the secondary and higher secondary is considered as 10 and 12 years of educational experience respectively. The survey also reveals that the consciousness among the female members about education is low compared to male farmers. It shows the real picture of education perceived in rural areas of Bangladesh.

Figure 5: Educational Background of Respondents

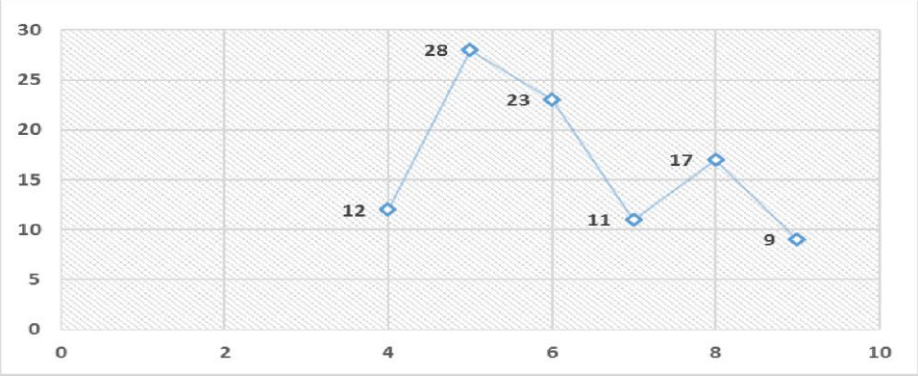


Source: Prepared by Authors

7.2.3 Household size

The family size of rural people is comparatively higher than the urban people. Most rural people live in a joint family. Due to the lack of proper educational and proper family planning concepts their household size is higher than the urban peoples. The information from sampled farmers in the survey also shows the same picture. Only 12% respondent has less than 5 people in their family. On the contrary 60%, respondents belong to a family with more than 5 family members. The extreme situation is that nearly 9 farmers are counted with more than 8 family members. With a large family size, it is quite difficult for them to fight against any situation effectively especially the risks associated with farming. It not only increases domestic expenses but also diminishes the probability of survival in the time of natural disasters or other calamities.

Figure 6: Family Size of Sampled Framers

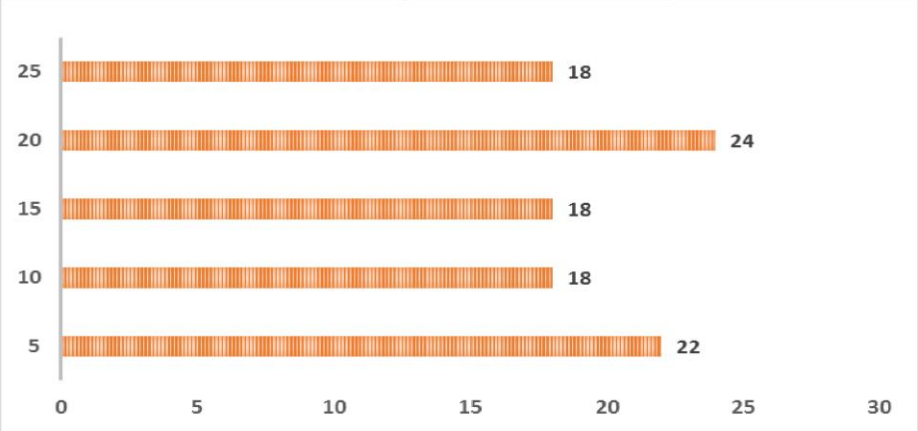


Source: Prepared by Authors

7.2.4 Experience in farming and co-operative farming

The experience of farmers in agriculture was surveyed through the close-end question. The experiences are segmented into different categories including rangers from 5 years to more than 25 years. The major respondents are segmented with almost farming experience of 20 years whereas 22% of total respondents have equal or less than 5 years of experience. Each parameter of 10 and 15 years of experience holds 18% of the total sampled respondents separately. Moreover, 18% of respondents have more than 25 years of experience in the farming industry. Among the framers, 56% of farmers have participated in co-operative farming. Co-operative farming is considered as a risk management strategy in which farmers collaborate to produce a specific crop on a communal basis. In this approach, farmers share each other's resources to achieve a common goal with minimum risk. As per the survey, 44 farmers are not engaged in the co-operative farming business.

Figure 7: Experience of Farmers in the Agricultural Sector



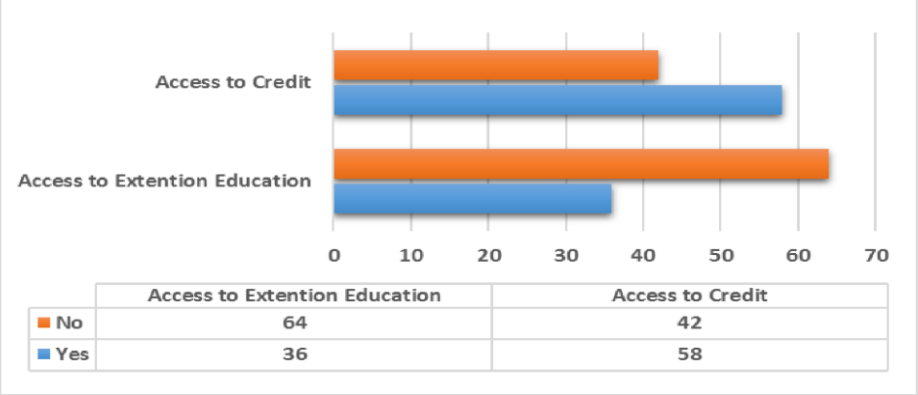
Source: Prepared by Authors

7.2.5 Access to credit and extension education

Though the government has emphasized on the credit available among the farmers, the lack of awareness, formal lending mechanism, and lack of financial security as collateral farmers are deprived of credit facilities in our country. However, in the survey, 58% of farmers have the experience of lending from different lenders. The accessibility of credit is above average according to the survey information with the 44 farmers depriving of the accessibility of credit facilities. On the other hand, extension education is a very effective measure to acquire knowledge about agriculture in detail. It is an informal education mechanism through which rural peoples are educated

for better productivity in farming and promote their livelihood. It also enhances the financial strength and standard of livings of the farmers. While analyzing the survey data, it shows that only 36 farmers got the opportunity to exploit the advantages of extension education. On the contrary, 64% of the total respondents didn't get the extension education program's benefits.

Figure 8: Accessibility of farmers in Credit and Extension Education System

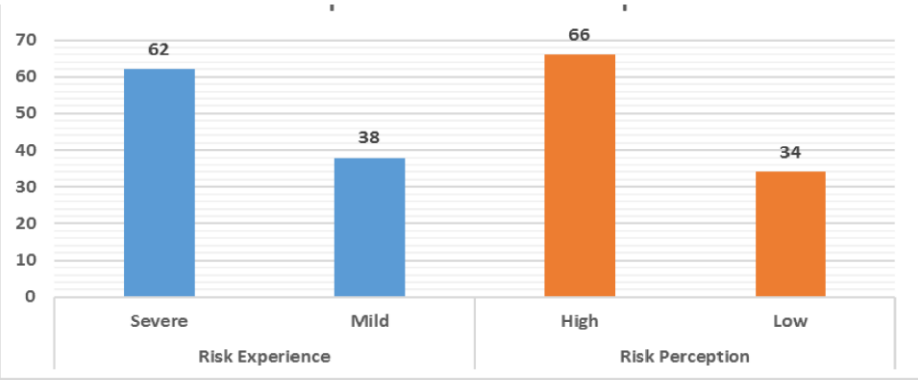


Source: Prepared by Authors

7.2.6 Risk Perception and risk experience

The perception of risks and the experience of risks are considered as a major parameter in the acceptance of crop insurance among the farmers. In the surveyed model, out of a total of 100 respondents, 66 farmers' perception of risks is high among which almost 62 farmers had experienced severe risk in farming. On the contrary, 34 farmers are holding low-risk perceptions in the agriculture sector. The mild level of risk was experienced by 38% of total respondents according to our survey information.

Figure 9: Risk Perception and Risk Experience of Respondents

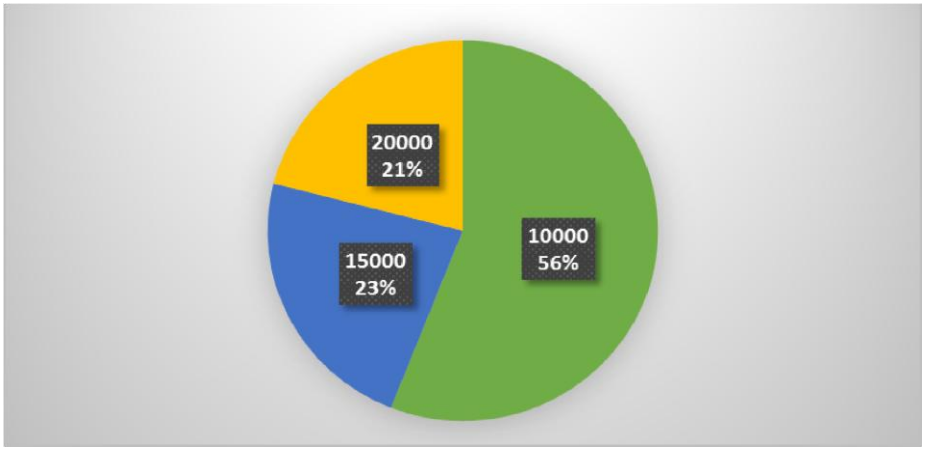


Source: Prepared by Authors

7.2.7 Income

Most of the rural people and farmers are poor section of the society. Most of the rural people have less financial stability and strength compared to the urban peoples. In our country, the majority of the farmers are small-scaled and medium scaled farmers with minimum monthly income capability. The survey also reflects the same situation in our country. According to the survey, 56% of the total respondent's farmers have a yearly income of almost BDT 120,000. Only 23% of farmers are the holder of monthly BDT 15,000 whereas 21 farmers account for monthly BDT 20,000. The income level is significantly connected with the adoption of crop insurance. It also has great in fecund over the attitude toward risks among the farmers.

Figure 10: Monthly Income of Respondent Farmers



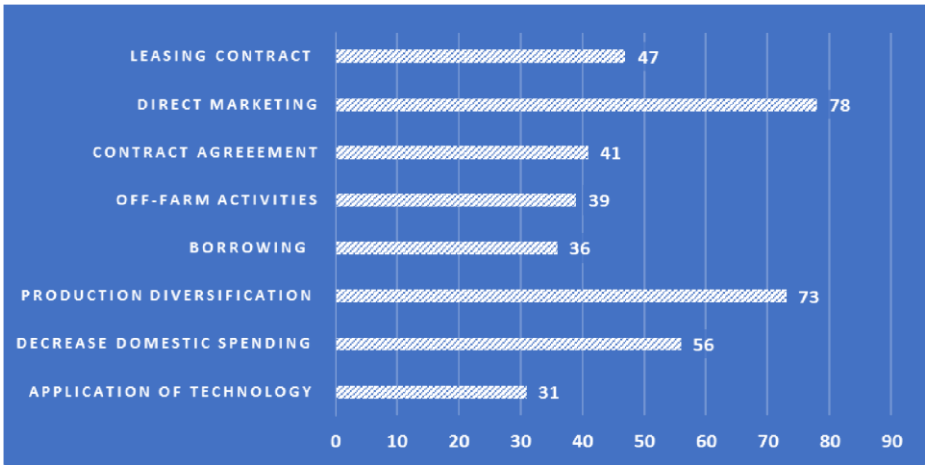
Source: Prepared by Authors

7.2.8 Application of alternative risks management strategies

Farmers take different types of risk management strategies to protect their harvest and yield from some risks. These strategies help the farmers to fight against the risks and protect their interests and amplify their financial stability. Among several strategies application of technology, decreasing domestic spending, production diversification, borrowing, off-farm activities, contract agreement, direct marketing, and leasing contracts is mostly common in framing sectors. In the sampled survey direct selling of crops and harvest in the market is mostly practiced (78%) risk management strategy among the respondents. It reduces the market-related uncertainty and the negative impact of middleman between farmers and customers. The second-best strategy among the farmers' opinion is the production versification. Almost 73% of the farmers adopted this approach to diversify their risks by cultivating more than

one crop at a time. In the time of natural calamities or financial challenges cutting own of domestic spending is an effective measure to manage the magnitude of risks. As per the survey data, only 56 farmers have chosen this strategy.

Figure 11: Application of Alternative Risks Management Strategies by Sampled Farmers



Source: Prepared by Author

7.3 Analysis of factors influencing adoption of crop insurance

Several variables were hypothesized to conclude the farmers' choice to approve crop insurance with the application of the logit model. The following model was used to find out the factors persuading the adoption of crop insurance in Bangladesh.

$$\boldsymbol{Ln}\{\boldsymbol{P_i}/(\boldsymbol{1}-\boldsymbol{P_i})\} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1 X_1} + \ldots\ldots\ldots + \boldsymbol{\beta_{10} X_{10}} + \boldsymbol{e_i}$$

Where: P_6 = probability of farmer's adoption of crop insurance $(1 - P_6)$ = probability of not adopting crop insurance β_9 = Intercept, $\beta_:$ (1,2,3...,10) = Regression coefficients, $X_:$ (1,2,3...,10) = Independent variables and e_6 = error term. The independent variables specified as factors affecting the adoption of crop insurance are educational status (years), working experience (years), household size, extension education (yes= 1, no= 0), awareness of agricultural insurance (yes= 1, no= 0), participation in cooperative membership (yes= 1, no=0), perception of risk (high =1, low = 0), past experience with risk (severe = 1, mild = 0), income level (n), use of alternative risk management strategies (yes = 1, no = 0) etc. The logistic model is applied to identify the probability of framers adopting crop insurance based on these independent variables. The summary of logistic model results is discussed in below.

Table 1: Diagnostic Statistics of Logit Model

Model Description	
Log-Likelihood	= -112.601737
The number of obs.	= 100
LR chi2 (10)	= 107.85
Prob. > chi2	= 0.0000
Pseudo R2	= 0.8253

The table shows that the model used in logistic regression has 100 observations with 10 predictor variables that influence the predicted variable. The magnitude of the diagnostic statistics displays a decent fit for the model. The log-likelihood of this model is -112.601737. The Likelihood Ratio Chi-Square (LR-Chi2) score is 107.85 with the p-value of 0.000 which specifies that the model is statistically significant. Pseudo R2 indicates the degree of accuracy or how well the predictor variables predict the predicted variables. In our model, the predictor variables have explained the predicted variables by almost 83%. The following table contains the details of each variable summary along with its statistical significance level.

Table 2: Summary of Logit Regression Parameters

Variables	**Coefficient**	**Standard Error**	**P>|z|**
Constant	-1.49*	0.59	0.011
Education Experience	0.88*	0.32	0.016
Farming Experience	-0.37**	0.13	0.004
House Hold Size	-1.50	0.63	0.067
The opportunity of Extension Education	2.82**	0.85	0.001
Awareness of Crop Insurance	2.70**	0.51	0.000
Co-operative Farming	-2.61**	0.51	0.001
Perception of Risk	2.19**	0.48	0.002
Risk Experience	2.53*	1.07	0.018
Income monthly	0.32*	0.14	0.021
Application of Alternative Risk Management Strategies	-2.45**	0.92	0.008

**Significance at 1% *Significance at 5%

The table shows that some variables have positively predicted the adoption of the framer's crop insurance whereas the others have negatively related to predicting the adoption of the crop insurance among the farmers. Variables including education experience (P-value < 0.05), opportunity of extension education (P-value < 0.01), awareness of crop insurance (P-value < 0.01), perception of risk (P-value < 0.01), risk experience (P-value < 0.05), and income monthly has positive coefficient. On the contrary, variables including farming experience (P-value < 0.01), co-operative farming (P-value < 0.01), and application of alternative risk management strategies (P-value < 0.01) has negative magnitude in predicting farmers' adoption of crop insurance. Predictor variables risk of experience, monthly income, and educational experience is statistically significant at a 5% significance level. Other predictors variables except household size are statistically significant at a 1% significance level.

8. Conclusion

Our analysis uses data from Bangladesh which is one of the largest and fastest growing emerging economy. Also, it has a mix of the major different insurance company types. The Bangladeshi economy is representative as well of financial market imperfections that are prevalent in many developing countries. Our data yield a number of interesting findings. Our analysis indicates that, the variables including education experience, the opportunity of extension education, awareness of crop insurance, perception of risk, risk experience, and income monthly have a positive influence in the adaptation of crop insurance. On the contrary, factors including farming experience, co-operative farming, and application of alternative risk management strategies have a negative influence in predicting farmers' adoption of crop insurance. These findings are helpful for policymakers in formulating policies related to crop insurance in order to upsurge the adoption of crop insurance in Bangladesh. However, this study has some limitations. First is data constraint.

Because of time and budget constraints data could not be collected from more farmers. Also, we could not cover all the districts of Bangladesh for data collection.

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Appendices

Appendix 1: Survey on Farmers' Status on Adaptability of Crop Insurance

Dear respondent,

Thank you for your cooperative participation in this survey. This study will take approximately 5 minutes to complete. This interview has been prepared to collect statistics on farmers' socio-economic status which is interconnected with farmers' adaptation of crop insurance. The collected evidence will be used only in the formulation of this research paper and will be reserved strictly confidential. Our team appreciates you for your valuable time to respond.

Respondent's Name:	
Gender:	Male Female
Age:	≤ 39 40-49 5-59 > 60
Education level (Years):	Primary (5) Secondary (10) Higher Secondary (12)
Household size:	
Income/month:	10,000 15,000 20,000
Experience in farming (In Years):	5 15 20 25
Participation in cooperative farming:	Yes No
Access to credit:	Yes No
Access to extension education:	Yes No
Perception of risk:	Low High
Risk experience:	Mild Severe
Awareness of Crop insurance:	Yes No
Adaptation of Crop insurance:	Yes No
Use of alternative risk management strategies	Yes No
If yes, tick the	1. Application of Technology

alternatives you have applied to mitigate the risks (multiple responses are allowed)	2. The decrease in Domestic 3. Spending 4. Production Diversification Borrowing 5. Off-Farm Activities 6. Contract Agreement 7. Direct Marketing 8. Leasing Contract

Appendix 2: Characteristics Distribution of Respondents

Variables	Categories	Frequency (n)	Percentage	Cumulative Percentage
Gender	Male	71	71%	71%
	Female	29	29%	100%
	Total	**100**	**100%**	
Age	≤ 39	6	6%	6%
	40-49	21	21%	27%
	50-59	58	58%	85%
	> 60	15	15%	100%
	Total	**100**	**100%**	
Educational Experience	Primary	56	56%	56%
	Secondary	33	33%	89%
	Higher Secondary	11	11%	100%
	Total	**100**	**100%**	
House Hold Size (In Numbers)	4	12	12%	12%
	5	28	28%	40%
	6	23	23%	63%
	7	11	11%	74%
	8	17	17%	91%
	9	9	9%	100%
	Total	**100**	**100%**	
Framing Experience	5	22	22%	22%
	10	18	18%	40%
	15.00	18	18%	58%
	20	24	24%	82%
	25	18	18%	100%
	Total	**100**	**100%**	

Participation in Co-operative farming	Yes	56	56%	56%
	No	44	44%	100%
	Total	**100**	**100%**	
Access to Extension Education	Yes	36	36%	36%
	No	64	64%	100%
	Total	**100**	**100%**	
Access to Credit	Yes	58	58%	58%
	No	42	42%	100%
	Total	**100**	**100%**	
Awareness of insurance Crop	Yes	38	38%	38%
	No	62	62%	100%
	Total	**100**	**100%**	
Risk experience	Severe	62	62%	62%
	Mild	38	38%	100%
	Total	**100**	**100%**	
Perception of risk	High	66	66%	66%
	Low	34	34%	100%
	Total	**100**	**100%**	
Monthly Income BDT) (In	10,000	56	56%	56%
	15,000	23	23%	79%
	20,000	21	21%	100%
	Total	**100**	**100%**	

Appendix 3: Use of Alternative Risk Management Strategies

SL No.	Alternative Strategies	Frequency (n)	Percentage
1	Application of Technology	31	31%
2	The decrease in Domestic Spending	56	56%
3	Production Diversification	73	73%
4	Borrowing	36	36%
5	Off-Farm Activities	36	36%
6	Contract Agreement	41	41%
7	Direct Marketing	78	78%
8	Leasing Contract	47	47%

Appendix 4: Summary of Predictor Variables

Variable	Observations	Mean	Standard Deviation	Min	Max
Educational Experience	100	7.35	2.900279	5	12
Farming Experience	100	14.9	7.141428	5	25
House Hold Size	100	6.2	1.530828	4	9
Extension Education	100	0.36	0.482418	0	1
Co-operative Farming	100	0.56	0.498888	0	1
Awareness of Crop Insurance	100	0.38	0.487832	0	1
Perception of Risks	100	0.38	0.487832	0	1
Risk Experience	100	0.4	0.492366	0	1
Income/monthly	100	13.25	4.043638	10	20
Application of Alternative Risk Management Strategies	100	0.64	0.482418	0	1

Appendix 5: Summary of Logistic Regression Output

Iteration 0: Log-Likelihood = -365.341819

Iteration 1: Log Likelihood = -315.940483

Iteration 2: Log Likelihood = -212.879331

Iteration 3: Log Likelihood = -112.605891

Iteration 4: Log Likelihood = -112.601738

Iteration 5: Log Likelihood = -112.601737

Iteration 6: Log Likelihood = -112.601737

Logistic regression — The number of obs. = 100 LR chi2 (10) = 107.85

Log Likelihood = -112.601737 — Prob > chi2 = 0.0000

Pseudo R2 = 0.8253

Ins_Adopt	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
_cons	-1.498037	.5862921	-2.56	0.011	-2.647149	-0.3489259
	0.8808849	0.319504	2.76	0.016	0.2546688	1.507101
Edu_Ex	-0.3725165	0.129237	-2.88	0.004	-0.6258161	-0.119216
Farm_Ex	-1.49788	0.629855	-2.38	0.067	-2.732373	-0.2633865
House_Size	2.818135	.8459655	3.33	0.001	1.160073	4.476197
Ex_Edu	2.704002	5060739	5.34	0.000	1.712115	3.695888
Awr_Ins	-2.605156	.5142127	-5.07	0.001	-3.612994	-1.597317
Co_Farm	2.187857	.4769067	4.59	0.002	1.253137	3.122577
Perc_Risk	2.531913	1.074286	2.36	0.018	0.4263504	4.637475
Risk_Ex Income	0.3212841	0.139552	2.34	0.021	0.0477666	0.59480173
Risk_Mgt	-2.451006	.9189813	-2.67	0.008	-4.252176	-0.6498355

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Impacts of Financial Literacy and Materialism on Savings Decisions of Business Students: Evidence from Faculty of Business Studies, University of Dhaka

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Abstract: The principal aim of this research is to examine the association between financial literacy and savings tendency of the business students. It also examines the relationship between materialism and savings tendency of them. In addressing the aim, a quantitative research work was conducted and supported by a cross sectional survey of 170 students from Faculty of Business Studies, University of Dhaka. Here, the Structural Equation Modeling (SEM) was used to test the hypotheses. The study reported a positive relationship between financial literacy and savings tendency of the students. But there was no significant relationship between materialism and their savings decisions. The study recommended a strengthened financial literacy as well as a reduction of the level of materialism among the students to undertake effective savings decisions.

Keywords: Financial Literacy; Materialism; Financial Well-being; Financial Attitude; Savings

1. Background of the Study

Financial literacy, by definition, is the ability of an individual to make financial decision and to enrich the financial aspects in life (Ibrahim et al., 2010). It is closely associated with individual knowledge because it educates an individual to apply the right financial tools and techniques for the right time (Mandell & Klein, 2009). Most notably, financial literacy is crucial for business students because they are educated about different methods and techniques of finance to make financial decision (Pangestu & Karandi, 2020). For example, every business student in Faculty of Business Students (FBS) is taught basic financial courses where they learn about time value of money, Net Present Value (NPV), payback period, Internal Rate of Return (IRR) methods and other key principles and methods of finance (FBS, 2020).

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The Faculty of Business Studies (FBS) of University of Dhaka has gained a strong brand image as a leading business education facilitator in Bangladesh. In every year, the faculty admits 1,250 students (FBS, 2020) on merit based qualification system who study in 9 different departments including management, marketing, accounting and information system, finance, banking and insurance, management information system, international business, tourism and hospitality management and organizational strategy and leadership. There are 6,092 students currently studying under BBA and MBA programs in the faculty in these departments (FBS, 2020).

FBS plays a crucial role in promoting the financial literacy of students. It is expected that business students have adequate financial literacy to make financial decision. Financial literacy is also related to materialism, which defines the tendency of leading a luxurious life. Although FBS contributes to promoting financial literacy of business students, it is yet to be tested the current status of students' financial literacy. In past, many studies have been conducted to examine the impact of financial literacy. For evidence, Pangestu & Karandi (2020) conducted empirical research to test the impact of financial literacy on saving decision of generation Z in Indonesia.

Although few theoretical and empirical studies have been conducted to examine the impact of financial literacy on savings decision (e.g., Potrich et al., 2015; Ibrahim et al., 2010; and Pangestu & Karandi, 2010), there is a dearth of studies to test the financial literacy of business students enrolled in FBS of University of Dhaka. To date, this is one of the first studies that contributes to examining the impact of financial literacy and materialism on savings decision of business students.

The study contributes to the existing literature by creating a research model. The findings of the study would add value for the top authority of FBS to make decision about the policy to improve student's financial literacy. The research is structured into five sections. Firstly, it introduces the background of the research. Secondly, it conducts literature review on financial attitude and well-being, financial literacy, materialism to develop a research model. Thirdly, it defines and justifies key methods and techniques used to conduct a credible and viable research work. Fourthly, it reveals the findings of the study by applying Partial Least Squares Structural Equation Modeling (PLS-SEM). Finally, it reveals core findings of the study.

2. Literature Review

2.1 Financial Attitude

The term 'financial attitude' has become a mounting concern for scholars from financial discipline. It is defined as a way of thinking and feeling related to financial aspects of an individual that can be either savings or consumption decision (Pangestu & Karnadi, 2020, p. 3). Potrich et al., (2015, p.365) defines financial attitude as psychological construct that characterizes an individual. To Ibrahim et al., (2010, p. 53), financial attitude is a mental entity that leads to financial behavior. Wang & Wong (2004, p.165) noted that financial attitude is an inherent characteristic of an individual that leads to set short-, medium-, and long-term financial goals, and subsequently to implement key planned activities. These definitions have the idea in common that financial attitude, an important psychological construct, triggers financial behavior of an individual to support overall financial goals. Pangestu & Karnadi, (2020, p.5) found that sound financial attitude positively affects the financial literacy of an individual, which ultimately puts a positive impact on savings decision. The sound financial attitude is derived when an individual studies key concepts, models, and theories of financial management since the main focus of financial literacy is to provide more value for stakeholders such as individual and family. Other studies (e.g., Potrich et al., 2015, p. 367) also demonstrate a positive effect of good financial attitude on financial literacy among individuals.

Contrary to the above, Mandell & Klein (2009) found that financial attitude among individuals such as business student has not significant effect on financial literary, if they do not understand, perceive, and respond to the long-term financial goals. The authors identified key issues such as perceiving the importance of financial management, and narrow focus of practicing key financial models, such as time value of money. Notwithstanding this, an appreciable number of studies found a positive impact of financial attitude on financial literacy. Thereafter, based on this argument this hypothesis can be proposed as-

H_1: A sound financial attitude positively affects the financial literacy of business students.

2.2 Financial Well-being

Financial well-being is of great significance in the study of financial literacy. Financial well-being refers to the extent to which an individually financially and psychologically stable to make good financial decision. According to Taft

et al., (2013), financially solvent people tend to save money and can make better financial decisions. Xiao et al. (2007) examined how financial behavior was linked with the financial well-being of college students. In their study, the results manifest that savings behaviors were positively related to financial wellbeing of the students and so were cash management and credit management.

Joo and Grable (2004) evidently supported that financial well-being is, either directly or in an indirect way, connected with financial behaviors, such as budgeting for each month, timely payment of credit card bills and proper saving tendencies. Chu et al. (2017) showed that households those have high financial literacy levels usually have higher financial well-being measured in terms of positive returns on investment. Again, Shim et al., (2009) demonstrated that financial behaviors including budgeting and savings management were linked to financial well-being of young adults. In a study, Johnson and Sherraden (2007) proposed that ranges in young people's financial literacy learned through courses on financial education may exert impact on financial well being of the students. On the contrary, Pandey et al., (2020) and some other studies contradicted the interrelation between financial well-being and financial literacy. Based on these assumptions, the following hypothesis is developed.

H_2: Financial well-being positively affects the financial literacy of business students.

2.3 Financial Literacy

Schagen and Lines (1996) described financial literacy as "the ability to make informed judgments and to take effective decisions regarding the use and management of money" which has been later mostly accepted among few other researchers. According to Remund (2010) financial literacy includes the range of individuals' understanding and possession of the confidence and capability to manage the short term as well as long term personal financial decisions in line with other influencing events and different economic situations.

Financial literacy promotes financial awareness among groups of consumers and thus can impact consumption attitude or materialistic behaviors. There are empirical studies determining the negative impact of financial literacy on materialism of people. According to the study by Nye

and Hillyard (2013), subjective literacy leads to less impulsive and more decisive attitude of individuals for consumption. Sabri & MacDonald (2010) also reveals that college students who have more spending experience on consumption have lower intentions for saving (p. 108). An increase in financial literacy reduces consumptive attitudes of individuals (Pangestu, S., & Karnadi, E. B. 2020; p. 11). The judgment based on the previous analyses can be ended up with the following hypothesis;

H_3: Financial literacy poses a negative impact on materialistic values of business students.

Financial literacy deploys more financial well-being and skills to plan substantive financial decisions. Quantitative and subjective financial literacy enlightens the financial behaviors of people in terms of improved knowledge, awareness, and skills (Nye and Hillyard 2013). Saving decision of individuals is greatly impacted by their financial literacy and the impact is obvious to be significant and positive (Mahdzan &Tabiani, 2013). Sabri & MacDonald (2010) also analyzed that saving decisions of the young college students are significantly and positively affected by the financial literacy (p. 107). Some other empirical evidences also suggest that financial literacy has a positive impact on financial behavior i.e. saving and investment behavior of people (Behrman, Mitchell, Soo & Bravo, 2012; Lusardi & Mitchell., 2014; Arofah, Purwaningsih & Indriayu, 2018).

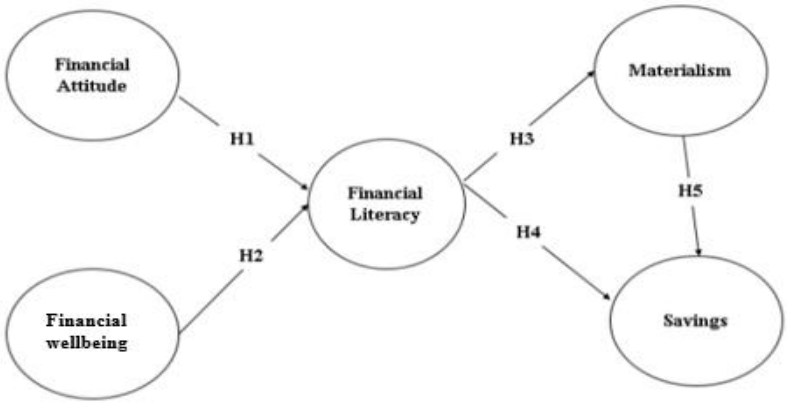
According to a survey by Australian regional university to measure financial literacy among the students, business students were examined to have better scores in financial literacy in comparison with other majors (Beal, Delpachtra, 2003). But according to Mandell & Klein (2009) financial literacy measured in terms of financial education does not impact subsequent financial behavior of young people. However, according to the discussions, we conclude the following hypothesis,

H_4: Financial literacy poses a positive impact on savings decision of business students.

2.4 Materialism

Materialism is one of the personal attributes of individuals that provide them the independence of consideration for more consumption. Materialism is measured as the degree of happiness and satisfaction a consumer can obtain from the consumption of goods and services (Nye & Hillyard, 2013).

Figure 1: Research Model (Source: Arofah et al., 2018; Beal & Delpachtra, 2003; Mahdzan & Tabiani, 2013)



High materialistic values develop compulsive buying behavior (Nye & Hillyard, 2013; Dittmar, 2005) o among people and thus reduces saving attitude (Donnelly, Iyer & Howell, 2012).Few other studies have also pointed out that materialism of individuals tends to negatively influence financial decisions regarding financial services. The empirical evidence from the studies (Arofah, Purwaningsih & Indriayu, 2018; Helm, Serido, Ahn, Ligon & Shim, 2019) found a significant negative relationship between materialism and financial behavior proving that materialistic value creates consciousness for buying attitude and consumption rather than saving or investigating the possessed money. Christopher, Marek & Carroll (2004) also showed materialism affects conservative approaches towards money, which indicates savings and investment behavior. Based on the discussions above hypothesis regarding materialism toward financial behavior is stated below.

H_5: Materialism negatively affects the financial behavior of business students.

3. Methodology

3.1 Research setting

The unit of analysis for this research work is business students because vast majority of academic courses in business studies are designed to improve and promote the financial literacy of students. The research population was business students of Faculty of Business Studies (FBS), the leading business faculty in Bangladesh. The study included the students studying at FBS for

several reasons. First, FBS is widely acknowledged in Bangladesh as a hub of financial and business knowledge. Second, the faculty contributes to promote financial literacy of the students. Third, it is governed by key business scholars and think tanks. As part of generalizing the research (Zikmund et al., 2013), the study adopted a random sampling of students listed in the FBS of University of Dhaka.

The sample size is a sensitive factor to conduct a valid and credible research work, and therefore, validating sample size, which represents the whole population, is paramount. In financial literature, various sample sizes have been recommended in the past. Even, several established theories have been developed to scientifically validate the sample size. According to Saunders et al., (2009), the determination of sample size depends on whichever statistical tools are used. Bell et al., (2010) suggested to consider a sample size equivalent to ten observations per variable. The study included four important variables as part of multivariate data analysis. Based on key theoretical assumptions, the study considered a sample size of minimum 100 because it adopted Structural Equation Modeling (SEM).

Data were collected by a quantitative cross-sectional survey. By leveraging the key notions of survey questionnaire method, the study collected data from business students of Faculty of Business Studies (FBS). The study included students of FBS as respondents regardless of degree such as BBA and MBA degrees.

3.2 Measurements

In light of the past studies on financial literacy, materialism, and savings decision, the research work identified key measurement items. The measurement items were selected by reviewing past studies i.e., financial attitude (Potrich et al., 2015), Financial well-being (Pangestu & Karandi, 2020), materialism (Pangestu & Karandi, 2020), and Savings (Ibrahim et al., 2010). The items were measured on a range of five-point Likert Scale i.e., strongly disagree =1, disagree=2, neutral=3, agree=4, and strongly agree=5. Based on a dichotomous scale i.e., male=1, and female =0, gender was measure and age was measured in years. The table 1 exhibits the list of key variables and measurement items.

Table 1: Summary of Measurement Items

Construct	Item	Source
Financial attitude	FA1: Saving money is important to me	Potrich et al., (2015)
	FA2: It is important to set goals in life especially in financial decisions	
	FA3: Financial planning is an important aspect of my life	
	FA4: Keeping financial record is important to me	
	FA5: Financial plan is really needed	
Financial well-being	FW1: I am concerned about the money I currently own	Michael Collins & Urban (2020)
	FW2: My current financial condition is satisfactory	
	FW3: Money acts as a controlling mechanism of my life	
	FW4: I always have surplus amount of money at the end of month	
	FW5: I can make better uses of my money	
Financial Literacy	FL1: I enjoy to apply my financial literacy	Pangestu & Karandi (2020)
	FL2: I know the principles of finance	
	FL3: I enjoy to work with abstract financial ideas	
	FL4: I can apply the concept of time value of money	
	FL5: I can apply key financial tools in financial decision making	
Materialism	M1: I like living a luxurious life	Pangestu & Karandi (2020)
	M2: Buying stuff gives me pleasure	
	M3: I like to show others how well I am doing in life	
	M4: I admire people who own costly stuff	
	M5: I would be happy if I could buy more	
Savings	S1: I save money regularly	Ibrahim et al., (2010)
	S2: I save more when I earn more	
	S3: I have been able to save money consistently over the last 12 months	
	S4: I save money for future needs	
	S5: I always prepare a budget for my spending	

3.3 Questionnaire design and data collection

As pointed out early, students of FBS at University of Dhaka were the unit of analysis for the study. This was because the research aims at critically examining the impact of financial literacy and materialism on savings decisions of business students of FBS at University of Dhaka. A structured survey questionnaire was used to collect data from the unit of the study. The questionnaire was designed by structuring into two important sections including part A and part B. Part A contained socio-demographic questions, and part B incorporated questionnaire for the different constructs of the research model. The questionnaire was developed in English language because business studies are conducted in English version, and therefore, they possess adequate competence to fill up the survey questionnaire in English language. In order to validate questionnaire, a pilot study of 10 business students was conducted. The feedback obtained from pilot study was used to fine-tune the final version and accordingly the questionnaire was developed.

During the COVID-19 pandemic, it was difficult to carry out field survey e.g. face to face survey because it involved health and safety risks. Therefore, online survey was conducted to include participants. Compared to telephone and postal surveys, the response rate of online survey is high (Bell et al., 2018). The online survey contributed to getting response from 175 respondents. Out of 175 responses, 170 were usable. Finally, the study was fostered using the responses from 170 participants.

3.4 Data analysis

Structural equation modeling is the foundation of partial least square method, which is a widely cited statistical analysis technique to find out the association between variables (Hair et al., 2013). Smart PLS software was used because the study adopted partial least squares (PLS) method to test hypothesis. To carry out partial least square's structural equation modeling (PLS-SEM), Smart PLS is an easy but effective software (Hair et al. 2014).

4. Findings

4.1 Demographics

Table 2 exhibits the demographic characteristics of respondents. A vast majority of the respondents (61%) were male followed by 39% female. Currently, FBS consists of nine departments. Students of all departments participated in this research work. The overwhelming majority of the respondents (26%) were from banking and insurance department followed by

15% from management and information system, 13% from marketing, 11% from accounting and information system, 5% from tourism and hospitality management, 7% from international business, and 3% from organizational strategy and leadership department. The income range of a large number of respondents (26%) was from BDT 2000 to BDT 5000. In terms of sources of income, majority of the participants' (49%) income source was tuition. Freelancing and inheritance from family also symbolizes important earning sources for some. Interestingly, some of the business students who have entered into the job market immediately after completion of their BBA and MBA degrees chose the full time jobs as their source of earning. Additionally, 35% respondents specified that they mostly save money for addressing educational expenditures, whereas many of them are saving for bearing their future wedding expenses. Saving money for future investment purposes is also prominently familiar among the students.

Table 2: Socio-demographic profile of respondents

Description	Frequency	Percentage
Gender		
Male	103	61
Female	67	39
Department		
Management	26	15
Accounting and information system	19	11
Marketing	22	13
Finance	17	10
Banking and Insurance	44	26
Management information system	16	10
Tourism and Hospitality Management	9	5
International Business	12	7
Organizational strategy and leadership	5	3
Income		
BDT 0-2000	22	13
BDT 2001-5000	44	26
BDT 5001-1000	32	19
BDT 10001-20000	34	20
More than BDT 20000	38	22
Source of Income		

Tuition	85	49
Freelancing	46	26
Inheritance	18	10
Investment	16	9
Working Full Time	21	12
Working part time	18	10
Others	3	3
Purpose of savings	65	38
Meeting educational expense	52	35
Investment	28	16
Entertainment	10	6
Marriage	35	20
Start-up business	14	5
Others	65	38

Source: Authors' Survey

4.2 Measurement model

As suggested by Bell et al., (2018), measuring reliability and validity is crucial prior to testing hypotheses. In response, Cronbach's alpha was calculated and assessed to measure reliability and so was composite reliability. In exploratory research (Saunders et al., 2009), the value of Cornbach's alpha and composite reliability on a range of 0.60-0.70 is acceptable. The table 3 exhibits that the Cronbach's alpha and composite reliability values are more than 0.755. These values are higher than the recommended values, and therefore, the constructs of the research work are reliable to generate results.

Table 3: The measurement model

Descriptions	Cronbach's Alpha	Composite reliability	AVE
Financial attitude (FA)	0.822	0.878	0.603
Financial well-being(FW)	0.836	0.890	0.636
Financial literacy (FL)	0.897	0.924	0.709
Materialism (M)	0.755	0.786	0.605
Savings (S)	0.835	0.880	0.809

Source: Authors' Survey

Convergent and discriminant validity were adopted to assess the validity. Average variance extracted (AVE) is a statistical term closely associated with convergent validity because at a particular value of 0.50, AVE is acceptable. And 0.50 item loading (Hair, 2015) is adequate to measure the validity. Table 5 exhibits the AVE and table 6 shows the item loading. The item loading ranged from 0.704 to 0.926, and AVE ranged from 0.603 to 0.809 indicating that both sets of values are adequate to satisfy the recommended value. As a result, the study meets the criteria of convergent validity.

Table 4: Correlation matrix and square root of average

	Financial attitude	**Financial well-being**	**Financial literacy**	**Materialism**	**Savings**
Financial attitude	**0.777**				
Financial knowledge	0.671	**0.798**			
Financial literacy	0.621	0.634	**0.842**		
Materialism	0.728	0.671	0.671	**0.711**	
Savings	0.620	0.633	0.632	0.842	**0.842**

Source: Authors' Survey

The square root of the AVE was estimated to measure discriminant validity and so was used the cross-loading matrix. As recommended by Hair (2015), discriminant validity requires to be higher value of square root of AVE than correlation with other constructs.

4.3 Structural Equation Modeling

With an aim of identifying the path relationship among the constructs of the research model, the study adopted structural model. Hypothesis testing was triggered by bootstrap method. Using t-statistics and path coefficient (β), the relationship between exogenous and endogenous was tested. The study revealed that financial attitude (t=2.955, β=0.003), financial well-being (t=3.376, β=0.094) had a positive impact of financial literacy and financial literacy had a negative impact on materialism (t=3.565, β=0.095), but financial literacy has a positive impact on savings (t=2.662, β=0.054). Therefore, H1, H2 and H4 were accepted and H3 and H5 were rejected (Figure 2) and (Table 5).

Table 5: Cross loading matrix

	Financial attitude	Financial well-being	Financial literacy	Materialism	Savings
FA1	0.732				
FA2	0.849				
FA3	0.867				
FA4	0.914				
FA5	0.726				
FW1		0.864			
FW2		0.886			
FW3		0.893			
FW4		0.866			
FW5		0.884			
FL1			0.800		
FL2			0.822		
FL3			0.889		
FL4			0.861		
FL5			0.836		
M1				0.926	
M2				0.872	
M3				0.804	
M4				0.704	
M5				0.902	
S1					0.801
S2					0.819
S3					0.888
S4					0.861
S5					0.839

Figure 2: Findings of SEM model

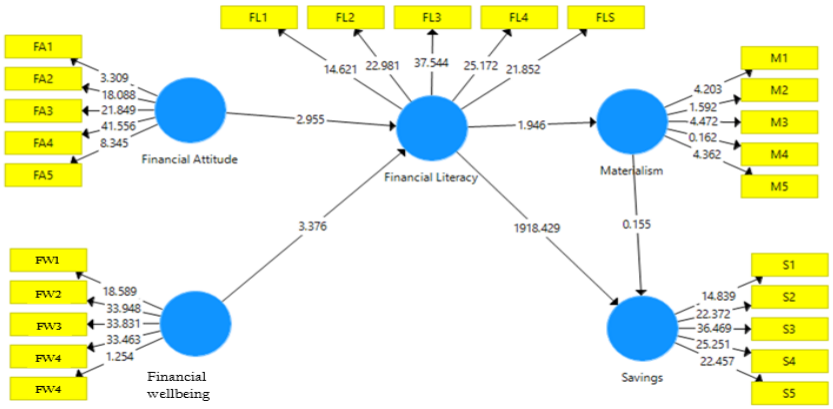


Table 6: Structural model

Hypothesis	Path	Beta	T	P	Comment
H1	Financial attitude>Financial Literacy	0.066	2.955	0.003	**Accepted**
H2	Financial well-being>Financial literacy	0.094	3.376	0.001	**Accepted**
H3	Financial literacy> Materialism	0.056	1.946	0.052	**Rejected**
H4	Financial Literacy> Savings	0.095	3.565	0.000	**Accepted**
H5	Materialism>Savings	0.054	2.662	0.877	**Rejected**

5. Discussion

The study is one of the first to test the effects that financial literacy and materialism would have on savings decision of business students. According to the results of the study, financial attitude has a positive impact on financial literacy. More specifically, the study found a statistically significant association between financial attitude and financial literacy. Similarly, there is a positive relationship between financial well-being and financial literacy. The result is consistent with past empirical studies (e.g. Mandell & Klein, 2009; Pangestu & Karandi, 2020). The authors claimed that financial attitude positively influences financial literacy because individual perceiving a

positive attitude towards financial literacy is very likely to learn key methods and techniques of financial decision. This does not only enhance their financial literacy but also expand their outlook to address key financial requirements. Again, an increase in financial well-being contributes to better devising future financial goals, and devise actions to address key financial commitments of individual (Remund, 2010; Ibrahim et al., 2010).

The study revealed that financial literacy has no association with materialism. This is inconsistent with previous studies (e.g. Mahdzan & Tabiani, 2013). Financial literacy enables an individual to apply the right financial tools for the right time. Therefore, it contributes to reducing the tendency to acquire unnecessary items. This also helps take control over the propensity to prioritize the material aspects of life. So, financial literacy is a good way to take control over the negative effects of materialism.

The study found positive association between financial literacy and savings but materialism has no impact on savings decision. These results are consistent with previous empirical research work. A study by Pangestu & Karandi, (2020) found that financial literacy creates self-awareness among individual to set realistic financial goals and save money to reach the goal. As a result, financial literacy encourages to save more money and to be more efficient in financial well-being. Moreover, materialism, according to Potrich et al., (2015), increases the tendency to purchase material assets. Thus, it leads to consume more than to save. However, the study found no statistically significant relationship between materialism and savings decision.

6. Conclusion and Recommendation

The theoretical model of the study contributes to the existing field of financial literature by showing the roadmap of the impact of several key determinants on financial behavior for savings. The main aim of this study was to examine how financial literacy and materialism affect the savings tendency of business students. The results from the SEM analysis depicted that positive financial attitude plays a vital role to construct a robust level of financial literacy. At the same vein, financial well-being also positively affects students' financial literacy. The unearthing of the study's core result manifests that higher financial literacy tends to increase savings tendency whereas materialism and savings behavior have negative interrelations. This further indicates that financial literacy acts for formulating key grounds of financial decision making and makes the students highly committed towards savings alike financial behaviors.

The study sketches out a great deal of illustrations for the students from business background, educators as well as policy makers of related fields. Students can instill more effective financial decision making behavior by leveraging the key results of this study. The study recommends that business students must perceive a positive attitude towards financial literacy along with possessing strong knowledge of their financial well-being. Such sorts of attitudes can be developed by participating in workshops, seminars, conferences on relevant backgrounds, class discussions and other career development activities organized by their educational institute. Furthermore, authorities and educators of University of Dhaka should devise action plans to reconcile theory into practice by improvising the curriculum and relevant course-works. Such attempts may enable students to apply relevant financial tools and techniques to effectuate their short, medium and long term financial goals. This is how the policy makers and teachers may concoct specific steps to enhance financially literate learners' aptitude to undertake burgeoning financial behaviors as well as to address the negative impacts of materialism.

The study contains several limitations. Only the students of FBS, University of Dhaka were included in this research project, and therefore, it is not worthy to generalize the research results for all. There are more windows open for further research on this content regardless of academic background, institution and region. As this study is cross-sectional, there are opportunities left to conduct longitudinal research collecting data over several phases.

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Factors Responsible for the Growth of Small and Medium Enterprises in Bangladesh: Evidence from a Survey

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Abstract: This paper empirically revisits the factors that drive the growth of the SMEs of Bangladesh using the data from 133 firm-level observations collected through cross-sectional survey in Dhaka, Gazipur, Narayangonj, Munshiganj, Mymensingh, Bogra, Jessor and Rajshahi (2018-2019). The study reveals that young entrepreneurs with prior related business experiences associated with proper educational qualification and having family involvement have achieved high capital growth in their business. The study further shows that the entrepreneurs engaged in manufacturing of boutique and fashion, handicrafts business have achieved high and superior capital growth in their business relative to the entrepreneurs engaged in engineering, steel and metal, foods, and other businesses. The impact of family involvement in the business seems to be statistically significant as evidenced by Chi square. The likelihood ratio test and Pseudo R-Square show the model fits the data well as compared to the null hypothesis and the drivers have influence on the movement of the outcome response variable. It can be said that with the passage of time, with increased support from financial intermediaries and training facilities from BDS, some of the drivers for capital growth have changed and some remain unchanged as it was found by Imam, Khan and Siddiqua (2011).

Keywords: SMEs; capital growth; revisit; ordered logit model; drivers

1. Introduction

This paper empirically investigates factors responsible for the growth of Small and Medium Enterprises (SMEs) in Bangladesh with the help of evidences from a survey. In Bangladesh SMEs are associated with the embracement of entrepreneurship where labor force is really cheap and abundant with a constraint of capital security. So SMEs play a crucial role in eradication of unemployment problem, poverty reduction and overall gross

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domestic product and can be treated as an alternative 'driving force' of economic growth.

This paper mainly tried to focus on identifying and qualifying the factors that pointedly and actively drives the growth of SMEs. Thus this paper will help to understand the key factors that mainly drive up the growth and development of SMEs in Bangladesh. The result can contribute in specifying which factors are key or driver for the growth of firms and it can also help respective authorities to propose whether any policy standards can be aimed at any specific business segments and at firms that possess explicit growth characteristics.

SMEs can be regarded as the heart of the economy of Bangladesh being a developing country. They are covering the largest portion of business in the economy, contributing significantly and directly in employment generation and resource utilization as they are employing 87% (JBCCI, 2019) of civilian population. They also ensure proper allocation of resources of a country. At present, they account for 22% (JBCCI, 2019) of total GDP of Bangladesh, whereas it stands at 80% (JBCCI, 2019) in India, 60% (JBCCI, 2019) in China and around 70% (JBCCI, 2019) in Japan. The sector accounts for around 36% (JBCCI, 2019) of the total employment in Bangladesh. Being conscious of its vital role in the economy, the government of Bangladesh are providing noteworthy importance to SMEs. In Bangladesh, more than 99% (JBCCI, 2019) of private sector industrial establishments are done by SMEs and it created job opportunities for 70%–80% of the nonagricultural labor force ((IMF) Country Report (2012)[1]). So, SMEs are the one of the most important segments of Bangladesh-economy as in the world and are getting the highest priority from policy makers due to their already proven multi-dimensional contribution to the socioeconomic environment of a country.

At present SME sector in Bangladesh is facing a lot of problems due to lack of policy initiatives that support heavily this sector for financial access (capital accumulation and formation) as well as motivating entrepreneurs, developing their skills and nurturing their capacities. Bangladesh government and SME Foundation are trying to develop this sector through different policy measures even though the rate of development is not up to expectations. So it is very important to identify such SME related business segments, the factors as well as skills that are likely to influence their behavior. With these rationale, the objectives of this paper are:

- To identify the factors that drives the performance and growth of SMEs in Bangladesh.
- To evaluate the contribution of those identified driving factors on the performance and growth of SMEs in Bangladesh as found by Imam. Khan and Siddiqua in 2011.
- To find out if area and time changes, whether the driving factors will have a policy implication for Government policy makers and even for financial institutions to set their rules and regulations to ensure access to finance by SMEs or not.

Based on database of 39 firm-level observations from Dhaka, Rajshahi and Bogra, Imam, Khan and Siddiqua (2011), found that young entrepreneurs having related experiences were more successful in achieving higher growth and that there existed a positive association between light-engineering business segment and growth of enterprise especially when the segment was in manufacturing sector and it was relevant for those entrepreneurs having related business experiences. These findings would have a policy implication for financial institutions in developing their successful lending strategy for SMEs and targeting those SME sectors that are potential for growth. So this policy implication influenced us to revisit Imam, Khan and Siddiqua (2011) paper and find out whether changes in the time period and area-coverage has influenced those factors that are responsible for growth of SMEs or not changing the area of observations from Dhaka, Rajshahi and Bogra to Dhaka, Gazipur, Narayangonj, Munshiganj, Mymensingh, Bogra, Jessor and Rajshahi and changing the time frame from 2008-2009 to the period of 2018-2019.

2. Literature Review

Two groups of studies on the business performance of SMEs focus on personality and the organizational aspect. According to Sarwoko (2013), the aspects of personality include individual characteristics, demography, and entrepreneurial competencies that will determine the strategy on the performance of SMEs (Sarwoko, 2014). While the study of organizational aspects includes the institutional competences, the resources of the organization, organizational culture, and structure. Morrison, Breen and Shameen, (2003), suggested an outline for identification of growth factors along with their characteristics for SMEs and found that human factor is the most devastating force that determines whether a business will grow or not, and suggested that small business growth is based on clear, positively

motivated business intentions and actions on the part of the owner-manager, assisted by factors associated with the ability of the specific business to grow and its opportunity for growth. These factors can be classified in three broad categories include ability, intentions and opportunities. (Morrison et al, 2003: 418). These findings show the importance of the individual factors as determinants of the growth of SMEs.

Individual, organizational, and environmental factors determine the growth of small businesses: (Zhou and Wit, 2002), organizational resources and competencies: culture and structure (Covin & Slevin, 1991), individual competencies in the entrepreneurial process (Li, 2009), characteristics of the owners'/managers' and strategies along with entrepreneurial competencies (Sarwoko (2013); Nimalathasam (2008); Pasanan (2007); Kor, 2003) all are identified as growth factors. Typically, the concept of growth for the small business sector can be directed by macroeconomic, industry and firm-specific factors including the effect of policy measures (Dockel and Lightelm, 2002). But at the same time Wennekers and Thurik (1999) suggested that the conditions of firms during their startup period were considered to be different so the success of these small firms is required to be viewed differently.

According to Freel (2002) and Berry et al (2002), descriptive works attempting only to enumerate frequencies using "what" - "how many" types of questions neglecting the "why" - "how" questions, and therefore fail to explain the process that actually leads to growth. In the matter of empirical model developing issues two types of data: longitudinal studies using time series data and cross sectional analysis using panel data are used. The longitudinal research is capable of overcoming the specific criticisms raised by Freel or Berry. However, as Ligthelm (2002) observed in contrast, that the cross-sectional survery is more refined survey and ask questions beyond "what" - "how many" types of equerries, and it also shows the reaction of firms over specified short time span (Tustin, 2001: 143-172) and he justified it on the ground that every firm has a unique history with some common drivers of growth (Ligthelm (2004)).

The review of literature showed that business venture success is largely contributed by human capital covering age, academic and family background, work history and support networks (Hisrich, 1990; Krueger, 1993) though they might have both positive and negative result. Robinson and Sexton, (1994) Wijewardena, et al. (2008) found that personality traits of entrepreneurs' have impact on organizational performance.

The qualifications and managerial aptitudes of the top management team have been considered as key factors for SME growth in several studies. According to Sidika, I. (2012); Olawale and Garwe (2010); Singh et al. (2008); Pasanen (2007), management capacities can be defined as a sets of knowledge, expertise, and competencies that can make the small firm more efficient and are necessary for survival and achievement of growth. Aylin et al. (2013) identified the lack of management skills as a barrier to growth and also stated that it can be one of the factors that can lead to failure which is supported by the findings of Bhide (1996).

Skilled and well-educated workforce is identified as one of the determinants of growth factor for SMEs (Hewitt and Wield (1992)). Lee (2001); Chandler and McEvoy (2000) advocated that capacities of human-capital form one of the most significant areas for the success of SMEs which reciprocally improves employee skills and motivates them, and that ultimately result in improving the productivity and long term sustainability of small firms. Similarly, it is being suggested that a learnt and expert workforce has more learning and innovative abilities (Batra and Tan (2003)).

There have been many empirical studies all over the world in order to find out the factors those measures the growth of SMEs. Different variables like turnover, profit and growth have been used as a measure to success of SMEs by Everett and Watson (1998); Lussier and Pfeifer (2001). Raduan et.al (2006) used binary logistic regression technique in their attempt to predict growth level as a binary response variable and tried to examine the relationship between the single dependent variable, venture growth (VG), which in their study was dichotomous and several independent variables. In their study, Human capital has been measured and decomposed into four variables that include ‘education level’, ‘working experience prior owning business’, ‘management experience prior to owning business’, and ‘parents own business’.

It is to be noted carefully that lack of access to external financing is treated as one of the other major challenges to the growth of SME and it has caused high rates of failure among those SMEs. Most of the financial institutions behave more vigilantly while providing loans to SMEs, and usually charges comparatively higher interest with high collateral requirement and loan guarantees (Shah et al. 2013). Krasniqi (2007) also found that complex loan policies and collateral requirements discourage small firms from getting financing from banks. Irrespective of being in developing and developed countries, small firms have less access to external financing that

forces small firms to be more self-restrained in their operations and growth in comparison to large firms (Berger and Udell (1998); Galindo and Schantiarelli (2003); Beck et al. (2005)). Chowdhury, M. and Alam, Z. (2017) used primary data from 172 owners and managers of 86 SMEs of Chattogram division and investigate the factors that create hurdles for SMEs in getting loans from financial institutions of Bangladesh. The outcome of the research showed that firms' characteristics, owners' characteristics and financial characteristics together have a significant positive correlation with the access to finance by SMEs. This finding specially pointed out that high rates of interest, noncompliance with collateral requirements, lack of education and skill of owners, limited size and age of the firms are the top ranking hurdles depriving the SMEs from getting loans from financial institutions in Bangladesh.

The training need for business development services skills such as, business plan preparation and marketing products and services, would enable entrepreneurs to enhance their ability to take their firms on the road of making the success of the enterprises that are potential for growth. The findings of identified factors/ drivers responsible for growth help financial institutions develop successful lending strategy to focus on those SMEs, that show high potential for growth rather than on the SME as a whole. Financial Institutions would be able to ensure lending strategy to be successful if they can tag their lending policy to the requirement for or provision of business development services and skills according to the relevant empirical studies.

After searching and analyzing for relevant literature on studies that covered factors influencing growth of Bangladeshi SMEs, it has been found that most of the studies covered only the prospect and challenges faced by SMEs in the path of growth, some covered characteristics of entrepreneurs and the characteristics of firms on the success of SMEs in Bangladesh. In a study Bosri, R. (2016) shows that in Bangladesh SMEs have a significant contribution to GDP and the achievement rate of SME financing is very high. The study further reveals that due to information asymmetry and granularity, excessive financing costs, underdeveloped legal framework, disbursement of SME loans is low in Bangladesh. Ahmed, M. and Chowdhury, T.A. (2009), showed that undersupply of raw materials, poor infrastructure development, denial from bank loans due to noncompliance with collateral requirements, lack of entrepreneurial skills, and undue bureaucracy are top ranking constraints of SME growth in Bangladesh. They suggested to activate the government supports in supply chain management, entrepreneurial skill

development, appropriate legal framework, initiation of a credible certification authority for product quality evaluation to foster the SME growth in Bangladesh.

By using a structured survey instrument covering primary data from 195 entrepreneurs of Khulna division, Bose, T.K. and Uddin, M.R.U. (2013) articulated that business plan, government support, management skill and channel of distribution have a strong positive correlation, customer management, access to capital, and technology have slight positive correlation and personnel, product and service have a negative correlation with the success of SMEs in Bangladesh.

Very few, to the best of knowledge, researchers studied the impact of drivers like age of the entrepreneurs, related business experience, education, involvement of family, training etc. like Imam, Khan and Siddiqua (2011) on the growth of SMEs in Bangladesh. Rather Islam, M. A., Khan, M. A., Obaidullah, A. Z. M., and Alam, M. S. (2011) used primary data from 89 managers of SMEs located in Dhaka, Chattogram, Khulna and Narayangonj and showed that characteristics of entrepreneurs have a significant impact on SME success whereas the impact of characteristics of firms on SME success is statistically insignificant and together they explain 21.3 percent variations in the success of SMEs. The study interestingly reveals that the duration of organization and entrepreneurs' gender play a significant role in the success of SMEs in Bangladesh.

From the above literature review, it can be concluded that the growth of SMEs is can be measured by a range of both internal and external factors, personal and organizational factors, macro and micro factors. Though there is a lacking of clear and strong understanding or any specific theory as to whether an SME will sustain, grow, succeed, or fail. Rather, it has been evident towards a complicated set of interrelated factors that affect small business growth.

3. Methodology

3.1 Data

To accomplish the research objectives, this article tried to identify the business dynamics of SMEs of Bangladesh. Hereby, both numerical data and non-numerical data through questionnaire survey on a few SMEs of Bangladesh have been collected. The questionnaire contains personal traits, enterprise information, information on business skills and related business experience, equity and loan and their sources, risk perception of entrepreneur,

and training need. This primary data was collected from the entrepreneurs who participated in the "SME Fair 2018" and "SME Fair 2019" and they were chosen through convenient random sampling.

The database contains over 140 firm level observations collected in cross-sectional surveys in different areas of the country, i.e. Dhaka, Gazipur, Narayangonj, Munshiganj, Mymensingh, Bogra, Jessore and Rajshahi. Finally, the sample is restricted to 133 in total because of relevant missing data of 7 enterprises. The present dataset includes firms across sectors, namely manufacturing, services and trading and business segments as well.

3.2 Variables to be considered for Analysis

For conducting analysis by using 133 firm-level observations of SMEs, Ordered Logistic Regression model has been used. Here, dependent and different independent variables are used to run the regression model.

3.2.1 Dependent Variable

The dependent variable of this model is the 'Capital Growth' which means the growth of the SME based on capital from the initial capital. Due to the information constraints, the compounded annual capital growth or the geometrical capital growth could not have found. So the simple average mean of the capital growth has been considered here to run the Ordered Logit model. Capital Growth was categorized into 4 categories (Imam, Khan and Siddiqua (2011)):

- Category 1: Low growth <= 2
- Category 2: Moderate growth <= 10
- Category 3: High growth <= 99
- Category 4: Superior growth > 99

3.2.2 Independent Variables

For conducting analysis using Ordered Logistic Regression model in STATA, 9 independent variables have been used following Imam, khan and Siddiqua (2011). These are:

- ***Proprietor's Age***

  Entrepreneurs have been categorized into 3 categories based on their ages.

- ***Related Experiences***

  Entrepreneurs have been categorized into 2 categories based on their related experiences.

- ***Educational Qualifications***

  Entrepreneurs have been categorized into 2 categories based on their educational qualifications.

- ***Family Involvement***

  Entrepreneurs have been categorized into 2 categories based on their family involvement.

- ***Risk Perception***

  Entrepreneurs have been categorized into 2 categories based on risk perception.

- ***Entrepreneurial Drive***

  Entrepreneurs have been categorized into 2 categories based on their entrepreneurial drive.

- ***Business Type***

  Entrepreneurs and the observations have been categorized into 3 categories based on their type of the business.

- ***Business Nature***

  Entrepreneurs and the observations have been categorized into 5 categories based on their nature of the business.

- ***Capital Sources***

  Observations have been categorized into 3 categories based on their sources of funds.

3.3 Econometric Model

Inductive approach requires real observations through real data collections which is done through the survey. An analytical approach to compare the growth factors of SMEs to measure their impacts is required here to conduct the research. Therefore, inductive approach is appropriate for this research. And, to analyze these data found from the survey and through the secondary sources, mainly it requires to test how these factors affect the growth of SMEs. So, these data were measured on various parameters like capital/equity growth and cross tabulation.

Due to the information constraints, instead of compounded annualized capital growth of the firm, the simple average mean of the capital growth has been considered to be the capital growth in order to nullify the effect of distribution. In order to identify firm's characteristics, entrepreneurial traits and factors that influence the capital growth of the enterprise, the technique of

cross-tabulation has been employed. The Chi-square test statistics are used to test the association of the factors with the growth of enterprises.

Ordered logit regression (explained in Endnote 1) allows us to model the dependence of a polytomous ordinal response on a set of predictors. The basic form of an ordered logit is shown in the following equation:

Ordered logit equation:

$$(\gamma \quad \gamma ij) = \theta j - \{\beta 1 Xi1 + \beta 2 Xi2 + \cdots + \beta p Xij\}$$

Where, Ordered Logit is the logit function

γij is the cumulative probability of the *j*-th category for the *i*-th case

θj is the threshold for the j-th category

p is the number of regression coefficients

X_{i1}…..X_{ip} are the values of the predictors for the *i*-th case

b_1....b_p are the regression coefficient

4. Findings of the Research

4.1 Impact of Age and Related Business Experience on Growth

Empirically it has been proved that young entrepreneurs are apt to attain higher capital growth. Table A1 (presented in Appendix) presents the cross tabulation of capital growth and age of entrepreneurs implying that the young entrepreneurs have attained high growth of their SMEs relative to matured and old entrepreneurs. The directional relationship between capital growth of entrepreneurs and age of entrepreneurs turned out to be inverse and statistically significant at 5% level of significance as evidenced by Chi square. This can be because young entrepreneurs usually are more prone to take challenges and assume more risks relative to others. Among all the young entrepreneurs, 31.5 percent attained moderate and high growth in their enterprises.

It is said that entrepreneurs with prior related business experience achieve high growth in their SME enterprises. Table A2 (Appendix) displays the cross tabulation of capital growth and related business experience of entrepreneurs and found to be statistically significant at 5% level of significance and out of all the entrepreneurs who have related business experience, 35.29 percent attained high and superior growth in their enterprises.

In another cross tabulation, the effect of related business experience of entrepreneurs has been separated out to show the impact of age of entrepreneurs on capital growth. Table 4.1 presents the cross tabulation of capital growth and age of entrepreneurs while controlling for related business experience of entrepreneurs.

Table 4.1: Cross Tabulation of Capital Growth vs. Age after Controlling for Related Business Experience

Related Experience	Capital Growth	Age of Entrepreneurs			Total
		Young	Matured	Old	
Not Experienced	Low	63	0	0	63
	Moderate	2	0	0	2
	High	0	0	0	0
	Superior	0	0	0	0
	Total	**65**	**0**	**0**	**65**
Experienced	Low	24	0	0	24
	Moderate	20	0	0	20
	High	18	1	1	20
	Superior	0	1	3	4
	Total	**62**	**2**	**4**	**68**

Source: Authors' Own Calculation

Table 4.1 depicts that the young entrepreneurs with prior related business experience have achieved high capital growth in their business relative to young entrepreneurs with no prior related business experience. It reveals that out of all the young entrepreneurs with prior related business experience, 29.03 percent attained high growth. This finding is statistically significant at 5% level of confidence as evidenced by Chi square indicating close association of capital growth vs. age and related business experience of entrepreneurs.

4.2 Impact of Educational Qualification on Growth

Educated entrepreneurs usually have greater knowledge to sense the market trend and prone to grab the market opportunity. Table A3 (Appendix) presents the cross tabulation of capital growth and educational qualification of entrepreneurs indicating that the educated entrepreneurs (28.24 percent) have

attained high and superior growth of their SME enterprisers relative to the entrepreneurs with no academic qualification.

In Table 4.2, age of entrepreneurs has been separated out to show the impact of educational qualification of entrepreneurs on capital growth while controlling for age of entrepreneurs.

Table 4.2: Cross Tabulation of Capital Growth vs. Educational Qualification after Controlling for Age

Age of Entrepreneurs	Capital Growth	Educational Qualification		Total
		Not Educated	Educated	
	Low	47	40	87
	Moderate	1	21	22
Young	High	0	18	18
	Superior	0	0	0
	Total	**48**	**79**	**127**
	Low	0	0	0
	Moderate	0	0	0
Matured	High	0	1	1
	Superior	0	1	1
	Total	**0**	**2**	**2**
	Low	0	0	0
	Moderate	0	0	0
Old	High	0	1	1
	Superior	0	3	3
	Total	**0**	**4**	**4**

Source: Authors' Own Calculation

Table 4.2 depicts that educated young entrepreneurs (22.78 percent) have achieved high capital growth in their business relative to uneducated young entrepreneurs. It justifies the inference regarding capital growth, educational qualification and age of entrepreneurs. This indicates that educational qualification of entrepreneurs has profound and significant impact on the capital growth of the entrepreneurs.

4.3 Impact of Risk Perception on Growth

Empirically it has been shown that entrepreneurs having high risk perception can achieve high and superior growth in their SME enterprises as they can grab the market opportunity ahead of others. Table A4 (Appendix) depicts that high-risk taker entrepreneurs (31.17 percent) achieve high and superior capital growth relative to entrepreneurs who are risk averse and turned out to be statistically significant (5% level).

Table 4.3 of capital growth of entrepreneurs and risk perception of entrepreneurs after controlling for educational qualification of entrepreneurs presents that educated entrepreneurs who have risk taking ability have attained high and superior growth (36.36 percent) in their SME enterprises relative to uneducated entrepreneurs who have risk taking ability. It turned out to be significant at 5% level of confidence and justifies the inference regarding capital growth, educational qualification and risk perception of entrepreneurs.

Table 4.3: Cross Tabulation of Capital Growth vs. Risk Perception after Controlling for Educational Qualification

Educational Qualification	Capital Growth	Risk Perception		Total
		No Perception	Have Perception	
Not Educated	Low	37	10	47
	Moderate	0	1	1
	High	0	0	0
	Superior	0	0	0
	Total	**37**	**11**	**48**
Educated	Low	18	22	40
	Moderate	1	20	21
	High	0	20	20
	Superior	0	4	4
	Total	**19**	**66**	**85**

Source: Authors' Own Calculation

4.4 Impact of Business Nature on Growth

In Bangladesh, entrepreneurs of boutique and fashion businesses can ensure high and superior capital growth (25.64 percent) relative to entrepreneurs of other businesses as depicted by the cross tabulation of capital growth of entrepreneurs and business nature of the entrepreneurs.

Table 4.4: Cross Tabulation of Capital Growth vs. Business Nature of Entrepreneurs

	Business Nature					
Capital Growth	**Boutique & Fashion**	**Engineering, Steel & Metal**	**Foods**	**Handicrafts**	**Others**	**Total**
Low	23	11	6	38	9	87
Moderate	6	7	1	5	3	22
High	8	1	1	9	1	20
Superior	2	1	0	1	0	4
Total	**39**	**20**	**8**	**53**	**13**	**133**

Source: Authors' Own Calculation

4.5 Impact of Business Type on Growth

Entrepreneurs engaged in manufacturing activities achieved high and superior capital growth (21.15 percent) relative to entrepreneurs engaged in service or trading activities as depicted by the cross tabulation of capital growth of entrepreneurs and business type of the entrepreneurs (Table A5 in Appendix).

Table 4.5 presents the cross tabulation of capital growth and types of business after controlling for nature of business of entrepreneurs. It depicts that the entrepreneurs engaged in manufacturing of boutique and fashion business have achieved high and superior capital growth in their business relative to the entrepreneurs engaged in manufacturing of engineering, steel and metal, foods, handicrafts and other business. Among all the entrepreneurs engaged in manufacturing of boutique and fashion business, 27.03 percent attained high and superior growth and it was statistically significant.

Table 4.5: Cross Tabulation of Capital Growth vs. Types of Business after Controlling for Nature of Business

Nature of Business	Capital Growth	Types of Business			Total
		Manufact-uring	Service	Trading	
Boutique & Fashion	Low	21	0	2	23
	Moderate	6	0	0	6
	High	8	0	0	8
	Superior	2	0	0	2
	Total	**37**	**0**	**2**	**39**
Engineering, Steel & Metal	Low	1	2	8	11
	Moderate	2	3	2	7
	High	0	0	1	1
	Superior	1	0	0	1
	Total	**4**	**5**	**11**	**20**
Foods	Low	6	0	0	6
	Moderate	1	0	0	3
	High	1	0	0	1
	Superior	0	0	0	0
	Total	**8**	**0**	**0**	**8**
Handicrafts	Low	37	0	1	38
	Moderate	5	0	0	5
	High	9	0	0	9
	Superior	1	0	0	1
	Total	**52**	**0**	**1**	**53**
Others	Low	3	0	6	9
	Moderate	0	0	3	3
	High	0	0	1	1
	Superior	0	0	0	0
	Total	**3**	**0**	**10**	**13**

Source: Authors' Own Calculation

4.6 Impact of Sources of Capital on Growth

Though financing of SMEs once was largely backed by personal and family savings, the private banks and non-bank financial institutions are now the prominent players of loan disbursement in this sector. Due to the absence of the SME business succession, lack of adequate security, problems in documentation and accounting, inability to bear risks, the authority's non-cooperation and timekeeping to provide necessary documents to run the business etc. restrict them from extending loan to this sector. Table 4.6 presents the cross tabulation of capital growth and source of capital of entrepreneurs implying that the entrepreneurs mostly finance their enterprises with own capital (18.52 percent) have attained high and superior growth of their SME enterprises.

Table 4.6: Cross Tabulation of Capital Growth vs. Source of Capital

Capital Growth	Source of Capital			Total
	Loan	Both	Own	
Low	5	9	73	87
Moderate	1	6	15	22
High	1	2	17	20
Superior	1	0	3	4
Total	**8**	**17**	**108**	**133**

Source: Authors' Own Calculation

4.7 Impact of Access to Credit on Growth

Entrepreneurs have limited access to credit for their poor collateral, accounting and lack of business succession. Table 4.7 presents the cross tabulation of capital growth and access to credit of the entrepreneurs, showing that there is no pattern of access to credit of entrepreneurs on growth (statistically significant at 5% level of significance). Out of all the entrepreneurs who have access to credit, 32 percent achieved high and superior growth in their SME enterprises.

Table 4.7: Cross Tabulation of Capital Growth vs. Access to Credit

Capital Growth	Access to Credit		Total
	No Access	Have Access	
Low	58	29	87
Moderate	0	22	22
High	0	20	20
Superior	0	4	4
Total	**58**	**75**	**133**

Source: Authors' Own Calculation

4.8 Impact of Family Involvement on Growth

Entrepreneurs specially the women entrepreneurs who get their family members involved can experience business succession easily. Table 4.8 depicts the cross tabulation of capital growth and family involvement in the business of entrepreneurs, showing that entrepreneurs whose family members engaged in their business mostly experienced high and superior capital growth (25 percent) and this turned out to be statistically significant as evidenced by Chi-square test at 5% level of confidence.

Table 4.8: Cross Tabulation of Capital Growth vs. Family Involvement

Capital Growth	Family Involvement		Total
	No Family Involvement	Have Family Involvement	
Low	50	37	87
Moderate	2	20	22
High	5	15	20
Superior	0	4	4
Total	**57**	**76**	**133**

Source: Authors' Own Calculation

4.9 Analysis of Results of Ordered Logit Model:

The dependent variable used in the Ordered Logit Model is the capital growth of SMEs that has nine independent variables. The objective here is to measure the influence of the drivers (independent variables) upon the polytomous response; capital growth of SMEs. The whole result of the Ordered Logit Model is attached in the appendix portion. The likelihood ratio test of Chi

square is 278.5 that indicates that the model fits the data well as compared to the null.

Pseudo R-Square is 0.2292 that indicates that all the drivers taken together explain 22.92% of the outcome response variable (significant at 5% level of confidence). The sign of the coefficients is dependent upon the factor's level effect relative to the reference category. For example, the coefficient between age of entrepreneurs and capital growth is 0.2226. Here, it can be said that for one unit increase in age, we expect a 0.2226 increase in the log odds of being in a higher level of capital growth of the entrepreneurs assuming all other variables constant in the model.

Number of Observations	133
LR Chi2	278.5
Pseudo R-Square	0.2292
Level of Significance at 5%	Significant

Same explanation fits in case of coefficient between the related business experience of entrepreneurs and capital growth which is 2.2184. This implies that for one unit increase in experience (i.e., going from 0 to 1), we expect a 2.2184 increase in the log odds of being in a higher level of capital growth of the entrepreneurs assuming all other variables constant in the model.

The result of the study surprisingly violates the theoretical notion of SMEs growth factors. The independent variables like related business experience of entrepreneurs, age of entrepreneurs, nature of business, business type, training, access to credit, skilled manpower, educational qualification, marketing competence, family involvement, risk perception, capital source; are generally considered to have profound influence on the capital growth of SMEs, but have little influence if taken together on the capital growth of SMEs as evidenced by Pseudo R-Square. This opens up the scope of further study to reveal the factors responsible for the growth of SMEs from Bangladesh perspective. One of the main objectives of this study is to compare the driving factors responsible for the growth of SMEs of Bangladesh in 2019 with the factors responsible for the growth of SMEs of Bangladesh in 2009 revealed by the study conducted by Imam, Khan and Siddiqua (2011). Both the studies show almost similar results identifying the key factors responsible for the growth of SMEs in Bangladesh considering the difference in sample size and timeframe of analysis.

5. Need Assessment of SMEs for Growth: Including Skilled Manpower, Training in Relevant Business, Marketing Competencies

5.1 Requirement of Skilled Manpower and Training for Growth

Skilled manpower in entrepreneurial ventures is one of the key factors for success. Table A 6 (Appendix) presents the cross tabulation of capital growth and requirement of skilled manpower for growth in the business of entrepreneurs indicating that entrepreneurs (28.57 percent) who have skilled manpower in their enterprises have attained high and superior capital growth of their SME enterprises.

It is said that entrepreneurs having training in the relevant business area can ensure higher capital growth relative to others. Table A 7 (Appendix) presents the cross tabulation of capital growth and training need for the growth of entrepreneurs. This shows that entrepreneurs who have training in the relevant business area have attained high and superior growth of their SME enterprises (30.38 percent).

Table 5.1 depicts the cross tabulation of capital growth of entrepreneurs and training needs for growth of SMEs of entrepreneurs after controlling for skilled manpower of entrepreneurs in their business which implies that entrepreneurs who have both training in the relevant business area and skilled manpower in the enterprise (32.88 percent) attained high and superior growth in their SME enterprises relative to entrepreneurs who do not have training in the relevant business area and skilled manpower in the enterprise.

Table 5.1: Cross Tabulation of Capital Growth vs. Training Need after Controlling for Skilled Manpower

Skilled Manpower	Capital Growth	Training Need for Growth		Total
		No Training	Have Training	
No Skilled Manpower	Low	43	6	49
	Moderate	0	0	0
	High	0	0	0
	Superior	0	0	0
	Total	**43**	**6**	**49**
Have Skilled Manpower	Low	11	27	38
	Moderate	0	22	25
	High	0	20	20
	Superior	0	4	4
	Total	**11**	**73**	**84**

5.2 Need of Marketing Competencies for Growth

SMEs that can properly market their products can experience high sales growth leading the capital to grow. Table 5.2 presents the cross tabulation of capital growth and need of marketing competence of the entrepreneurs and shows that there is no pattern of marketing competence of entrepreneurs on capital growth.

Table 5.2: Cross Tabulation of Capital Growth vs. Marketing Competence

Capital Growth	Marketing Competence		Total
	No Marketing Competence	Have Marketing Competence	
Low	61	26	87
Moderate	0	22	22
High	0	20	20
Superior	0	4	4
Total	**61**	**72**	**133**

Source: Authors' Own Calculation

The directional relationship between capital growth of entrepreneurs and marketing competence of entrepreneurs turned out to be statistically significant at 5% level of significance as evidenced by Chi square. Among all the entrepreneurs who have marketing competence, 33.33 percent attained high and superior growth.

6. Policy Implication

The study empirically investigated the factors responsible for the growth of Small and Medium Enterprises (SMEs) of Bangladesh. The study revealed that young entrepreneurs with prior related business experiences associated with proper educational qualification and having family involvement have achieved high capital growth in their business This is because young entrepreneurs usually are more prone to take challenges and assume more risks relative to others. The study further shows that the entrepreneurs engaged in manufacturing of boutique and fashion, handicrafts business have achieved high and superior capital growth in their business relative to the entrepreneurs engaged in manufacturing of engineering, steel and metal, foods, and other business. The likelihood ratio test and Pseudo R-Square show

the model fits the data well as compared to the null and the drivers have influence on the movement of the outcome response variable.

Most of the entrepreneurs are not competent enough in marketing their products even through the traditional media of advertisement let alone digital media. Initiating training facility on digital marketing mechanism by the ICT Division of Bangladesh can bring luminous outcome for the SMEs. The SME Foundation needs to make collaboration with the Ministry of Finance and make it realize the gravity of the situation and lead it to pay special consideration while preparing budgets. The SME Foundation seems to be focused much on the manufacturing enterprises while concentrating less on the service enterprises. This can be seen in the participation of SMEs in the SME Fairs 2019 organized by the SME Foundation where most of the SMEs participated engaged in manufacturing activities. So, the SME Foundation needs to include the service providing SMEs in its policy formulation.

There has been constant paucity in the infrastructure development and standardization of legal framework concerning the SMEs in this country. For this, the sector cannot attract the foreign investment up to the expected level. So, there is dire need for supportive trade policy, proper contract implementation, easy settlement of the transactions, effective indirect tax payment for the SMEs. Most importantly, the entrepreneurs need to develop themselves and make them adaptive to the changes in the market trends. As the market is becoming more and more competitive day by day, the entrepreneurs need to pay more attention to the innovation of new products and services that solve the people's problems uniquely. Ensuring adequate skilled manpower in the enterprises through different training mechanism, considering the demand of products internationally, proper management of both monetary and human resources, safeguarding against the risk of product and design imitation, appropriate hedging tactics for uncertainties can foster the SME growth in Bangladesh.

7. Conclusion

The study reveals that the biggest problem SMEs face now is their limited access to credit. Even the SME Foundation; the supreme body of the SME sector of Bangladesh is facing a shortage of funds to disburse among the SMEs. If the easy access to credit by SMEs were possible, the contribution by the SME sector to the sustainable development of the country would be greater. Currently, if the entrepreneurs somehow managed to get SME loan, the interest rate they have to pay in most of the cases is at double digit. So, Bangladesh Bank here got to play a vital role in ensuring that entrepreneurs

through specially focusing the women entrepreneurs are getting adequate financial assistance from the banks. The SME Foundation can guarantee the banks on behalf of the entrepreneurs for the repayment of the loan on due time.

Providing proper training facilities to the entrepreneurs, bringing innovation in products and services, considering the demand of products internationally, safeguarding against the risk of product and design imitation etc. can help the SMEs to experience superior growth and have a greater impact on the sustainable economic development of the country.

Since the study is based on a small sample size of 133 firm level observations so it is one of the constraint of this study. On the other hand it can be treated as an scope for further study in the near future for the researchers and policy makers for a sustainable growth of SMEs in Bangladesh.

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Endnote: 1

The ordered logic model is based on the notion that there is some latent continuous outcome variable, and that the ordinal outcome variable arises from discretizing the underlying continuum into ordered groups that are evenly distributed. The thresholds or constants in the model (corresponding to the intercept in linear regression models) depend only on which category's probability is being predicted. Values of the predictor (driver) variables do not affect this part of the model. The prediction part of the model depends only on the predictors and is independent of the outcome category. These first two properties imply that the results will be a set of parallel lines or planes- one for each category of the outcome variable.

The portion of the equation shown above which includes the coefficients and predictor variables, is called the location component of the model. It uses the predictor variables to calculate predicted probabilities of membership in the categories for each case. The test of parallel lines can help us assess whether the assumption that the parameters are the same for all category is reasonable.

The parameters estimates table summarizes the effect of each predictor. For factors, a factor level with greater coefficient indicates a greater probability of being in one of the "higher" cumulative outcome categories. The sign of a coefficient for a factor level is dependent upon that factor level's effect relative to the reference category.

Appendix

Table A 1: Cross Tabulation of Capital Growth vs. Age of Entrepreneurs

Capital Growth	Age			Total
	Young	Matured	Old	
Low	87	0	0	87
Moderate	22	0	0	22
High	18	1	1	20
Superior	0	1	3	4
Total	**127**	**2**	**4**	**133**

Source: Authors' Own Calculation

Table A 2: Cross Tabulation of Capital Growth vs. Related Business Experience of Entrepreneurs

Capital Growth	Related Experience		Total
	Not Experienced	Experienced	
Low	63	24	87
Moderate	2	20	22
High	0	20	20
Superior	0	4	4
Total	**65**	**68**	**133**

Source: Authors' Own Calculation

Table A 3: Cross Tabulation of Capital Growth vs. Educational Qualification of Entrepreneurs

Capital Growth	Educational Qualification		Total
	Not Educated	Educated	
Low	47	40	87
Moderate	1	21	22
High	0	20	20
Superior	0	4	4
Total	**48**	**85**	**133**

Source: Authors' Own Calculation

Table A 4: Cross Tabulation of Capital Growth vs. Risk Perception of Entrepreneurs

Capital Growth	Risk Perception		Total
	No Perception	Have Perception	
Low	55	32	87
Moderate	1	21	22
High	0	20	20
Superior	0	4	4
Total	**56**	**77**	**133**

Source: Authors' Own Calculation

Table A 5: Cross Tabulation of Capital Growth vs. Business Type of Entrepreneurs

Capital Growth	Business Type			Total
	Manufacturing	Service	Trading	
Low	68	2	17	87
Moderate	14	3	5	22
High	18	0	2	20
Superior	4	0	0	4
Total	**104**	**5**	**24**	**133**

Source: Authors' Own Calculation

Table A 6: Cross Tabulation of Capital Growth vs. Requirement of Skilled Manpower

Capital Growth	Requirement of Skilled Manpower		Total
	No Skilled Manpower	Have Skilled Manpower	
Low	49	38	87
Moderate	0	22	22
High	0	20	10
Superior	0	4	4
Total	**49**	**84**	**133**

Source: Authors' Own Calculation

Table A 7: Cross Tabulation of Capital Growth vs. Training Need for Growth

Capital Growth	Training Need for Growth		Total
	No Training	Have Training	
Low	54	33	87
Moderate	0	22	22
High	0	20	20
Superior	0	4	4
Total	**54**	**79**	**133**

Source: Authors' Own Calculation

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The Impact of Integrated Reporting Disclosure on Financial Performance: Evidence from Listed Firms in Bangladesh

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Abstract: Integrated reporting (IR) is a recent phenomenon in the corporate reporting realm. IR framework connects material information on an organization's strategy, governance, performance, and prospects in a way that reflects the firm's value creation process in a single report. The aim of this study is to investigate the impact of integrated reporting (IR) disclosure on the financial performance of the listed financial organizations (banks and NBFI) in Bangladesh. A total of twenty companies including ten banks and ten nonbanking financial institutions listed in Dhaka Stock Exchange (DSE) were considered as a sample size since banks and NBFIs play an active role in the economy. Content analysis was used to extract the data from the annual reports of the respective companies for the years from 2016 to 2018. This study finds that only organization overview and external environment have a significant impact on financial performance. But this study didn't find any significant association of most of the other variables such as governance, business model, risk and opportunities, strategy and resource allocation, performance, outlook and basis of presentation with financial performance. The findings of this study will contribute to the literature based on the practices of integrated reporting in Bangladesh as a voluntary disclosure to meet the expectations of stakeholders. Nevertheless, the paper could be used as an important guide to assist the regulators in preparing guidelines and bring new insights for corporate reporting disclosure.

Keywords: Integrated reporting; Sustainability; Stakeholders accountability; Voluntary disclosure; Financial performance

1. Introduction

In the corporate reporting disclosure, integrated reporting (IR) as a concept gained significant attention over the last decade. IR is considered to be a new form of corporate reporting where the short-term focus of value creation for

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the shareholders is shifted toward the long-term value creation encompassing all the stakeholders of the society while supporting the managers to take decisions prudently and fostering an inclusive organizational culture (Eccles and Kiron, 2012; IIRC, 2013; De Villiers et al., 2014; Hossain et al., 2016; Ahmed and Anifowose 2017). In today's corporate domain, the sustainability of an organization cannot be ensured by providing economic information only. For this, social, environmental and governance issues must be taken into consideration. The number of companies who are reporting for financial and non-financial information is increasing over time. In the corporate world, many organizations including listed companies are reporting non-financial information in their annual reports nowadays which is a significant parameter for measuring operating performance. The widespread increase of corporate fraud in recent years is becoming more critical and for this social and environmental performance are taken into consideration (KPMG, 2008, Kolk and Pinkse, 2006). Hussainey's (2004) study mentioned that in the annual report, two types of information are categorized as historical or past information along with future or forward-looking information. Stakeholders now put more importance on forward-looking information rather than historical information since such reports do not offer prospects or are retrospective in nature. Over the last two decades, corporate fraud, earnings management, creative accounting have become burning questions among regulators, policymakers, business professionals. Corporate scandals like Enron, Worldcom came under public review, and stakeholders are now more concerned about corporate affairs. Bravo (2016) and Aljifri and Hussainey (2007) study mentioned that progressive and dynamic information specifically non-financial information including risk and uncertainties and financial information including expected sales, earnings, cash flows, and capital expenditure would be advantages for all stakeholders as well as related parties. As a result, the issue of integrated reporting started to get attention and it is now an emerging trend of corporate disclosure. An increasing number of companies have so far adopted IR practice, with the latest survey reporting that over 1,000 companies worldwide have implemented IR (IIRC, 2016). The incentives behind this research are the lack of research in IR in the context of Bangladesh and there is no unique institutional setting. Since Bangladesh is moving forward to achieve the sustainable development goals (SDGs), reporting integrated information including financial as well as non-financial information in the annual report will be a massive challenge to achieve SDGs within the time frame. Though some banks and financial institutions have started IR voluntarily and then The Institute of Chartered Accountants of

Bangladesh (ICAB) take initiatives to circulate the disclosure checklist following the International Integrated Reporting Framework in 2015. ICAB is trying to develop awareness about the adoption of integrated reporting for all the companies of Bangladesh. As a result, it is observed from the published annual report that some companies are practicing an integrated reporting framework voluntarily specifying the financial and non-financial information in a systematic format. So, it is crucial to observe how the investors value the forward-looking information in the annual report. As IR is emerging as a new format of corporate reporting, this research is to figure out the current scenario of integrated reporting and the impact of integrated reporting on firm performance in Bangladesh.

This research study will address two specific questions in the context of Bank and Financial institutions of Bangladesh. The research questions are:

RQ1: What is the level of integrated reporting practices in the bank and financial institutions of Bangladesh?

RQ2: What is the impact of integrated reporting on firm performance in the bank and financial institutions of Bangladesh?

Thus, the objective of this study is to get an overview of the integrated reporting disclosure in the banking and non-banking financial institutions of Bangladesh. This study will also examine the impact of integrated reporting (IR) disclosure on the financial performance of the listed financial organizations (banks and NBFI) in Bangladesh.

The findings of this study will contribute to the literature and fill up the research gap by examining the practices of integrated reporting in Bangladesh as a voluntary disclosure to meet the expectations of stakeholders. This study will also contribute to literature through the impact of integrated reporting on firm performance. This study is relevant for stakeholders, practitioners, standard setters to meet the demand of stakeholders about the nonfinancial information that is suitable for proper decision making and to get a better insight into the company. The manual content analysis shows the continuous progress to adopt the IR in Bangladesh.

The research is organized into seven sections. The remainder of the paper is structured as follows: Section 2 explains the literature review and theoretical underpinning of integrated reporting disclosure; Section 3 discuss the hypothesis development; Section 4 presents the research method; Section 5 discuss the empirical results and analysis; Section 6 present the Summary of

the Findings and Finally, Section 7 ends with a conclusion and scope of future research.

1. Literature Review and Theoretical Underpinning of Integrated Reporting Disclosure

IIRC (2013) mentions that "Integrated reporting should follow a principles-based approach". Some guiding principles help to create value for the organization. First of all, integrated reporting focuses not only on financial capital but also on intellectual, human, manufactured, social, and relationship capital in the annual report. Second, there is a relationship of different factors that helps to create value addition. Then, the report also highlights the association of key stakeholder engagement. Moreover, the report also focuses on material matters and practices that allow various stakeholders by considering integrated thinking. Also, the report is succinct that contains full disclosure about material facts and must be free from error. Finally, the report must be consistent and comparable over time.

Company's reporting pattern changes to integrated reporting including social, environmental, and governance recently from traditional financial reporting (King III (2009; de Villiers et al., 2014). Currently, IR is growing rapidly in various segments around the world and getting attention from academicians. According to Ahmed and Anifowose (2016), the orientation of integrated reporting practice shows the importance of such a report as a mandatory requirement in South Africa. Previous studies (Soh et al., 2015; King Report IV, 2016; Reimsbach et al., 2017) found that from the stakeholder's perspective as well as given the newness of IR, publication of a single report (financial and non-financial) helps to achieve those objective that link financials with social and environmental issues. Similarly, prior studies (de Villiers and Maroun, 2017; Adams, 2015; Beck et al., 2015; Eccles and Krzus, 2010) found that academician, government, and audit firms are in favor of integrated report that discloses the economic, social and governance (ESG) information in one single report. Financial information along with notes and disclosures assists users to predict the true and fair view of financial statements. So, previous studies (Maniora, 2015; Simnett and Huggins, 2015; Adams, 2015) found organization's ethical behavior equal to the accountability to report financial and non-financial performance.

Lodhia (2015) study found that integrated reporting presents the economic, social, and environmental aspects in a holistic approach instead of traditional financial reporting. Previous studies also address that

organizations' main objective to represent non-financial disclosure helps to improve the financial position. Different types of theories like agency theory, stewardship theory, institutional theory, and legitimacy theory are involved in disclosing integrated reporting (Adeniyi and Fadipe, 2018; Onyali and Okafor, 2019). Past studies mentioned different theories for voluntary disclosure and in particular the voluntary integrated reporting disclosure (Baldini et al., 2018; Reverte, 2009). The legitimacy theory, signaling theory, institutional theory, proprietary cost theory, and voluntary disclosure theory are mostly used in prior studies (Dienes et al., 2016).

In general, there are two main theories used in different studies to explain integrated reporting disclosure such as stakeholder and agency theory. Stakeholder theory states that a company mainly performed based on stakeholders' demands. Though there is a variety of stakeholders, the company will act not only for the benefit of shareholders but also other parties like employees, customers, society, and regulators. But agency theory explains and resolves issues between principals (shareholders) and agents (managers) because there is a conflict of interest existing between those parties. Frias-Aceituno et al. (2014) study stated that a company can reduce information asymmetry and agency problems by providing more information. Companies should provide relevant, and timely information to ensure transparency (Churet, Rebeco, and Eccles, 2014).

Integrated Reporting helps to measure the value creation of a business and is used as an administrative and communicative instrument in recent times (EY, 2014). Stockholders are continuously looking to increase the usefulness of their decisions. Liquidity, Profitability, solvency, and efficiency are used as performance parameters and the two most common performance proxy variables are Return on Assets (ROA) and Return on Equity (ROE) in previous studies (Fiori et al., 2017). Another study by Najmand and Tufail, (2013) found that accounting disclosure minimizes conflict of interest between shareholders, creditors, and managers. On the contrary, Horn et al. (2018) found that profitable organizations disclose a low level of voluntary information.

Very few studies related to integrated reporting and firm performance are found in the existing literature. Islam (2021) conducted a study of twenty firms listed in the Dhaka Stock Exchange from 2015-2018 and found that the integrated reporting disclosure index is positively and significantly related to ROA, ROE, and market to book value ratio. Another study by Nurim et al.

(2020) conducted a study of 108 public companies from 2013 to 2017 in Indonesia and found that only variable profit significantly affects a company's performance measured from Tobin's Q of company. Adegboyegun et al. (2020) examined the impact of integrated reporting on the performance of corporate organizations in Nigeria between 2009 and 2018 and found that IR has no significant impact on corporate performance in the short run, it has a significant relationship with firm performance in the long run. Another study from Omran MSY, Zaid MAA, and Dwekat, A (2020) found that integrated reporting is positively associated with corporate environmental performance. Velte, P (2021) found both IR adoption and IR quality are linked with positive consequences on firm valuation as they lead to higher total performance measures.

Albetairi, H.T.A, Kukreja, G. and Hamdan, A. (2018) conducted a study of Bahrain from 2012 to 2015 and found that business model, strategy, and resource allocation have a positive and significant relationship with Return on Assets (ROA), while risk and opportunities and performance elements negatively, but significantly related to ROA. Songini et al. (2021) conducted a study of 53 companies from 2013 to 2016 and found that IR quality is positively associated with the level of education of board members and negatively associated with the presence of the woman.

Most of the emerging empirical studies conducted qualitative and content analysis approach to examine the integrated reporting practices. Lipunga (2015) studied the IR level in developing countries applying content analysis to a disclosure framework obtained from the integration of the list of items used by Abeysekera (2013). The value of "1" was assigned to the integrated reports when an item of the disclosure framework was present and "0" otherwise. In Bangladesh, some companies are disclosing related to performance and accomplishment in terms of product quality, safety and integrity, creative innovation, involvement with the community, basic rights in the workplace, and ensuring a good environment through integrated reporting which is voluntary. Very few organizations present an integrated report from 2015 onwards in their annual reports. But Mohammad (2019) conducted a study from 2012 to 2017 in the banking sector and found that "From 2017 onwards companies disclose fully non-financial information like environment, society and governance along with economic facts". Companies are recently disclosing non-financial information including environment, governance, and societal information in addition to financial information but this information is not linked with firm performance (Islam and Islam, 2018).

From the above analysis, it is evident that research is scarce in the banking as well as the non-banking sector of Bangladesh. Thus, this research study is conducted to examine the integrated reporting practices and to find out the relationship between firm performance and integrated reporting practices in the banking and non-banking sector of Bangladesh and fill up this research gap is the main motivation of this study.

2. Hypothesis development

Since integrated reporting is a critical factor for value creation in business, it is assumed that integrated reporting will increase financial performance. Also, it fosters integrated thinking, company's try to allocate financial resources effectively.

Understanding the environment that surrounds the organization is important for the management. The environment shapes the various strategic decisions that executives make as they attempt to lead their organizations to success. Integrated reporting presents the overview and circumstances of a company and creates long and short-term values (IIRC, 2013). The external environment affects the financial performance, growth, and survival of a company (Cano et al., 2004). So, the following hypothesis is developed:

H_1: There is a positive relationship between organization overview as well as external environment and financial performance.

Previous studies suggested that the quality of disclosure and IR are affected by the characteristics of the board, board size, and composition. (Busco et al. 2019; Michelon and Parbonetti, 2012; Qu et al. 2015; Wang and Hussainey, 2013). Business model reporting plays a significant role for future expansion of business. Wang and Hussainey's (2013) study presents the positive relationship between board size and business model with voluntary disclosure. Good governance ensures to create short and long term value in the company. So the following hypothesis is proposed:

H_2: There is a positive relationship between corporate governance, business model, and financial performance.

The growth of the firm measures its future expansion possibilities. A superior form of reporting, such as IR, helps firms present their financial position in front of the investors that is positively reflected in the firm's market value. Thus, it is hypothesized that there is a positive relationship

between the adoption of IR and the firm's growth. Dey (2020) found a positive and significant relationship of the market-to-book value ratio with the IR disclosure in Bangladesh's banking sector. Most of the strategies taken by companies have a material impact on their success and allocation of resources to the proper channel is required to gain a competitive advantage. There is a positive relationship between long-term profitability and corporate risk management disclosure (EY, 2014). Therefore the following hypothesis is proposed:

H_3: There is a positive connection to information covered by strategy and resource allocation, risks, and opportunities, with financial performance.

Several proxies of firm performance (such as return on asset (ROA), return on equity (ROE), earning per share (EPS), market performance by Tobin's Q, and growth) are used as proxies in empirical literature. The most commonly used firm performance measures are ROA (Aljifri and Hussainey, 2007; Mahboub, 2019) and ROE (Menicucci, 2018). Rahman *et al.* (2020) found a positive relationship among ROA, ROE, and intellectual capital disclosure (ICD) after analyzing the listed companies' annual reports under Bangladesh's pharmaceuticals and chemical industry. Salvi et al. (2020) analyzed the firms' performance and the presence of IR in the corporate annual reports and showed a positive connection between them. Aerts et al.'s (2006) study find that there exists a positive relationship between profitability and firm performance disclosure. Also in the case of business outlook and the basis of preparation and presentation, IIRC 2013 states that it is necessary to report process and boundary of materiality. For convergence of such information and proper decision making by the users the following hypothesis is taken into consideration:

H_4: There is a positive relationship among performance, outlook, and basis of preparation with ROA and ROE.

3. Research method

This study develops a disclosure index (Table 1) based on the content of the IIRC reporting framework. Annual reports of ten banks and ten financial institutions are selected randomly and data is collected from 2016 to 2018 listed in the Dhaka stock exchange to measure the relationship. To analyze this, SPSS statistical software is used to find out the relationships between the following content elements and financial performance.

Table 1: Integrated Reporting Disclosure Index

Contents Elements	Components	Determinants
1. Organization overview and external environments	Mission and vision	Code of conduct guiding principles, core values shareholding structure, Organizational overview, industry forces analysis, financial highlights.
	Culture, ethics, and values	
	Ownership and operating structure	
	Principal activities and markets	
	Competitive landscape and market positioning	
	Position within the value chain	
	Key quantitative information	
	Legitimate needs and interests of key stakeholders	
	Macro and microeconomic conditions	
	Market forces	
	The speed and effect of technological change	
	Environmental challenges	
	The legislative and regulatory environment	
	The political environment	
2. Governance	Leadership structure	Profile of management, Risk management structure, stakeholder analysis, Human resource remuneration
	Strategic decision making and culture establishing and monitoring process	
	Particular actions of governance for risk management	
	Reflection of culture, ethics, and values on the capitals	
	Whether governance practices exceed legal requirements	
	Responsibility for promoting and enabling innovation	
	The link of remuneration and incentives with value creation	
3. Business Model	Input	Business model, Operating context, Market place
	Business Activities	
	Output	
	Outcomes	
	Identification of key stakeholders and other dependencies	

4. Risk and opportunities	Specific sources of risks and opportunities	Effectiveness of internal control and risk management
	Assessment of risks and opportunities	
	Specific risks and opportunities taken	
5. Strategy and resource allocation	Short, medium, and long term strategic objectives	Strategic direction and control
	Strategies to achieve those objectives	
	Resource allocation plan	
	Way of measuring achievements and target outcomes	
	The linkage between strategy and resource allocation plans and other content elements	
	Role of Innovation	
	Developing and exploiting intellectual capital	
	Features and findings of stakeholder engagement used in strategy and resource allocation	
6. Performance	Quantitative indicators about targets and risks and opportunities	Triple bottom line highlights, Operating performance
	State of key stakeholders relationships	
	The linkage between past and current performance	
	KPIs that combine financial measures with other components	
	Significant effect of regulations on performance	
7. Outlook	Challenges and uncertainties regarding pursuing its objectives	Anticipated changes in the external environment
	Potential respond to the critical challenges and uncertainties	
	Potential implications for its business model and future performance	
	Anticipated changes over time	
8. Basis of presentation	Materiality determination process	Audit reports, Sustainability report, Corporate governance report
	Description and determination of reporting boundary	
	Significant frameworks and methods used to quantify or evaluate material matters	

Source: Index based on IIRC Framework (2013)

The components of the integrated reporting framework are considered as the independent variables. Return on Asset (ROA) and Return on Equity (ROE) are considered as the dependent variable in this study.

Dependent Variable:	Operating Performance (ROA, ROE)
Independent Variables:	Organizational overview and external environment, Governance, Business model, Risks and opportunities, Strategy and resource allocation, Performance, Outlook, Basis of preparation and presentation.

Disclosure Index Development

The study has developed a disclosure index to measure the impact of integrated reporting on financial performance (ROA and ROE). A score 1 is attached to items disclosed in the integrated reports while 0 is provided for non-disclosure. The total disclosure sum is calculated as:

Integrated Reporting Disclosure (IRD)= $\sum_{i=1}^{n} di$ / n

where d_i = 0 or 1 as follows:

d_i = 0 if no disclosure

d_i = 1 if disclose.

n= the maximum number of items a company can disclose in the integrated report

4. Empirical Results and Analysis

Table 2 presents descriptive summary statistics for financial institutions from 2016 to 2018. Firstly, the mean value of organization overview and external environment is 0.822 with a standard deviation of 0.09573. Also, the governance is measured by the profile of management, risk management structure, stakeholder analysis, human resource remuneration which has a mean value of .0.74 with a standard deviation of 0.09803. Then the business model which is measured by the organization's model has a minimum value of 0.60 and a mean value is 0.8290. The risk and opportunities which has a minimum value of 0.30 and a mean value of 0.7195. In the case of strategy and resource allocation, the mean value is lower than the ROE and ROA. For performance and outlook, the minimum value is 0.4 and .50 respectively and the standard deviation is 0.13 and 0.10 respectively. The basis of preparation is lowest in terms of the mean value of 0.57 and standard deviation of 0.209 respectively.

Table 2: Descriptive Statistics

Variables	Mean	Min.	Max.	SD
Organization Overview and external Environment	0.8220	0.60	1.00	.09573
Governance	0.7400	0.50	0.90	.09803
Business Model	0.8290	0.60	1.00	.08290
Risk and Opportunities	0.7195	0.30	1.00	.14043
Strategy and Resource allocation	0.6520	0.34	0.85	.13640
Performance	0.6970	0.40	0.90	.13354
Outlook	0.6935	0.50	0.83	.10070
Basis of Preparation	0.5700	0.22	0.80	.20979
Return on Equity (%)	6.5199	-6.83	15.39	5.15068
Return of Asset (%)	0.8176	-0.81	4.90	1.14427

In Table 03, the Pearson correlation matrix is presented where the relationship or association between two variables is found. In the case of organization overview, there is a strong correlation between ROA and ROE but for governance and business model the relationship is low.

Table 3: Correlation

Variables	Org. over.[a]	Gov.[b]	Bus.[c] Model	Risk and Oppo.[d]	Strategy and Reso.[e]	Performance	Outlook	Preparation	ROA	ROE
Org. Over.	1									
Gov.	0.577	1								
Bus. Model	0.644	0.429	1							
Risk Opp.	0.565	0.216	0.202	1						
Strategy and Reso.	0.799	0.616	0.609	0.367	1					
Performance	0.734	0.499	0.313	0.285	0.571	1				
Outlook	0.162	0.560	0.317	0.111	0.367	0.214	1			
Preparation	0.506	0.344	0.373	0.206	0.457	0.561	0.412	1		
ROA	0.482	0.160	0.382	0.300	0.469	0.157	-0.018	0.263	1	
ROE	0.281	0.075	0.033	-0.025	0.359	-0.038	-0.164	0.065	0.507	1

[a]=organization overview and external environment; [b]=Governance; [c]= Business Model; [d=]Risk and Opportunities; [e]=Strategy and Resource allocation

Governance is positively correlated (0.160) to ROA but low relationship (.075) in ROE. The business model is positively associated with ROA (0.382) and ROE (0.033). The risk and opportunities have a low degree of relationship in ROA and but are negatively related to ROE. But strategy and resource allocation have a moderate relationship of 0.469 with ROA but a low relationship of 0.359 to ROE. The performance has a low relationship with ROA 0.157 but negatively correlated to (.038) with ROE. For outlook, there is a negative impact on ROE and ROA. The basis of preparation and presentation has a very low impact onfinancials.

Hypothesis testing

H_1: There is a positive relationship exists between organization overview as well as external environment and financial performance.

Here the model summary presents that the R square value is 0.19 which is explained by 19% of the ROE that can be related to organization overview. The Durbin Watson value is 0.482 which indicates that there is a positive correlation between organization overview and external environment and ROE. In the case of ANOVA, the significance value is 0.031 which is below 0.05 so there is a significant relationship between those variables. In the case of ROA, from table 05, the R square value is 0.079 which is explained by 7.9% of the ROA that can be predicted from the organization overview. The Durbin Watson value is 2.297 which indicates that there is a positive correlation between organization overview and external environment and ROA. In the case of ANOVA, the significance value is 0.023 which is below 0.05 so there is a positive relationship between those variables.

Table 4: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.233	.19	4.63529	.233	5.460	1	18	.031	1.926	.482[a]

a. Predictors: (Constant), Organization Overview and External Environment

b. Dependent Variable: Return on Equity

Table 5: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.281[a]	.079	.028	1.12835	.079	1.540	1	18	.231	2.297

a. Predictors: (Constant), Organization Overview and External Environment

b. Dependent Variable: Return of Asset

Table 6: Co-efficient path

Independent variables	Dependent Variables	Beta co-efficient	T statistics	P-value
Organization overview	ROE	0.482	2.337	0.031
and external environment	ROA	0.281	1.241	0.023

H_2: There is a positive association exists between corporate governance, business model, and operating performance.

In the second hypothesis, the relationship of governance and business model and operating performance is analyzed. Here the R square value is 14.6% means the amount of variance in the ROE that is explained by the Governance and business model which is very low. The Durbin Watson's value is 1.344 which indicates that there is a positive auto-correlation among the variables. In the case of p-value, both ROE and ROA, are more than 0.05 which is insignificant.

Table 7: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	382[a]	.146	.045	5.03240	.146	1.452	2	17	.262	1.344

a. Predictors: (Constant), Business Model, Governance

b. Dependent Variable: Return on Equity

Table 8: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.075a	.006	-.111	1.20629	.006	.048	2	17	.953	2.169

a. Predictors: (Constant), Business Model, Governance

b. Dependent Variable: Return of Asset

Table 9: Co-efficient path

Independent variables	Dependent Variables	Beta co-efficient	T statistics	P-value
Corporate Governance	ROE	-0.005	-0.20	0.984
	ROA	0.075	0.279	0.784
Business Model	ROE	0.384	1.547	0.140
	ROA	0.001	0.004	0.997

H_3: There is a positive connection to information covered by strategy and resource allocation, risks, and opportunities, associated with financial performance.

In the third hypothesis, the R square value is 0.239 which is explained by 23.9% of the ROE can be related to risk and opportunities as well as resource allocation. The Durbin Watson value is 1.778 which indicates that there is a low correlation strategy and resource allocation along with ROE. In the case of ANOVA, the significance value is 0.086 which is above 0.05 so there is no significant relationship between strategy and resource allocation and ROE. For ROA, there is no significance (0.093 more than 0.05). The coefficient value is 0.526 for risk and opportunities for ROE and 0.458 for ROA which is not statistically significant.

Table 10: Model Summary[b]

Mo del	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.489[a]	.239	.149	4.75053	.239	2.668	2	17	.098	1.778

a. Predictors: (Constant), Risk and Opportunities, Strategy and Resource allocation

b. Dependent Variable: Return on Equity

Table 11: Model Summary[b]

Mo del	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.397[a]	.158	.059	1.11017	.158	1.592	2	17	.232	2.207

a. Predictors: (Constant), Risk and Opportunities, Strategy and Resource allocation.

b. Dependent Variable: Return of Asset

Table 12: Co-efficient path

Independent variables	Dependent variables	Beta co-efficient	T statistics	P-value
Strategy and Resource allocation	ROE	0.415	1.825	0.086
	ROA	0.426	1.781	0.093
Risk and Opportunities	ROE	0.147	0.647	0.526
	ROA	-0.182	-0.760	0.458

H_4: There is a positive relationship among performance, outlook, and basis of preparation with ROA and ROE.

In the last hypothesis, the model summary is explained by R square is .088 means 8.8% of independent variables performance, outlook, and basis of preparation are influenced by ROE. Also, the Durbin Watson value is 1.844 means there is a positive autocorrelation exists between variables. For ANOVA, there is no relationship among variables since the p-value is higher than 0.05. For return on asset, the model summary shows that the R square value is 0.239 which means almost 24% of independent variables are explained by ROA. Also for the ANOVA table, the significance value is 0.809 which is higher than 0.05 means there is no statistical relationship among those variables.

Table 13: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.297[a]	.088	-.083	5.35910	.088	.517	3	16	.677	1.844

a. Predictors: (Constant), Performance, Outlook, Basis of preparation

b. Dependent Variable: Return of Equity

Table 14: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.239[a]	.057	-.120	1.21092	.057	.322	3	16	.809	2.147

a. Predictors: (Constant), Performance, Outlook, Basis of preparation

b. Dependent Variable: Return of Asset

Table 15: Co-efficient path

Independent variables	Dependent variables	Beta co-efficient	T statistics	P-value
Performance	ROE	0.010	0.033	0.974
	ROA	-0.114	-0.390	0.702
Outlook	ROE	-0.152	-0.581	0.569
	ROA	-0.232	-0.870	0.397
Basis of preparation	ROE	0.320	1.035	0.316
	ROA	0.225	0.716	0.485

6. Summary of Findings

This study examines how the integrated reporting practices affect financial performance in banking and non-banking financial institutions. This study finds that integrated reporting practices affect the financial performance of the companies. Some banks (Brac Bank, Bank Asia, Southeast Bank Ltd., City Bank, Mutual Trust Bank Limited) and NBFIs (IDLC Finance, Lankabangla Finance, IPDC Finance, Infrastructure Development Company Limited, BD Finance and Investments) in Bangladesh present their integrated report separately in their annual report. There is a separate section named integrated reporting checklist in the annual report. But other banks and financial institutions do not present integrated report separately as it is a voluntary reporting. The main results of the study are given below:

Table 16: Findings

Hypothesis	Findings	Result
H_1: There is a positive relationship exists between organization overview as well external environment and financial Performance.	Results indicate that integrated reporting practices are influenced by the key stakeholders which ultimately affect the financial performance.	Significant
H_2: There is a positive association that exists between corporate governance, business model, and operating performance.	Here there is a very low association among the variables and operating performance is not significant for governance and business model. Governance is positively correlated 0.160 to ROA but low relationship .075 in ROE. The business model has a low impact on ROE 0.382 as well as ROA 0.033.	Not significant

H_3: There is a positive connection to information covered by strategy and resource allocation, risks, and opportunities, associated with financial performance.	This study finds no relationship between strategy and resource allocation, risks, and opportunities with financial performance. The risk and opportunities have a low degree of relationship in ROA and but are negatively related to ROE. But strategy and resource allocation have a moderate relationship of 0.469 with ROE but a low relationship of 0.359 to ROA.	Not significant
H_4: There is a positive relationship among performance, outlook, and basis of preparation with ROA and ROE.	The performance has a low relationship with ROE 0.157 but negatively correlated to (.038) with ROA. For outlook, there is a negative impact on ROE and ROA. The basis of preparation and presentation has a very low impact on financial performance.	Not significant

7. Conclusion and Scope for Future Research

The integrated report is a mixture of qualitative and quantitative information and presents the company's overview and external environments, governance, business model, risk and opportunities, strategy and resource allocation, performance, outlook, the basis of preparation in the social and environmental context for value creation. If the company's firm performance is improved through integrated reports then the company will give more emphasis on integrated reporting practices. Most of the prior studies find a positive relation between integrated reporting and firm performance but the all components of integrated reporting with firm performance were not considered in those studies. In this study, each item of integrated reporting with firm performance is examined separately. This study finds that organization overview and external environment play an association in improving the financial performance of the banking and non-banking financial institutions of Bangladesh but other variables didn't find any significant positive relationship with firm performance. Due to the significance of financial information, investors should be more cautious about the corporate financial information release. Also, regulators should make more specific regulations or guidelines on non-financial information disclosure.

The findings of this study will contribute to the literature and fill up the research gap by examining the practices of integrated reporting in Bangladesh as a voluntary disclosure to meet the expectations of stakeholders. This study will

also contribute to literature through the impact of integrated reporting on firm performance. This study is relevant for stakeholders, practitioners, standard setters to meet the demand of stakeholders about the nonfinancial information that is suitable for proper decision making and to get a better insight into the company. The manual content analysis shows the continuous progress to adopt the IR in Bangladesh.

This study has some limitations. First, this study considers only three years to conduct this research. Second, this study considers a limited sample due to the lack of integrated reporting practices in a large volume. Thus, the results may change if we change the period, and sample size. Future research should be aimed to consider other factors at the firm level that promote a detailed and complete reporting practice. Also other than financial sectors other sectors can be taken into consideration so that such reporting can be an effective tool for corporate transparency and accountability. Till now, the extent of integrated reporting is not satisfactory enough, thus regulatory authorities like Bangladesh Bank, Bangladesh Securities and Exchange Commission (BSEC), and professional bodies like ICAB, ICMAB can take initiative to improve the reporting framework and monitor time to time the practices of integrated reporting to create value for sustainable development. Finally, researchers can conduct further research to determine items that are more relevant and reliable content of integrated reporting disclosure.

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Liquidity, Corporate Performance, and Industry Variations: Evidence from the Listed Companies of Dhaka Stock Exchange Limited

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Abstract: Liquidity management of a firm is an integral part of its day-to-day operational challenges. Although liquidity management involves short-term decisions, proper liquidity management is crucial for a firm's long-term ability to survive and grow successfully. This paper examined the relationship between performance indicators like return on assets and asset turnover ratios with liquidity indicator variables like, firms' cash conversion cycle, liquidity turnover periods, and net working capital to sales ratio, keeping some firm-specific indicators and exogenous factors as control variables. The study was conducted using data from randomly selected listed firms of three different manufacturing industries of the Dhaka Stock Exchange. I have found that liquidity indicators have a statistically significant relationship with Asset Turnover Ratio as a performance indicator. The study used data from the 2010 to 2017 period and used pooled panel accounting data of 113 firm years (original data count 120) to conclude that proper liquidity has influenced a firm's performance.

Keywords: Corporate Performance; Liquidity Management, Cash Conversion Cycle, Days Sales Outstanding; Days Payables Outstanding; Asset Turnover Ratio; Industry Variation Factors

1. Introduction

Management of a firm's liquidity is an integral part of its day-to-day operations. Although liquidity management involves short-term decisions, the absence of proper liquidity management is crucial for a firm's long-term ability to survive and grow successfully. This paper examined published data of 15 randomly selected listed firms from three different manufacturing sectors of the Dhaka Stock Exchange Limited comprising 120 firms' year's data to examine if the liquidity indicators of these firms have any statistically significant relationship with their performance indicators. The liquidity management of a firm is the key component of its working capital

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management. The level of liquidity of a firm indicates its ability of the firm to meet its short-term obligations primarily using its short-term assets like cash and near-cash assets (Smith, 1982, p. 4). A firm's profitability and long-term viability significantly depend on its proper management of liquidity (Ammons, 2012, p. 11 Smith B. & Begemann, E. 1997, p. 3). As liquidity is very important for a firm for its existence, excessive liquidity on the other hand may have a negative impact on its profitability as most of the liquid assets like cash, trade credit, inventory has its high cost and almost no return, that contribute towards negative profitability (Wilner, 2000, p. 153).

Most of the studies on this topic examined relations between liquidity or working capital and different profitability indicators. The researchers used performance indicators like returns on asset, returns on equity or other profitability measures to examine such association, and found a statistically significant relationship between liquidity and performance in the context of both developed and developing economies (Wang, 2002; Deloof, 2003; Eljelly, 2004; Lazaridis & Tryfonidis, 2006; Mbawuni, 2016). In this paper, I have examined the relationship between liquidity and a firm's performance using data from 15 selected listed firms of three different manufacturing sectors comprising financial data of 8 years periods ranging from 2010 to 2017. I have applied the Fixed Effect model and applied the OLS method (Baltagi, 2005, P. 26) to test the target relationship as a specific number of farms' panel data is used to examine the outcome of this paper. In this study, I focused on firms' performance efficiency issues by using the asset turnover ratio as an indicator of performance. Another aspect that came in my study includes assessing the industry's effect on such performance. I also examined the impact of industry variation upon liquidity measures of the firms. It is found that the performance of firms varies with industry variation along with the level of liquidity of the firm. However, my study did not find the impact of industry variance upon the level of liquidity of the firms.

2. Objectives

The specific research objectives of the study include:

- To determine if there exists a statistically significant relationship between firms' liquidity and efficiency-based performance
- To ascertain the extent and direction of the relationship between individual components of liquidity and the performance of firms
- To determine if such relationship varies across the industries or to examine the industry effect on such relationship; and

- To determine if a firms liquidity parameters are influenced by its industry variations

Among the key objectives, objectives i, ii, and iii will be considered a set of primary objectives while objective iv will be considered as the secondary objective of the paper.

3. Literature Review

Typical finance literature centers around the concept of a firm's value as a measure of performance. A firm's market value depends on risk-adjusted long-term profitability reflected in its market price (Fang, Noe, & Tice, 2009). Finance literature assumes that under an efficient market condition, a firm's financial management objective should target maximization of the firm's value. The modern theories of finance started evolving from the early '50s with a focus on portfolio theory, dividend policy, and capital asset pricing model, all having focus on corporate valuation and with little attention to working capital management (Jensen, M. et al. 1984, p. 3). Working capital management started getting some attention as an important part of financial decisions in post-industrial revolution academic literature as finance functions in the form of managing a firm's ability to pay off its liabilities (Smith K., 1982 p. 4). However, it did not get expected theoretical focus on corporate finance literature in terms of its ability or role to value maximization function as can be traced from one of the earliest post-world war papers in this area, which was published in 1955 focusing on the operational issues of cash management strategies (Sagan, 1955, pp. 121-129).

One of the pioneering papers linking profitability and firms' liquidity was published by Keith Smith, where he highlighted some impacts of sound working capital management on a firm's profitability (Smith, 1982, pp. 3-21). Smith used budget forecasts and expected profit model and concluded that there exist positive implications between return on investment (ROI) and working capital leverage ratio measured by current liability to total funds ratios (Smith, 1980, pp. 549-562;). His study used a forecast of balance sheet indicators of working capital.

Wang in his paper used dynamic measures of working capital and Tobin's Q as measures of firms' performance. He adopted the cash conversion cycle and its components and found statistically significant dependence between firms' performance to cash conversion cycle (Wang, 2002). Deloof was the first researcher who examined the relationship between a firm's gross operating income to working capital measured by the cash conversion cycle

and its components for selected Belgian firms (Deloof, 2003). Deloof also observed that a statistically significant relationship exists between firms working capital and profitability.

While the market value in an efficient market presents the correct reflection of available information (Malkiel and Fama 1970), in most of the emerging markets, it is observed that market price does not meet standards of efficient market hypothesis (Phan & Zhou, 2014). Consequently, valuation-based performance indicators may not reflect true dependence on a firm's liquidity. Therefore, most of the studies conducted in the context of developing markets used accounting data as the basis of the performance of firms.

Most of the contemporary literature on working capital and liquidity focused on the concept of a firm's cash conversion cycle – a dynamic measure of liquidity. The Cash Conversion Cycle or CCC concept introduced by Hager overcomes most of the limitations of the traditional measure of liquidity - the Current Ratio. CCC covers both the time dimension and the flow of capital within the firm (Hager, 1976). It provides an operating view rather than a purely financial one, resorting to information from the financial statement. This paper also examined liquidity of the selected firms measured with a focus on cash conversion cycle along with some of its constituent components upon firms' performance across different industries. Accordingly, Eljelly in a study on the Saudi cement industry observed that effective working capital management requires removing potential risks in short-term planning and controlling of temporary investments and liabilities to prevent firms over the investment of temporary investment components like receivables and inventory (Eljelly, 2004). Thus, we see that working capital or liquidity management of a firm plays a significant role in the profitability of the firm. Accordingly, decisions regarding a company's working capital management are interconnected with the level of its liquidity maintenance and are a critical factor for its continuity of operations in the long run, while illiquidity can lead a firm towards bankruptcy (Wilner, 2000) and may have an impact on its efficiency of operations (Wilner, 2000).

Large numbers of works were carried out in recent years to examine the relationship between working capital and firms' performance. These papers were written in the context of some European countries like the UK (Thuvarakan, 2013), Belgium (Deloof, 2003), Italian (Lazar, 2016) Greece, Japanese and Taiwanese firms (Wang, 2002), as well as in some Afro-Asian countries like India, Pakistan, Kuwait, Nigeria, Kenya, and also Bangladesh

(Raheman, 2010) (Abosede & Samuel, 2014) (Kaur & Kalotra, 2019) (Chowdhury & Muntasir, 2007). Most of these studies focused on different aspects of the performance of firms upon a general pool of firms across the industry and did not examine industry variation impact. In some of such leading studies were conducted on a pool of different European (Belgium, Greece, UK) listed companies during early 2000. In these studies, a statistically significant relationship was observed between firm performance and liquidity during the 2001 to 2010 period (Deloof, 2003) (Lazaridis & Tryfonidis, 2006) (Eljelly, 2004). While some such studies were conducted on specific sectors by different authors in their recent works (Mbawuni, 2016) (Warrad & Omari, 2015) (Abosede & Samuel, 2014) (Chowdhury & Muntasir, 2007). In these studies, also statistically significant relationship was observed between firms' performance and level of working capital. However, the magnitude and direction of such a relationship vary from study to study. The majority of researchers observed that the relationship between profitability measured in terms of ROA, ROE, or firms amount of profit and levels of working capital or liquidity measured in terms of Cash Conversion Cycle (CCC) and its constituents like accounts receivables, accounts payables, inventory, etc. (Deloof, 2003) (Eljelly, 2004) (Lazaridis & Tryfonidis, 2006) (Mbawuni, 2016).

All the studies cited above used different measures of liquidity to examine the relationship between performance and working capital or liquidity. Deloof used CCC as the primary measure of working capital (Deloof, 2003). Eljelly used Current assets, Current liabilities, and networking capital to find their impact on profitability (Eljelly, 2004). The studies on the relationship between working capital and profitability targeted the general relationship. In Bangladesh, most of the studies so far conducted focused on specific industries. But very few known studies were attempted to see if such a relationship varies across the industry. However, it is well evidenced from different studies that firms' performance varies across the industry (Rumelt, 1991), (Hawawini, 2003; Claver, 2002). But studies on the impact of working capital did not explore if the impact is influenced by industry variability. Similar observations were reported in a study on European firms, that reports average firms' performance varies due to industry characteristics (Hawawini, et al., 2002)

In a study, Rehman et al. carried out a study on several industries in Pakistan. The main objective of their research was to find out if any industry is significantly influenced by the working capital components. In the study, they concluded that except for the food industry there exists a significant

relationship between the working capital components and the firm's profitability (Raheman, 2010). Lazaridis and Tryfonidis used Accounts Receivable Turn Over Ratio, Inventory Turnover Ratio, and CCC as independent variables to determine the impact of liquidity on profitability (Lazaridis & Tryfonidis, 2006). In a recent study on Johannesburg stock Exchange-listed firms, the same independent variables were applied along with some firm-specific and macroeconomic variables as control variables to assess the impact of liquidity on firm performance (Oseifuah & Gyekye, 2016). All these studies used fixed-effect model and panel data to find their result.

4. Variables of the study

The objective variables measuring performance and efficiency along with different determinant variables for the study include the following items:

4.1 Dependent Variables for Primary and Secondary Objective

For this study, I have examined two important research objectives using two models. In the first model, I examined if the performance of the firms is influenced by different liquidity parameters across the industry. For the primary objective set, I used performance aspects for a firm measured using both profitability and efficiency in asset management which include liquid or working capital assets (Santosuosso, 2014). Here, both efficiency and profitability can be captured simultaneously by one single parameter - the Asset turnover ratio (As To Ratio) besides traditional measures of profitability like return on equity (re) return on assets (ROA) or profit margin (PM in terms of sales) (Kimmel, et al., 2019). Since investment in liquid assets like cash equivalent holdings, inventory, accounts receivables are important assets to maintain uninterrupted production and as well to boost sales, the total asset turnover ratio can reflect such investments efficacy (Beinabaj, et al., 2013; Warrad & Omari, 2015), (Okwuosa, 2005). However, investment in these liquid assets is subject to significant financial costs.

Therefore, the efficiency of a firm's investment decision, as well as sales performance, can be negatively impacted if there is over-investment in these assets. This ratio measures the efficiency of the use of the capital invested in the assets by relating the volume of sales to the total assets employed in the business. The larger the value of this turnover ratio, the bigger is the size sales of the firm, and thereby the higher will be the earnings per monetary unit invested in the assets of the business (Kimmel, et al., 2019). Further, if we decompose the ROE using DuPont analysis. it shows that a firms' ROA and

eventually ROE increases as its asset turnover ratio increases. That means the asset turnover ratio is also a broad measure of the efficiency of the use of capital since the total assets include plant and other fixed assets as well as current assets. It helps management to determine if the sales volume is sufficient, relative to the capital commitment in the business. However, as my study focused on liquidity issues of the firm, I have considered a gross investment in assets including total current assets as a component of total assets. Therefore, the inverse of Asset Turnover Ratio (As TO Ratio) is calculated using the formula: $Net\ Sales\ /\ Total\ Assets$.

For the secondary objective to study if the selected industries for this study influence a firm's liquidity, the liquidity is measured by cash conversion cycle (CCC). CCC is considered an important parameter of a firm's liquidity by different studies (Rizov, 2004), (Richards & Laughlin, 1980), (Hogan, 1985). Therefore, industry impact on a firm's liquidity is measured by CCC as the dependent variable.

4.2 Independent Variables

For the primary objective to study the impact of liquidity upon performance, I have used a number of independent determinant variables, which are mostly the same as are used in other leading studies. The variables include the cash conversion cycle (CCC) of a firm. Which shows the average length of time a firm requires to convert its cash resources first into inventory then into collectibles from its customers due to credit sales and finally netted by(deducting) the average number of days the firm itself holds its suppliers' money generated by credit purchase or bank loans (Richards & Laughlin, 1980). Almost all recent studies on working capital vis-à-vis liquidity and firm performance considered CCC as the primary determinant variables (Deloof, 2003) (Eljelly, 2004) (Claver, 2002) (Hawawini, 2003) (Oseifuah & Gyekye, 2016). Besides CCC most of these studies also used current ratio (CR) accounts receivables turnover ratio (ARTO), inventory turnover ratio (InvTO), days sales remaining outstanding (DSO), and days payables remaining outstanding (DPO) as other important liquidity parameters for their studies (Ammons, 2012) (Abosede & Samuel, 2014) (Claver, 2002) (Deloof, 2003) (Eljelly, 2004) (Lazaridis & Tryfonidis, 2006) (Oseifuah & Gyekye, 2016). Besides the above liquidity parameters, some other financial parameters like total assets, debt-equity ratio are also important parameters to influence a firm's overall liquidity position (Oseifuah & Gyekye, 2016; Lazaridis & Tryfonidis, 2006) (Deloof, 2003). A firm's size measured by its total asset varies with may cause the abnormal size impact on the overall

equation and to abnormal size total asset is corrected by taking the natural log of total assets, while the size debt and equity is standardized by taking the debt-to-equity ratio (Deloof, 2003) (Lazaridis & Tryfonidis, 2006) (Eljelly, 2004). Besides these firm-specific or endogenous variables, I have also included some exogenous variables like private sector credit growth data (PsCrGd) and real interest rate (RIntRat) in my model to separate the credit environment prevailing at the time of any investment decision of firms (Rizov, 2004). In addition, the impact of industry variability is one of the important issues in my research objectives. As observed earlier, industry variability influences firms' performance significantly my paper used the above variables to test the primary research objectives of the study (Hawawini, 2003).

4.3 The Research Models

The literature review has observed the relationship between liquidity and determinants. From the discussion, it can be asserted that:

Efficiency based performance of a firm is significantly determined by a firm's liquidity, which is a function of several firm-specific as well as industry or macroeconomic factors and is stated as:

P=(Liquidity parameters, firm size, industry variants, and macroeconomic condition)

Based on the above functional relationship, the following empirical model, using panel data was employed to test the relationship between liquidity and performance as discrete components and efficient performance. The primary empirical model for the paper is stated as follows:

$$Y_{it} = \beta_0 + \beta_k X_{it} + \nu_{it} + \varepsilon_0$$

Where

Y_{it} = measures of firms' efficiency-based performance indicator Asset Turn Over Ratio (As ToRat) as proxy for Profit Ratio for each sample firm i in year t X_{it} = cash conversion Cycle (CCC), Accounts Receivable Turnover Ratio (AR_TO), Inventory Turnover Ratio (Inv_to), Days Sales Remaining Outstanding (DSO), Days Payables Remaining Outstanding (DPO), Debt to Equity Ratio or Leverage Ratio (DE), Natural Log of Total asset or size of firm (Ln_ta), Dummy Variables to represent Industry (IndDum) for three sectoral dummies, exogenous variables like Real Interest Rate (Rint_Rat) M2 (Broad Money) Growth Rate (M2_Gro).

β_o = is the intercept or constant variables of the model.

β_i = Represents individual regression co-efficient associated with each independent variable

v_{it} = individual error component (a particular characteristic of each firm)

ε_{it} = the idiosyncratic error (unobservable factors) that vary over time and affect profitability.

i = 1, 2, 3…, 15 (firms)

t = 2009, 2010…, 2017 (time)

k = 1, 2, 3...10

The following empirical model is applied to find determinants of liquidity or to find relationship between liquidity and its determinants factor:

$$\Omega_{it} = \beta_0 + \beta_k X_{it} + v_{it} + \varepsilon_0 \quad (2)$$

Where

Ω_{it} = measures of firms' liquidity – Cash Conversion Cycle (CCC) as proxy for liquidity for each sample firm i in year t

X_{it} = are the independent variables as explained including: CR, ARTO, Inv_to, DSO, DPO, DE, Ln_ta, InDUM for three sectoral dummies.

β_o = is the intercept or constant variables of the model.

β_k = Represents individual regression co-efficient associated with each independent variable

v_{it} = individual error component (a particular characteristic of each firm)

ε_{it} = the idiosyncratic error (unobservable factors) that vary over time and affect profitability.

i = 1,2, 3…, 15 (firms)

t = 2009, 2010…, 2017 (time)

k = 1, 2, 3...10

Based on the functional relationship, the following hypotheses were used to test the research models:

4.4 Hypothesis for Primary and Secondary Research Objectives

Hypothesis set 1: For Primary Research Objectives

Null Hypothesis: *H_0: Efficiency and Performance of firms are not contingent upon firm's liquidity across different industry*

Alternative Hypothesis: *H_1***:** *Firms performance and efficiency are influenced by firms' liquidity across different industry*

Hypothesis set 2: For Secondary Research Objectives

Null Hypothesis: *H_0: Liquidity of firms are not contingent upon firm's liquidity policy paraments across different industry*

Alternative Hypothesis: *H_1***:** *Firms liquidity is influenced by firms' liquidity policy parameters across different industry*

5. Descriptive Statistics

The study is based on sample data collected from 15 listed companies across three different manufacturing industry sectors namely Pharmaceuticals (Industry 1) Food (Industry 2) and Engineering (Industry 3) of the Dhaka Stock Exchange Ltd. To test the above hypothesis, multivariate least square regressions method was deployed to apply the research models 1 and 2. The following table shows the summary of key descriptive statistics of the relevant variables used in the study:

Table 1: Data showing key variables of the study in summarized format

Variables	Obser-vations	Mean	Std. Dev.	Minimum	Maximum
ROA	120	4.704962	5.534006	-1.3313	26.36862
NP Margin	120	10.57105	7.786967	-.7082561	59.48165
Asset Turnover Ratio	120	66.43352	47.51389	8.435811	231.6787
Current Ratio	120	1.976696	2.204351	.6394335	19.65469
Quick Ratio	120	1.181416	1.731833	.1386027	17.22279
Acct. Receivable TO Ratio	120	27.00261	61.69652	.7779493	433.7594
Inventory TO Ratio	120	4.087751	3.377809	.5780727	15.8666
Days Sales Outstanding	120	77.05284	97.5352	.8299532	519.3322
Days Payables Outstanding	120	28.91611	22.95662	.1124284	88.28174
Cash Conversion Cycles	120	182.032	162.4658	-17.95098	975.8497
Debt to Equity Ratio	120	.7387022	.9395971	.0328548	6.162652
Natural Log of Total Asset	120	24.20728	7.708541	17.8604	60.27835
Fin. Institutions Loan (Billion)	120	47.70322	16.10917	20.3353	61.28424
Real Interest Rate	120	5.529059	.6463528	4.661743	6.8859
Broad Money (M2) Growth	120	17.02547	2.227586	13.54835	21.07886

The Table 1 above shows key statistics like mean, standard deviation, minimum and maximum values of sample data of which, some variables were excluded in the ultimate model testing due to different inconsistency. These variables include traditional performance indicators like return on assets (roa), and net profit ratio (np_margin). These two variables are being used in most of the empirical studies conducted on topics of impact of working capital on firm performance. The results of those studies were mixed. However, in my work, I used asset turnover ratio (asto_rate) as unique performance measure that also address investment efficiency of the firm. The observed firm's asset turnover ratio varied between 47.51 to as low as 8.43 with an outlier case of 231. That sample was eventually dropped. Similarly, I have dropped some other observations for this type of data anomalies, and finally reached to 113 observations.

5.1 Correlation between variables and Multicollinearity Issue

One of the constraints of running regression using panel data lies in existence of multicollinearity between the variables. The correlation matrix in Table 2 shows that the variables used in the study are not significantly correlated among themselves. The relationship between Cash Conversion Cycles and Days Sales Outstanding is observed to have high degree of correlation and hence was dropped from the model to avoid multicollinearity problem. Further, the 'rmcoll' command (Stata command for identifying and elimination multicollinearity) of Stata was applied to eliminate multicollinearity.

As a result, one of the industry dummy variables was suggested to be dropped. Looking at the characteristics of the 3 industry dummy variables, it is observed that Industry Dummy1 (Pharmaceutical Industry Dummy) has negative correlation with performance indicator Asset Turnover Ratio, while the other two industry sectors (Food and Engineering) show positive correlation with almost all other variables. Therefore, Industry Dummy variable 2 (for Food sector) was dropped by Stata software. Thus, based on the observations form the correlation matrix as well as the Stata software-based multicollinearity control using '*_rmcoll'* command, the data set was corrected for any form of distortions.

Table 2: Showing Correlation Matrix for key variables -Observations =113

Variables	Asset Turnover Ratio	Current Ratio	Acct. Receivable TO Ratio	Inventory TO Ratio	Days Sales Outstanding	Days Payables Outstanding	Cash Conversion Cycles	Debt to Equity Ratio	Natural Log of Total Asset	Real Interest Rate	Broad Money (M2) Growth
Asset Turnover Ratio	1.0000										
Current Ratio	-0.0680	1.0000									
Acct. Receivable TO Ratio	0.4181	-0.0835	1.0000								
Inventory TO Ratio	0.1234	0.0185	-0.0159	1.0000							
Days Sales Outstanding	-0.1953	0.3500	-0.2845	-0.0764	1.0000						
Days Payables Outstanding	0.2365	-0.0657	0.1625	-0.0387	-0.1795	1.0000					
Cash Conversion Cycles	-0.3927	0.2371	-0.3644	-0.3332	0.8245	-0.3040	1.0000				
Debt to Equity Ratio	-0.0110	0.0502	-0.2449	0.1477	0.2122	0.2169	0.0649	1.0000			
Natural Log of Total Asset	0.5001	0.1334	-0.0698	-0.1748	-0.0237	0.2857	-0.1030	0.0394	1.0000		
Real Interest Rate	-0.2731	-0.1725	0.2403	0.2255	-0.3741	0.3209	-0.4142	-0.0485	-0.4443	1.0000	
Broad Money (M2) Growth	-0.0295	-0.1031	-0.1662	-0.0721	-0.0400	0.0537	-0.0111	0.1028	0.0602	-0.1275	1.0000
Industry Dummy1	-0.2699	-0.2104	-0.2422	-0.0194	-0.1367	0.3406	-0.1092	0.2343	-0.2328	0.4360	0.1172
Industry Dummy 2	0.0342	0.0186	0.5367	0.3014	-0.3607	-0.0280	-0.3828	-0.4124	-0.1826	0.4251	-0.2985
Industry Dummy 3	0.2554	0.2066	-0.2356	-0.2564	0.4767	-0.3363	0.4679	0.1299	0.4152	-0.8540	0.1497

	Industry Dummy 1	**Industry Dummy** 2	**Industry Dummy** 3
Industry Dummy 1	1.0000		
Industry Dummy 2	-0.4987	1.0000	
Industry Dummy 3	-0.6048	-0.3887	1.0000

The Table 2 also shows the correlation between dependent asset turnover ratio (asto_rate) with other variables. It shows negative relationship with current ratio (cr), days sales outstanding (dso), cash conversion cycle (ccc), financial institutions loan growth, overall money supply (M2) growth, an indication that higher level of liquidity leads to lesser degree of asset turnover ratio. In other way, we can say higher level of liquidity and availability of liquidity induces firms to have more asset investment and thereby lower its asset turnover ratio, which is also observed in case of US firms (McKinney, 2004). The similar relationship between firm performance and liquidity is also observed in other studies (Deloof, 2003) (Hogan, 1985) (Oseifuah & Gyekye, 2016). The Table 2 also shows positive relations between accounts receivable turnover ratio (ar_to), inventory turnover ratio (inv_to), size of firm measured by natural log of total asset (ln_ta), and real interest rate (rint_rat). Regarding industry identifier dummy variables (InDum1, InDum2 and InDum3), two of the industries (Food and Engineering Industries) has positive relationship with asset turnover ratio (asto_rate) while relationship with Pharmaceutical Industry sector (InDum1) is found negative, implying that there is different performance outcome with different industry.

5.2 Multiple Regression Result Analysis: I ran multiple regression using panel data for the two models specified for this study. The results for the first model (Table 3) reflects the relationship between efficiency-based performance indicator asset turnover ratio (as to rate) with our target determinants of liquidity along with the industry variability indicators represented by industry dummy variables. The results show that model explains statistically significant relationship between dependent and independent variables with probability of F ratio almost zero explaining almost 68 percent of variations. Independent variables like accounts receivable turnover, inventory turnover, cash conversion cycle is significant at more than 95% confidence interval, and firms leverage factor of debt-to-equity ratio (de) is found statistically significant at 90% confidence interval. Further, performance indicator and industry dummy variables are also found significant at 95% or more confidence interval. Among the variables, cash conversion cycle, debt to equity ratio, and industry dummy variables have negative relationship with efficiency-based performance indicator assets turnover ratio.

Table 3: Regression Results of Model 1: Asset Turnover Ratio as Measure of Performance and Efficiency upon Different Determinant Variables

Source	SS	df	MS
Model	156902.570	10	15690.257
Residual	73369.579	102	797.495424
Total	230272.149	112	2257.57009

Number of observations	=	113
F (10, 102)	=	19.67
Prob > F	=	0.0000
R-squared	=	0.6814
Adj R-squared	=	0.6467
Root MSE	=	28.24

Asset Turnover Ratio	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Account Receivable Turnover Ratio	.3961106	.0590518	6.71	0.000	.2788286	.5133925
Inventory Turnover Ratio	4.109952	1.005001	4.09	0.000	2.113933	6.105971
Days Payables Outstanding	.3502915	.1651619	2.12	0.037	.0222657	.6783173
Cash Conversion Cycles	-.1103487	.0239742	-4.60	0.000	-.1579636	-.0627337
Debt to Equity Ratio	-6.833568	3.644812	-1.87	0.064	-14.07248	.4053428
Natural Log of Total Asset	1.537251	.5086268	3.02	0.003	.5270748	2.547428
Industry Dummy1	-49.11775	9.627492	-5.10	0.000	-68.23878	-29.99672
Industry Dummy2	-84.33896	12.72612	-6.63	0.000	-109.6141	-59.06378
Real Interest Rate	-2.246395	4.686147	-0.48	0.633	-11.55349	7.060698
Broad Money (M2) Growth Rate	-2.442259	1.400151	-1.74	0.084	-5.223081	.3385625
constant	112.6612	45.91031	2.45	0.016	21.47932	203.843

The findings of the regression output are consistent with findings of another contemporary study on performance to firms' liquidity (Beinabaj, et al., 2013) (Kaur & Kalotra, 2019) (Claver, 2002). Further, it confirms that the performance of firms has a negative relationship with firms' liquidity (CCC) and broader financing policy (Debt to Equity or leverage policy), while such performance is not the same across the industry.

The results of model 2 regression are shown in Table 4. The result confirms the model's explanatory consistency by about 54% of the variations as a determinant of liquidity. In this model, liquidity is measured by cash conversion cycles. Here it is observed that almost all determinants of liquidity along with the industry variation identifiers (Industry Dummy variables) have statistically significant determinant power for firms' liquidity with an exception for current ratio (cr), debt to equity ratio (de), and real interest rate (rint_rat) which did not show statistically significant relation with liquidity parameter cash conversion cycle. However, besides the liquidity predictor variables, the industry variability also plays a statistically significant role in firms' liquidity. As observed here, industry 2 (Food Industry) and Industry 3 (Engineering Industry) have an opposing influence on a firm's liquidity.

Table 4: Regression output of Model 2: Cash Conversion Cycles as measure of liquidity upon Different determinants of Liquidity

Source	SS	df	MS
Model	1593399.31	11	144854.482
Residual	1098903.07	101	12075.8579
Total	2692302.38	112	26395.1211

Number of observations	=	113
F (11, 101)	=	12.00
Prob > F	=	0.0000
R-squared	=	0.5918
Adj R-squared	=	0.5425
Root MSE	=	109.89

Cash Conversion Cycles	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Account Receivable Turnover Ratio	.1071263	.280427	0.38	0.703	-.4499075	.66416
Inventory Turnover Ratio	-3.343502	4.270833	-0.78	0.436	-11.82699	5.139984
Days Payables Outstanding	.6561124	.6549822	1.00	0.319	-.6449293	1.957154
Asset Turnover Ratio	-1.577105	.3737797	-4.22	0.000	-2.319573	-.834638
Debt to Equity Ratio	-18.57904	14.33437	-1.30	0.198	-47.05251	9.894435
Natural Log of Total Asset	-4.420701	2.052758	-2.15	0.034	-8.498253	-.34315
Current Ratio	8.16462	5.277421	1.55	0.125	-2.318329	18.64757
Industry Dummy2	-97.73435	39.34413	-2.48	0.015	-175.8866	-19.58207
Industry Dummy 3	208.5369	36.65411	5.69	0.000	135.728	281.3457
Real Interest Rate	-10.64474	18.22854	-0.58	0.561	-46.85349	25.564
Broad Money (M2) Growth	-12.62934	5.40172	-2.34	0.022	-23.35919	-1.899482
Constant	613.9907	159.8844	3.84	0.000	296.3999	931.5814

Source: Stata 9.0 Output file.

Thus, the two model specifications for this study establishes the empirical relationship between the performance of firms and their liquidity parameters as observed in similar studies conducted in different countries as well as in Bangladesh.

6. Conclusion and Policy Implications

The study was conducted on the premise that how liquidity parameters of firms can explain an efficiency-based performance indicator like a firm's asset turnover ratio. As observed in several studies on similar topics as reviewed here, performance is measured by return on assets or more generic measure the net profit ratio. My approach to incorporate efficiency-based performance through asset turnover ratio also found that the firm's investment-based efficiency of operations is also significantly explained by its liquidity management practice. Excessive investment in liquid assets (in addition to other assets) affects firms' performance. Further performance is not the same across all industries. That means such a conclusion does not imply the same results to all sectors. Therefore, the management must carefully pay attention to industry-specific needs to plan its asset investment as well as liquidity management policies depending on industry needs.

Liquidity management along with overall investment in assets, investment planning is critical for a firm's performance. Financial managers, while planning their investment decisions of a firm, must pay attention to its impact on performance. While liquidity is important for the smooth operations of the firms, an excessive investment may result in inferior outcomes. However, such outcomes will not be the same across all industries.

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