

Independent Final Report
On
Mobile Financial Services in Bangladesh: The Case of bKash



by
Siddique Md Mehdarul Faiz
ID: 52120002

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Certification

I, Siddique Md Mehdarul Faiz (52120002) hereby declare that this Independent Final Report is true and original. The information and materials presented here have never been submitted to a different college or university in order to receive a certificate or award. The data was gathered from other researchers and publishers, and it was all properly referenced and recognized.

Siddique Md Mehdarul Faiz

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ABSTRACT

Mobile financial services (MFS) which is a tool of financial inclusion has aided the disadvantage and low-income individuals in remote areas of Bangladesh to get access to various financial services without visiting a bank or an ATM. Mobile banking has brought around 48% of the people in Bangladesh under its umbrella so even people living in remotest part of the country can get their banking transactions done. Numerous stakeholders can profit from mobile banking. The adoption of mobile banking will boost the economy's GDP, encourage entrepreneurship, and increase money flow on a macro level MFS is desirable because there are many uneducated people in the rural areas for whom the process of banking is complicated, they might not have access to a bank or ATM nearby and recently the price of smartphones is going down drastically but have a better network speed and cheaper data plans. Financial inclusion is very important for the enhancement of the economy of a developing country and in the case of Bangladesh it is mainly being done through mobile banking. MFS provides stability to the banks with an increased cashflow which in turn stabilizes the economy.

Through the research I want to study:

- What is the impact of average daily transactions on the revenue of bKash?
- What are the factors assisting in the development of mobile banking services?
- What is the contribution of bKash to the development of mobile banking in Bangladesh?

The sources of the research will be mainly based on the secondary data collected from the selected commercial bank websites for the financial reports, Bangladesh Telecommunication Regulatory Commission (BTRC) and the central bank known as Bangladesh Bank (BB). The collected data will be used in Microsoft Excel for descriptive statistics to compare the data and in SPSS to run the linear regression to support the hypothesis.

Chapter 1. Introduction

Bangladesh is a small country with a meager economy inscribed on the world map in 1971 after gaining independence from the grasp of the colonizing country. Since then, the country has survived and grew with many ruling parties until the recent years where the country has outperformed its neighbors and seen a constant rise in economic growth. Bangladesh had a negative GDP growth of -2.12% from 1971 to 1975 but has managed to achieve positive average GDP growth of 5.10% from 1976 to 2020, with 2019 being the highest at 8.15% (Figure 1). Despite 2020 being affected by Covid-19 Bangladesh still managed to keep the growth in the positive. The GDP per capita averaged a meager \$161.42 between 1971 to 1975 but since 1976 it averaged at \$575.95. Since 2014 the GDP per capita rose above \$1000 with 2020 being the highest at \$1961.61 (Figure 1). All this achievement came through years of contribution from the financial inclusion.

Financial inclusion is providing financial products and services at an affordable cost made accessible to individuals and businesses especially to the low income and underprivileged society to improve their lives (The World Bank, 2022). Financial inclusion is beneficial for multiple parties as at the macro level it will escalate the flow of money, encourage entrepreneurship, and contribute to growth in GDP.

With the advent of the Internet, the financial services industry has undergone a total transformation in terms of how business is conducted. Companies now have access to innovative business models and ways to offer their customers round-the-clock service. Online banks, brokers, and wealth managers that provide specialized services have emerged as a result of the capacity to conduct financial transactions online, however they still make up a very small portion of the financial services market. Mobile phone adoption in European countries is very high (at least 80% of customers own a mobile phone), while mobile infrastructure in Asian countries like India, China, Bangladesh, Indonesia, and the Philippines is comparable to or even superior to centralized infrastructure.

Banks play a major role in financial inclusion by providing various financial products and services and stabilizes the economy. Bangladesh's banking sector had six nationalized commercial banks at its inception, along with three state-owned specialty banks and nine foreign banks. Private banks' entry into the market in the 1980s resulted in a significant expansion of the banking sector. (Bangladesh Bank, 2022). There are 61 Scheduled Banks under the jurisdiction of the Bangladesh Bank Act, 1972 and 5 Non-Scheduled Banks which are set up to achieve a certain and defined goal. (Appendix 1)

Financial inclusion is very important for the enhancement of the economy of a developing country and in the case of Bangladesh it is mainly being done through mobile financial services. In order to allow clients to execute banking transactions while on the go, mobile financial services (MFS) link banking with mobile wireless networks. This refers to the capability of utilizing a mobile device to deposit, withdraw, transmit, and receive money. Bank agents are routinely used to facilitate these services, enabling mobile account holders to do transactions outside of bank branches at independent agent sites. (Bangladesh Bank & CGAP, 2012).

The banking industry has grown significantly over the last few years. However, there are worries that, due to high operating expenses, banks have been unable to bring a large portion of the population into the fold of basic financial services, particularly those from distant and rural areas. The majority of Bangladeshis especially in the rural areas do not have access to a secure and trustworthy money transaction mechanism through a traditional banking system or ATM. People who did not have a bank account used to send money via the slow and unreliable postal money transfer services or through middlemen (Bangladesh Bank & University of Dhaka, 2017). Due to the recent fall in prices of smartphones and a better network speed with cheaper data have made mobile financial services very much accessible in Bangladesh (Figure 2). The number of mobile phone subscribers have gone up somewhat consistently from 86.56 to 171.85 million between 2012-2021. As the number of subscribers increased significantly over the ten years period the number of people with access to mobile banking also saw a consistent rise from 3.02 to 111.47 million. This increase in number of clients encouraged the MFS sector to grow and for more banks to provide the service which helped with the scope of financial inclusion and boosted the economic growth.

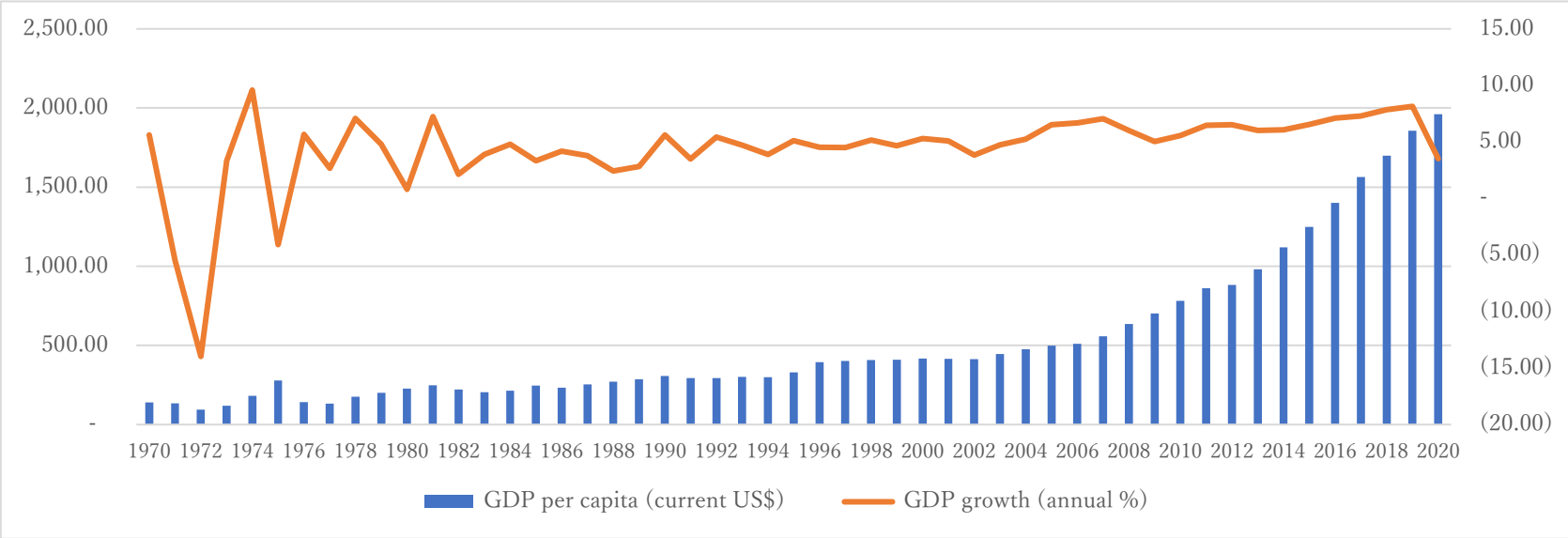
1.1 Objectives and questions.

The report seeks to portray the overall scenario of the mobile financial services in Bangladesh and determine how financial inclusion through mobile financial services is empowering the banks which is contributing to the economic growth. The objective of the report is to find the answer for the following questions:

- What is the impact of average daily transactions on the revenue of bKash?
- What are the factors assisting in the development of mobile banking services?
- What is the contribution of bKash to the development of mobile banking in Bangladesh?

1.2 Scope and limitations.

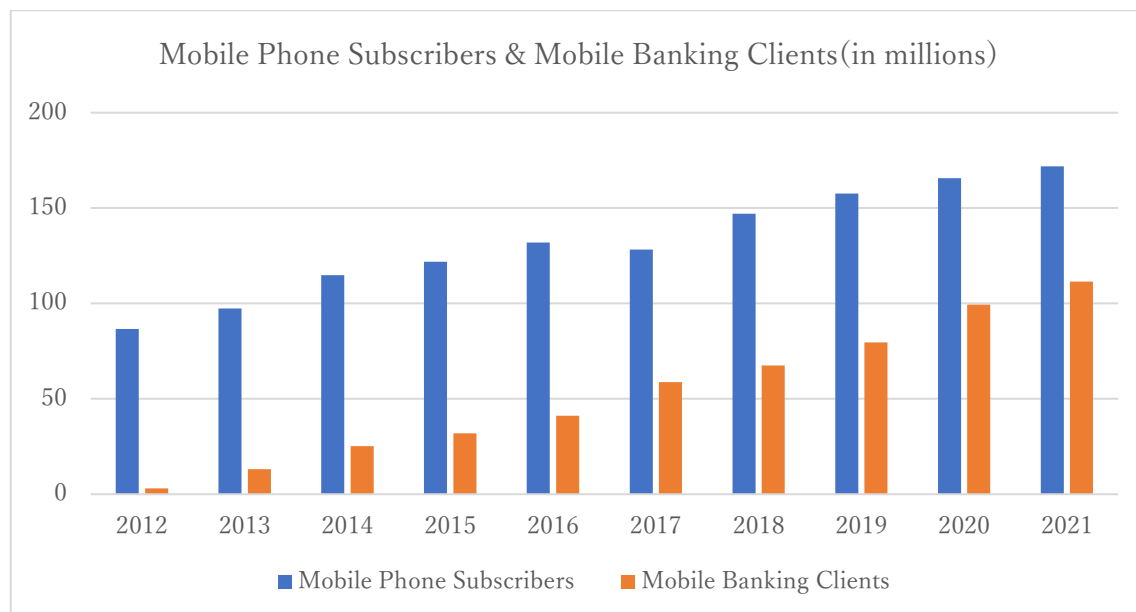
This report will cover only analysis of the market leaders in the mobile finance sector and use the monthly and annual data from 2018 to 2021. The study will be based on the secondary data collected from the government websites and the selected banks. Therefore, some essential reasons to explain can be partially answered based on the massive banking industry and the financial services provided by them.



Source: World Bank

For more information, please see: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=BD>

Figure 2. Mobile Phone Subscribers & Mobile Banking Clients



Source: Bank of Bangladesh, and Bangladesh Telecommunication Regulatory Commission (BTRC), Accessed on 19/04/2022.

For more information, please see:

<https://www.bb.org.bd/en/index.php/financialactivity/mfsdata>

[http://www.btrc.gov.bd/site/page/0ae188ae-146e-465c-8ed8-d76b7947b5dd/-](http://www.btrc.gov.bd/site/page/0ae188ae-146e-465c-8ed8-d76b7947b5dd/)

Chapter 2. Literature Review.

The banking sector's digital transformation is poised to enter a new phase. Financial services companies, however, are now sufficiently prepared to keep up with technology breakthroughs and inventively adapt those to enhance customer service. (Deloitte Center for Financial Services, 2014). Financial inclusion is a stimulant for societal economic and social growth, but there is still a long way to go to attain the desired result for developing countries (Sharma & Kukreja, 2013). The elimination of poverty, the enhancement of personal and household welfare, and the promotion of entrepreneurship and small business activities can all be aided by access to financial services. Simultaneously, economies with increased financial access and facilitation for all expand quicker and have less income disparity (UNDESA and MCIT, 2012).

Financial inclusion has come a long way in recent years, thanks to new technology, communications infrastructure-enabling legislation, and commercial opportunities at the bottom of the pyramid (Cheston et al, 2016). One of the best technological stories of the previous decade is the spread of mobile phones in developing countries. Indeed, mobile phones are likely to outnumber bank accounts in those countries (Proteus, 2006). Customer experience is being dramatically reshaped by mobile technology. Consumers are linked to using mobile devices to an extent unequaled by any kind of technology in the past due to mobile's availability and convenience of use. Mobile is gradually becoming the major mode of communication with financial services providers for many people. Even though users are familiar with such mobile services, many are hesitant to utilize them due to security, privacy, and simplicity of use concerns (Deloitte Center for Financial Services, 2014).

The mobile financial system provides an easy way to manage money without having to deal with cash. The time and distance restrictions for numerous banking transactions are eliminated by this capability. Customers now find banking more convenient, and their banking transactions have been enhanced. In addition to banking, it is used to pay bills, purchase tickets, recharge mobile devices, and other things. Through increasing consumer transactions, mobile banking enables banks to interact with their customers more frequently and to make money. Mobile banking is a service that mobile phone companies are considering offering to their clients. Banks and financial organizations, on the other hand, see mobile banking as a way to reach out to "the financially excluded." Government authorities has a similar interest as well but are addressing security and taxation concerns. Surprisingly, academic research on the impact of mobile banking on emerging economies is rare (Maurer, 2008). If given a minimal incentive and instruction, illiterate households, particularly women, can accept and use mobile banking technology, according to a study titled "Mobile Banking and Remittances: Evidence from Migrant Workers of Urban Bangladesh". Despite the fact that many of the homes in the survey were illiterate, the study indicated that training could assist bridge the digital gap. The study, which focuses on the impact of mobile banking on household welfare, indicates that mobile money has beneficial benefits on remittance frequency, health, and education results for rural households, as well as a reduction in borrowing. The findings point to mobile banking as a possible option for broader financial inclusion in emerging nations (International

Growth Centre (IGC) and BRAC Institute of Governance and Development (BIGD) , 2016). The banking business in Bangladesh has grown dramatically during the last few years. However, there are worries that, due to high operating expenses, banks have been unable to bring a large portion of the population into the loop of basic financial services, particularly those from distant and rural areas. In 2021 the population of Bangladesh was 166.3 million (Statista, 2021), and the BTRC reported that the number of mobile phone subscribers were 171.85 million as a person can have more than one mobile subscription but have only 124.8 million bank accounts. As a result of this circumstance, the Bangladesh Bank decided to allow commercial banks to provide financial services over mobile networks to the people either dealing with banks or not, which are known as mobile banking, mobile transfers, and mobile payments.

In Bangladesh, the mobile financial system is widely utilized for bill payment, savings, and remittance, but not so much for credit and insurance (The Boston Consulting Group, 2011). The development of MFS as a financially viable, secure, and competitive banking system is what Bangladesh Bank, the country's central bank, is aiming for. MFS can expand the number of service points available throughout the financial system while lowering expenses. A significant advantage of MFS is its ability to attract a large number of unbanked people to the formal financial sector. It can also develop into essential infrastructure that reduces costs and boosts productivity throughout the banking industry and the overall economy (Bangladesh Bank, 2012). Bangladesh Bank is assisting the government's efforts by encouraging financial inclusion and environmentally sustainable financing through its own programs, and mobile financial services have emerged as a crucial tool for financial inclusion activities (Chowdhury, 2016) while financial inclusion in Bangladesh is greatly facilitated by bank credits to the agriculture sector (Sarker, Ghosh , & Palit, 2015).

Bangladesh Bank (2012) publishes a policy document titled "Mobile Financial Services in Bangladesh: An Overview of Market Development," which provides a market-level overview of Bangladesh's early-stage development with MFSs. In the context of Bangladesh, all prior publications acknowledge the growing role of MFSs in poverty reduction and economic well-being.

Chapter 3. Methodology.

A descriptive approach has been taken to write this report. The paper is descriptive in structure because it makes an effort to gather information and data and do statistical analysis.

Mainly two types of data have been used to study and complete the report. Qualitative data to analyze the report statistically and Quantitative data to explain the factors through literature.

The quantitative data have been used to explain the factors affecting the revenue of bKash and qualitative data to describe the mobile banking situation in macro level and in micro level and the contribution of bKash towards the mobile banking industry in Bangladesh.

Mainly secondary source of data has been used. The information is derived from the findings of other researchers, not from their own observations. Government websites, magazines, periodicals, books, journals, and other writers' writings are a few of the important secondary sources.

The collected data has been used in Microsoft Excel for descriptive statistics to compare the data and in SPSS to run the correlation to support the hypothesis.

Chapter 4. Finding and results.

I propose the model to analyze the data that I have collected shown in the Appendix 3 to portray the impact of average daily transactions on the revenue of bKash. I developed the model mentioned below to prove it.

$$\text{OLS Model} \quad Y = a + B_i X_i + \epsilon \quad i= 1,2,3$$

Y= Revenue of bKash, in Core BDT

X1= No of average daily transaction

X2= Mobile banking customers

X3= Mobile phone subscribers

a= Intercept, when $X_i=0$, the minimum revenue will be represented in a-value
 B1, B2,

B3= Coefficients of variable X1, X2, and X3, respectively

E= Error, unobserved parameters

Table 1: Correlation Analysis

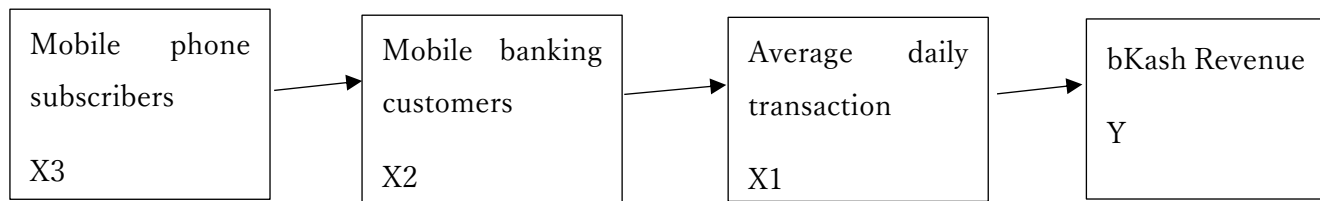
Correlations

		Revenue	Avg daily trans	Mobile banking cust	Mobile phone subs
Revenue	Pearson Correlation	1	.983*	.953*	.931
	Sig. (2-tailed)		.017	.047	.069
	N	4	4	4	4
Avg daily trans	Pearson Correlation	.983*	1	.989*	.960*
	Sig. (2-tailed)	.017		.011	.040
	N	4	4	4	4
Mobile banking cust	Pearson Correlation	.953*	.989*	1	.985*
	Sig. (2-tailed)	.047	.011		.015
	N	4	4	4	4

Mobile phone subs	Pearson Correlation	.931	.960*	.985*	1
	Sig. (2-tailed)	.069	.040	.015	
	N	4	4	4	4

*. Correlation is significant at the 0.05 level (2-tailed).

Table 1. shows the significance of average daily transactions of bKash towards revenue of bKash is 0.017 with coefficient correlation of 0.983. The significance of mobile banking customers towards average daily transactions is 0.011 with correlation coefficient of 0.989. The significance of mobile phone subscribers towards mobile banking customers is 0.015 with correlation coefficient of 0.985.



The mobile phone subscribers influence the mobile banking customers which in turn influences the average daily transactions which eventually influences the revenue of bKash

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-200.907	33.38356	-6.01815	0.026517	-344.545	-57.2694	-344.545	-57.2694
Variable 1	1.809114	0.207646	8.712504	0.012919	0.915687	2.702541	0.915687	2.702541

$$Y = a + b_1X_1 + E$$

$$Y = -200.907 + 1.809114 * X_1 (\text{number of average daily trans})$$

Y is the revenue of bKash, -200.907 is the constant (in terms of $X_1=0$) and 1.809114 is the coefficient which will be multiplied to the number of average daily transactions of bKash.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-1202448	905767.6	-1.32755	0.315587	-5099652	2694755	-5099652	2694755

X Variable								
1	93833.66	9945.869	9.434436	0.011049	51040.04	136627.3	51040.04	136627.3

$$X1 = -1202448 + 93833.6 * X2 \text{ (number of mobile banking customers)}$$

X1 is the number of average daily transactions of bKash, -1202448 is the constant (in terms of X2=0) and 93833.6 is the number of mobile banking customers.

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-200.907	33.38356	-6.01815	0.026517	-344.545	-57.2694	-344.545	-57.2694
X Variable								
1	1.809114	0.207646	8.712504	0.012919	0.915687	2.702541	0.915687	2.702541

$$X2 = -200.907 + 1.809114 * X3 \text{ (number of mobile phone subscribers)}$$

X2 is the number of mobile banking customers, -200.907 is the constant (in terms of X3=0) and 1.809114 is the number of mobile phone subscribers.

Revenue of bKash is highly correlated to average daily transactions, number of mobile banking customers and number of mobile phone subscribers. However, the number of average daily transactions predicts the revenue of bKash better than the other two factors. The number of mobile phone subscribers forecasts the number of mobile banking customers. The number of mobile banking customers in turn forecasts the average daily transactions.

bKash will lose its revenue if there are no or few daily transactions at a 90% confidence level even though people are using mobile banking services or subscribed mobile phones. However, there is a chance that the revenue of bKash will possibly stimulate if people start using mobile banking services.

4.1. Discussion of the factors assisting in the development of mobile banking services.

4.1.1. Mobile Banking in developed countries.

Global banking and payment business is undergoing a revolution because of mobile technology. It presents new chances for banks to increase the convenience they give to their current clients in industrialized nations and connect with sizable numbers of unbanked clients in emerging regions. In industrialized nations, almost everyone owns a mobile phone, and some users have multiple cell subscriptions. In the United States and

France, mobile penetration is at 105%; in the United Kingdom and Germany, it is at 130%. However, mobile banking is still rarely used in most countries and is only recently available in several of these areas. PayPal has become a major force in online and mobile payments in the US. Beginning as a person-to-person (P2P) electronic payment network in 1998, PayPal quickly expanded after eBay acquired it so that its customers could pay vendors using PayPal. (Gupta, 2013).

83% of respondents to bi intelligence's cell banking aggressive facet study indicated they utilize mobile banking, and banks are investing at previously unheard-of levels in mobile banking capabilities: For instance, bank of the USA maintained its 2017 mobile banking expenditure from 2015 while tripling it in 2016 (Toplin, 2018).

4.1.2 Mobile Banking in Developing countries.

Building a 21st century infrastructure allows poor countries to surpass wealthy ones (because they have little legacy infrastructure to begin with). For instance, India advanced from having no landlines to the most modern wireless telecommunications. India is moving away from traditional brick and store banking toward wireless banking as a result of that revolution. Other developing nations exhibit such patterns, as well. M-Pesa, a mobile payment system popular in Africa, serves as an example. Contrary to popular belief, developing nations may lead developed nations in mobile banking (Govindarajan, 2012).

To reduce poverty, it is essential to increase access to financial services like savings, deposits, insurance, and remittances. Savings can assist low-income people invest in productive assets like livestock, loans can help businesses grow, and insurance can provide a family with income in the event that the primary earner becomes ill. But in many developing nations, 90% of the population lacks access to a bank account or other fundamental financial services. Since their transactions tend to be minimal and many of them reside in isolated places outside the reach of bank branch networks, the formal financial sector frequently does not view the poor as potential customers. The availability of informal banking services including microloans and village savings and loan societies is still restricted (Andrew, 2009). Banks must find innovative methods to serve the poor profitably if they are to see them as potential clients. Often, it is too expensive to extend branch networks, but the creation of suitable technologies may offer a solution. One strategy with a lot of potential for reaching the poor is offering financial products via mobile phones: Mobile phones are already available to a large number of the poor. Mobile networks' low-cost ability to reach rural places is a benefit of mobile phones. Mobile phone providers frequently enjoy better familiarity and trust among the poor than traditional banking institutions do. Additionally, it is simple to modify a mobile device to conduct financial transactions (Andrew, 2009).

India has a sizable unbanked population as a result of accessibility and cost issues. With 840 million or more mobile subscribers, mobile banking can offer a quick, affordable,

simple, comfortable, and secure avenue for customers to conduct banking transactions throughout India. While bank customers can access a variety of services through their mobile banking applications, it was necessary to link the biggest banks in order to provide customers with a real-time, round-the-clock remittance solution. This need is met by the Inter-Bank Mobile Payment Service (IMPS), an original payment method from NPCI (Govindarajan, 2012). Access to banking services in rural areas is virtually nonexistent in developing countries like India. However, the power to provide people with banking services may be channeled through mobile banking, making financial inclusion a reality. One method of offering banking services via mobile devices is mobile banking, sometimes known as mobile money. Mobile banking also makes it simpler to overcome obstacles throughout the challenging circumstances we have faced. For instance, 8 out of 10 Indians now depend on mobile banking services as a result of the pandemic. People can be protected against ambiguous times and difficulties even in the future by using digital technology (Finezza, 2022).

According to Jay Rosengard (Rosengard, 2016), adjunct lecturer in public policy at the Harvard Kennedy School, gaining access to formal financial services is known as financial inclusion and is a crucial component of equitable economic growth. Financial inclusion enhances the standard of living for individual families and promotes regional and global economic growth, according to research, by reducing transaction costs and assisting in the distribution of risk and capital across the economy. For women and other oppressed groups who have historically been excluded from the formal economy and had less control over their own funds, financial inclusion can be especially effective. With regard to financial inclusion, Kenya has surpassed other nations because to this growth. The percentage of people in Kenya who have access to a financial account is more than twice the average for sub-Saharan African countries and around treble the average for low-income countries overall.

Kenya rose to the top of the mobile money globe. More adult residents in Kenya have cell phone subscriptions than there are, and more than 80% of those who have a cell phone also use mobile money. The popularity of mobile money in Kenya is mostly due to three factors. Kenya's regulators first facilitated the growth of mobile money. Particularly the Central Bank played a progressive role, ensuring the market with its monitoring while allowing "regulation to follow innovation." Second, Safaricom's strategy—the operator that is everywhere—was crucial. The corporation already held a more than 50% market share in 2007. Its dominant position and widespread presence helped it grow. Third, Safaricom's management recognized that human management, not technology, was more important which ultimately what made M-PESA successful (Fengler, 2012).

Mobile banking is not the first new technology to enable nations advance more swiftly and skip over some developmental phases. In the 2000s, cell phones had this effect in sub-Saharan Africa. Countries were able to skip the landline telephone era and quickly provide modern communication to their citizens as mobile phone ownership soared. Kenya presently has a cell phone ownership rate of 82%, which is almost identical to the

US average of 89% (Brazzel, 2017).

4.1.3 Business Model of MFS

Numerous mobile banking concepts are now being developed. However, the business model will be reliant on banking officials, or retail or postal institutions that execute banking transactions for of telco or banks, if mobile banking is being utilized to attract low-income populations in typically remote locations. The bank representative will be in charge of customer care, service quality, and cash management, making them a critical part of the mobile banking business model. Many carriers will cooperate with their regional resellers of airtime. However, banks use bakeries, pharmacies, etc. in Colombia, Brazil, Peru, and other markets. The main difference between these models is who will develop the relationship with the end consumer (account opening, deposit taking, lending, etc.), the bank or the non-bank/telecommunication company (Andrew, 2009).

Banks are already making investments in mobile technology and security, creating apps for smartphones, introducing new capabilities like remote check deposit, and training customers. As a result, customers have adopted mobile banking far more quickly than they did online banking more than ten years ago. Most banks think that using mobile technology will lower transaction costs while also boosting client engagement and retention. This is comparable to the advantages that online banking was supposed to provide years ago. A Harvard study, however, reveals that while internet banking increased customer retention and decreased cost per transaction, it also caused an increase in the total volume of online and offline transactions, which raised the overall transaction cost. (Gupta, 2013).

David Porteous (Porteous, 2006) differentiates amongst additive and transformational mobile banking models in a paper. The aforementioned specifically reaches out to banked groups, feasibly "morphing" the economic growth of a country, whereas the latter purposefully approaches to unbanked groups, presenting the mobile platform as an alternative option to the former's target audience of already-banked customers. The latter is more significant in developing nations because it is frequently promoted as a tool for promoting financial inclusion while also eliminating the need to open bank branches in outlying regions. The call for m-banking to advance quickly is typically justified by success claims (mostly measured in terms of the number of users) from experiences in other nations, particularly the Philippines, South Africa, and Kenya, whereby the bank-based and non-bank based m-banking models are in operation since 2001, 2004 and 2007, respectively.

Using electronic communication technology, the conventional banking model can be made to operate better without changing its goals or functions, which will greatly increase the efficiency, accuracy, and convenience of financial services for consumers. Mobile banking is the best banking system because it is so widely used. The development of

wireless technology helped humanity by giving them an ideal financial system. Even if we were unable to put the ideal engine, ideal technology, and ideal teaching system into effect, we have come extremely close to achieving the ideal banking model by increasing the use mobile banking extensively (Aithal, 2016).

4.1.4 Pros and Cons of MFS.

The practice of doing financial-related tasks using a mobile device, such as a smartphone or tablet, is known as mobile banking. A mobile device can be used to conduct mobile banking through a call, text, website, or app. Mobile banking has both pros and cons, some of which have been noted here.

Pros.

It does not need an internet connection because it makes use of telecom carriers' mobile connectivity (Chandran, 2014).

Mobile banking allows users to carry out a number of financial tasks conveniently and safely from their phone. It can be very helpful to be able to access bank accounts, make payments, and even keep track of assets from anywhere. Avoid lines by conducting your banking at a time and location that work for you (Dalha, 2014).

It is easier to locate ATMs, deposit checks, pay bills, examine previous transactions, check your account balance, manage investments, and more (Chandran, 2014).

For the majority of mobile phone owners in rural locations, mobile banking offers 24/7/365 accessibility to financial services in a simple, convenient, and ideal manner. The best benefit of M-banking is that customers can access their accounts whenever and from wherever they want using a mobile device (Shalini, 2021).

Even more secure than online/internet banking, according to reports, is mobile banking. E-banking transactions can be secured using a private key kept on the SIM card. To effectively protect private financial and purchasing information, a mobile phone can be converted into a wireless wallet (Choudhary, 2022).

Cons.

Users of mobile banking run the danger of being the target of phishing emails and fraud. The unencrypted servers of mobile phone providers pose the biggest security risk in mobile banking. A skilled hacker will be able to readily get details about a user's account or debit and credit cards. Additionally, messages from banks are not encrypted. This implies that intercepting the information as it is transmitted through the mobile operator won't be a problem (Ihor, 2021).

Losing the mobile phone frequently results in hackers gaining access to your mobile banking PIN and other private data (Chandran, 2014).

Older mobile phone and device versions are less suitable for mobile banking than contemporary mobile devices like smartphones and tablets (Dalha, 2014).

Banks usually place a cap on the volume of transactions; the bank may even outright forbid any transactions that it deems to be risky. The bank runs a huge risk while managing consumer deposits and credit accounts remotely. Both the total amount of transactions per day and the number of transactions per day are subject to restrictions (Ihor, 2021).

Mobile banking users may accrue hefty fees from their banks over time. Charges for using mobile banking are typically expensive, especially for frequent users (Prosper, 2022).

4.1.5 Fundamentals to the success of MFS.

Mobile money services now have more opportunities to succeed thanks to the evolution of the mobile phone markets. Regular improvements in the mobile channel have raised awareness among businesses and financial institutions, particularly in emerging nations, who now recognize that a growing percentage of their online presence may be spent on mobile. Here are a few factors that could affect how mobile money services develop in the future.

Simplicity of Use: People can use mobile money to purchase goods and services; they can send money practically anywhere, even if they are far from a bank. The electronic payment device is now the mobile device. Its main benefit is its mobility. It makes it possible to make payments at anytime and anywhere. Customers can pay their bills and make purchases whenever they want thanks to telephone and internet banking advantages (Choudhary, 2022).

Unbanked and Underbanked: The requirements of the unbanked, underbanked, and unhappy banked can be greatly improved by embracing mobile money services. allowing individuals to use mobile devices to make payments and send money to businesses, friends, and family. decreasing the need for long bank lines and integrating them into the modern economy (Gupta, 2013).

Ease of Savings: Using a mobile phone to store money and having access to it whenever you need it is one of the key successes of mobile money services. This also lessens the need for actual cash, putting up a barrier against theft (Dalha, 2014).

Remittances: Mobile money has the ability to meet customer needs and expectations to transmit funds at any moment throughout the day or week, regardless of the amount, given that so many financially excluded individuals transfer domestic and international remittances in cash and numerous people use mobile phones in developed and emerging

markets. The MFS should support transactions from one customer to another customer (c2c), from a business to a customer (b2c), or between businesses (b2b) (Mandal, 2019).

The mobile phone era: Virtually every area of consumer behavior is altering as a result of the adoption of mobile technologies. Mobile money providers now have an unprecedented chance to forge connections with both potential and current consumers across a variety of mobile platforms (Dalha, 2014).

Enhances Economic Growth: Due to the portability of mobile devices and the widespread availability of mobile network services compared to traditional banks, the availability of MFS in various strategic areas is essential for future acceptance and widespread use of such services, thereby enhancing both microeconomic growth and macroeconomic development. It enables businesses to cut costs, access credit for investments, and connect with customers who were previously unreachable by financial services (UNDP, 2022).

Network fluctuations, the impact of losing a mobile device, unauthorized use, and the possibility of improper transfers are issues that the service providers need to face head-on in order to maintain standards and guarantee efficient and effective use of the services over the long haul. Due to the low network quality and remote locations of these institutions, mobile money's full potential benefits cannot be realized (Asfaw, 2015).

4.1.6 Various types of Mobile Banking.

The atmosphere is become more fully digitalized thanks to mobile banking. It reduces documentation and cuts down on waiting time that would otherwise be lost in lengthy lines. According to Renju Chandran (Chandran, 2014) banks offer their customers mobile banking services in the many ways outlined here:

- Over mobile applications, mobile banking: One must use the internet to download the software or application from your bank or online store to your mobile device. This functions with GSM and CDMA mobile devices running iOS and Android. (For smartphone; bKash by Brac Bank and Rocket by Dutch Bangla Bank, etc.)
- SMS-based mobile banking (also known as SMS banking): It is by far the most widely used type of mobile banking. You can receive your account's details by SMS.
- Unstructured Supplementary Service Data through mobile banking (USSD): In this case, one simply need to call the bank's support number to get information on your account. The USSD platform can be used on any phone, not just smartphones or expensive models.

4.1.7 Mobile Financial Services in Bangladesh.

Following a protracted evaluation and ad hoc permissions on MFS, Bangladesh's central bank issued regulatory standards for MFS on September 22, 2011, titled "Guidelines on Mobile Financial Services (MFS) for Banks." It was again altered in December of that year (Sultana, 2014). Later in 2018, the Bangladesh Bank issued the "Bangladesh Mobile Financial Services (MFS) Regulations, 2018" regulations. The new laws went into force immediately, replacing the previous "Guidelines on Mobile Financial Services for Banks" (Payment System Department, Bangladesh Bank, 2018)

4.1.8 bKash, The Major MFS Provider in Bangladesh

BRAC Bank founded bKash Limited, a private company limited by shares constituted under the Companies Act, 1994 on March 1, 2010. bKash was founded in Bangladesh to provide mobile financial services. Bangladesh Bank has granted the bank a license to provide mobile financial services through bKash. BRAC Bank presently owns 51 percent of the company's stock. In addition, Bill & Melinda Gates Foundation (B&M) in 2014, Alipay Singapore E-Commerce Private Limited ("Alipay") in 2018, and SoftBank in 2021 all invested in bKash in the form of convertible preference shares with the permission of all current shareholders. B&M holds 22,525 shares, Alipay 55,433 shares, and SoftBank 85,146 shares of the total 163,104 convertible preference shares as of December 31, 2021. Preference shareholders do not have voting rights, but they do have the same economic rights as equity shareholders in terms of the corporation (Brac Bank, 2021, p. 340).

With over 55 million verified accounts, bKash has a network of over 250,000 agents in Bangladesh's urban and rural locations. In 2017, bKash was placed 23rd among the top 50 firms in Fortune Magazine's annual "Change the World in 2017" list of the top 50 corporations making social impacts. In a customer study conducted by the Bangladesh Brand Forum, bKash was named the Best Brand of Bangladesh for the second consecutive year (2019 and 2020). For the fourth year in a row, bKash has been named the No. 1 Mobile Financial Services Brand in the MFS category (bKash, 2022).

4.1.9 Legal Compliance of bKash.

Compliance fundamentally refers to following the rules established by the Bangladeshi Central Bank. The goal of bKash is to always maintain the highest level of compliance, guided by the correct application of all circulars, instructions, policy letters, and rules issued by Bangladesh Bank and the Bangladesh Financial Intelligence Unit (BFIU). With a view to assuring customer pleasure and the security of their funds while investigating new channels for financial inclusion, bKash Limited is closely collaborating with the regulator as well as other external stakeholders on pertinent issues. In response to Circular 20 issued by the BFIU, the independent AML&CFT Department of bKash Limited was established in 2017. The overarching goal of this circular is to construct a solid culture of

AML&CFT compliance that extends beyond internal stakeholders and includes external stakeholders under the protection of a common compliance architecture. This culture should be strong at all levels and start at the bottom. In order to achieve a global standard for the governance of AML&CFT in its operations, bKash is working nonstop (bKash, 2022).

bKash is collaborating with a system of support to make it easier for Law Enforcement Agencies (LEA) to combat misuses of Mobile Financial Services (MFS). To prevent financial crimes from misusing the MFS platform, fraud prevention, information support, and dispute resolution are being actively pursued. Additionally, bKash frequently arranges interactive training sessions for LEA and bKash personnel at all levels. The highest level of regulatory compliance is something that bKash is still devoted to cultivating (bKash, 2022).

4.1.10 Opening a bKash account.

Nowadays, opening a bKash account is extremely easy. It is possible to create an account with connections from Airtel, Banglalink, Teletalk, Grameenphone, and Robi. To create a bKash account using the mobile phone, the following instructions need to be followed (bKash, 2022):

First get your mobile phone, both the original and copy of the National ID and one passport-sized photo. Then with the following documents you can go to a bKash agent or customer care. They can help you open a bKash account. Then you fill up the form, give your digital fingerprint and signature and submit the documents.

The cell number will change to the bKash Account number once these steps have been completed. The new bKash Account will initially allow to access the Cash In, Mobile Recharge, and Receive Money services. However, it won't allow to Cash Out, Mobile Recharge, Make Payments, or use any of the other bKash services until the KYC Form verification is finished which takes about 3-5 business days. Once the Account is completely operational, dial *247# to use the bKash services whenever it's necessary, day or night, seven days a week. When opening an account at a Customer Care Center or Customer Care, customers will be able to take advantage of all the services. The PIN number should always be kept secret for security measures and avoid theft (bKash, 2022).

4.1.11 bKash's contribution to savings through MFS

Saving money has long been a popular practice in Bangladesh. The lack of substantial social welfare benefits makes it worse. Employees in the public sector were always relieved to receive pension benefits. However, individuals employed in the private sector, particularly the less privileged group like farmers, general laborers, etc., spend their days worrying about how they will support themselves in their later years. There are some government-run programs for the disadvantaged, but they can be complicated and may not have had the desired impact. Furthermore, a significant portion of the population was

obliged to abandon any such savings plan due to illiteracy and limited access to banking services. However, as the mobile financial service (MFS) providers launched various savings programmes in partnership with the scheduled banks, things started to look up for these folks. The appeal of this savings potential is that MFS providers are accessible at all times and locations. The infrastructure, workforce, and operational schedules of banks are constrained. Looking back, MFS has grown in significance within the nation's banking sector over the past ten years. During the previous fiscal year, there had been a more than 30% rise in transactions using MFS, with over 178 million mobile accounts registered. With consistently updated programs that make financial transactions more convenient, MFS is not only the digital financial facility with the quickest growth rate but also one that is well-respected (Rahgir, 2022).

In recent years, MFS front-runner bKash has taken the lead in promoting savings opportunities. Beginning with the first such program in partnership with IDLC last year, bKash has been working with several banks to expand its reach in order to facilitate savings by as many people as possible, especially for low savers and those who lack access to bank-sponsored or government-sponsored programs. The newest development on the card is the debut of bKash and City Bank's Shariah-based deposit program. The service, known as City Islamic DPS, is accessible to users through the bKash app and account. One can sign up for term deposits with installments ranging from 500 to 3000 Tk for various tenures (Rahgir, 2022).

Savings are beneficial for society as much as for individuals. Additionally, it significantly aids in national growth. Reports indicate that Bangladesh's savings rate is significantly lower than those of its neighbors. However, the scene is certainly set for a shift for the better with the energetically innovative endeavors like those of bKash. One may have wanted to save earlier, but the means and opportunity were not available. By eliminating the need for any physical branches or the anxiety associated with making a small deposit at a physical branch, enabling savings through technology democratizes access to such a fundamental financial necessity. The money that has to be saved must be used (Rahgir, 2022). Perhaps the coordinated efforts of MFS providers and banking organizations will reshape the nation's financial system and promote sustainable growth.

4.1.12 CSR of bKash.

The Daily Star and CSR Window Bangladesh have given bKash the "Best CSR in Education" award in recognition of its distinctive commitment to education as part of corporate social responsibility (CSR). The group was recognized for hosting scientific fairs and book reading events for youngsters at schools around the nation. bKash received this esteemed accreditation for the first time as an MFS organization.

Since 2014, bKash has participated in Bishwo Shahitto Kendro's book reading initiative as a good corporate citizen of the nation. Through this partnership, bKash has given 2,63,700 books to roughly 2,900 educational institutions, benefiting 2.7 million readers nationwide. Additionally, bKash has updated or replaced outdated books in school libraries and added new collections. Students have been able to learn a wide range of

information outside of their curriculum thanks to this widespread initiative. Additionally, to encourage kids to pursue science, bKash has been hosting national scientific festivals since 2019 in partnership with Biggan Chinta, the most read science magazine in Bangla. The goal of holding this festival is to make students aware of the value of doing science in their daily lives and to create a country that values science. A quiz competition, speech by eminent national educators, a robot exhibition, a magic show, an introduction to various scientific topics, cultural performances, and prize-giving sessions are all planned for this festival, which is held in front of teachers, parents, and dignitaries. Earlier in 2022, bKash collaborated with "Proyash-Jashore" to support 118 special needs students' education (bKash, 2022).

To end the discussion, we deduce that by analyzing the macro level data of mobile banking we could identify various factors assisting in the development of the mobile banking services and the advantages enjoyed and the challenges faced by the industry. Analyzing the micro level data, we could identify how bKash is actively participating in the development of the mobile banking industry in Bangladesh as it is the role expected to be played by them for being the market leader.

Chapter 5. Conclusion.

One of Bangladesh's most pressing problems recently has been financial inclusion. The worry appears to have diminished with the introduction of bKash as they are providing more options for the disadvantaged group to access financial services through mobile banking. The introduction of new financial services with the ability to raise financial literacy among the population would guarantee the establishment of a viable ecosystem for Bangladesh and may also boost bKash's contribution to Bangladesh's overall financial inclusion in the future. The study showed that the revenue of bKash and average daily transactions is highly correlated even though the revenue has a strong relation with the number of mobile banking customers and number of mobile phone subscribers. Furthermore, the study revealed certain opportunities and challenges as mentioned below:

Opportunities.

Substantial marketplace: Bangladesh has a sizable market for mobile banking. The service provider can improve their agents' access to education to better prepare them for this field. Additionally, they can train them and produce work prospects. By doing this, they can expand the space for innovation in this industry and provide a venue for the launch of new services and products. Now that more individuals are using mobile banking, additional opportunities are opening up, which can be a tremendous advantage for the citizens of our nation. Additionally, providing them with new goods and services can aid in their development.

Innovative products and services: There are more opportunities for innovation in this field, and it will give consumers additional service and product options. It is already in widespread use in Bangladesh. For instance, merchant banking, shopping, remittance, peer-to-peer (P2P), buying airline tickets, paying bills, etc. There is possibility for it as more and more places are being constructed to improve the neighborhood.

Collaboration opportunities: As the market expands, more chances will arise for partnerships between various MFS providers. People will have more possibilities for using it, which could lead to a significant increase. As a result, there will be more chances for clients to integrate with those MFS providers and for businesses to grow. There will be additional opportunities for people to engage in other types of services, expanding the market. More MFS providers will then be motivated to offer such kinds of services. The market will have a competitive advantage, which will ultimately benefit consumers.

Reduced cost: People with lower incomes are not interested in mobile banking because they believe it to be more expensive than traditional banking. However, if awareness is raised and service costs are reduced associated with mobile banking and this industry, people may become involved with this type of banking.

Challenges.

Societal felony and scams: Some social crimes and fraud instances have been reported

since the advent of online or mobile banking. People are moving illicit funds to foreign nations through mobile banking, which ultimately leads to money laundering. On the other side, hackers are able to break through security measures and steal customers' PINs. Because of this, users are losing control over their accounts and having their money hacked. Recent cyberattacks caused Bangladesh Bank to lose a sizable sum of money. Criminals use mobile banking to pay arms traffickers and to commit social crimes like human trafficking.

No sufficient rules and regulations: Despite the laws and regulations that the Bangladesh Bank has established, there are still gaps in them. These gaps are being utilized by fraudsters. It cannot be properly tracked because there is no other appropriately qualified entity to look into it.

Market penetration: There should be fair playing conditions for market involvement. Unfortunately, there are several obstacles and risks that a new entrant to the market must overcome. They lack interest because of this. Equal opportunity is necessary, though, so that newcomers can enter the area and present their services and innovations.

Difficulties in transfer: Moving money from one carrier to another MFS provider account is still problematic (Rocket to Brac bank). It must drop to enable clients to transfer funds between accounts.

Correlation between BTRC and Bangladesh bank: To administer this sector more efficiently and in an organized way, BTRC and Bangladesh bank should work in collaboration and under correct leadership.

Technological advancement: To reduce the number of fraud instances, this industry needs high-tech software. Quality personnel were also required to run that software. A global problem is cyber security. Bangladesh must thus band up with other nations to address the issue.

Chapter 6. Recommendations.

MFS has a very bright future in Bangladesh. Bangladesh can develop new technologies, like a mobile phone, in the future to expand and sustain this industry, similar to the USA. The development of technology has allowed for new ideas to be generated by people. In this aspect, a country's economy will expand as more and more people become involved in it. A whole new notion and plan for the people will develop through innovation and services. The cost of living will decrease, as will expenses like travel. Remittances allow for the emergence of individuals, which boosts our economy. It may involve revolutionary transformation in the medical field. Through it, farmers may receive their earnings and textile workers can receive their salaries and payments. Bangladesh's eventual economic situation will be brighter.

The advancement of technology is critical, yet criminality is a worry. Therefore, the issue can be changed by more creative people in this field. For that issue, the creation of digital tools, software, and trackers is required. Cybercrime Unit, Bangladesh Bank, BTRC, and Bangladesh Police can all be extremely helpful in this area.

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Appendices

Appendix 1. Scheduled and Non-Scheduled Banks of Bangladesh in 2022

No	Organization	Web Link
1	AB Bank Limited	http://www.abbl.com
2	Agrani Bank Limited	http://www.agranibank.org
3	Al-Arafah Islami Bank Limited	http://www.al-arafahbank.com/
4	Bangladesh Commerce Bank Limited	http://bcblbd.com/
5	Bangladesh Development Bank Limited	http://www.bdbl.com.bd
6	Bangladesh Krishi Bank	http://www.krishibank.org.bd
7	Bank Al-Falah Limited	http://www.bankalfalah.com
8	Bank Asia Limited	http://www.bankasia-bd.com
9	BASIC Bank Limited	http://www.basicbanklimited.com
10	Bengal Commercial Bank Limited	https://bgcb.com.bd
11	BRAC Bank Limited	http://www.bracbank.com
12	Citibank N.A	http://www.citi.com/domain/index.htm
13	Citizens Bank PLC	
14	Commercial Bank of Ceylon Limited	http://www.combank.net/bdweb/
15	Community Bank Bangladesh Limited	http://www.communitybankbd.com
16	Dhaka Bank Limited	http://dhakabankltd.com
17	Dutch-Bangla Bank Limited	http://www.dutchbanglabank.com
18	Eastern Bank Limited	http://www.ebl.com.bd
19	EXIM Bank Limited	http://www.eximbankbd.com
20	First Security Islami Bank Limited	https://www.fsibld.com
21	Global Islami Bank Limited	http://www.globalislamibankbd.com
22	Habib Bank Ltd.	http://globalhbl.com/Bangladesh/
23	ICB Islamic Bank Ltd.	http://www.icbislamic-bd.com/
24	IFIC Bank Limited	http://www.ificbank.com.bd/
25	Islami Bank Bangladesh Ltd	http://www.islamibankbd.com
26	Jamuna Bank Ltd	http://www.jamunabankbd.com
27	Janata Bank Limited	http://www.janatabank-bd.com
28	Meghna Bank Limited	http://www.meghnabank.com.bd
29	Mercantile Bank Limited	http://www.mblbd.com
30	Midland Bank Limited	http://www.midlandbankbd.net/
31	Modhumoti Bank Limited	http://modhumotibankltd.com/
32	Mutual Trust Bank Limited	http://www.mutualtrustbank.com
33	National Bank Limited	http://www.nblbd.com
34	National Bank of Pakistan	http://www.nbp.com.pk
35	National Credit & Commerce Bank Ltd	http://www.nccbank.com.bd
36	NRB Bank Limited	http://www.nrbbankbd.com
37	NRB Commercial Bank Limited	http://www.nrbcommercialbank.com/
38	One Bank Limited	http://www.onebankbd.com

39	Padma Bank Limited	http://www.padmabankbd.com/
40	Premier Bank Limited	http://www.premierbankltd.com
41	Prime Bank Ltd	https://www.primebank.com.bd/
42	Probashi Kollyan Bank	http://www.pkb.gov.bd/
43	Pubali Bank Limited	http://www.pubalibangla.com
44	Rajshahi Krishi Unnayan Bank	http://www.rakub.org.bd
45	Rupali Bank Limited	https://rupalibank.org/en/
46	Shahjalal Islami Bank Limited	http://www.sjibld.com/
47	Shimanto Bank Limited	https://www.shimantobank.com/
48	Social Islami Bank Ltd.	http://www.sibld.com
49	Sonali Bank Limited	http://www.sonalibank.com.bd
50	South Bangla Agriculture & Commerce Bank Limited	http://www.sbacbank.com/
51	Southeast Bank Limited	https://www.southeastbank.com.bd
52	Standard Bank Limited	http://www.standardbankbd.com
53	Standard Chartered Bank	http://www.standardchartered.com/bd
54	State Bank of India	https://bd.statebank/
55	The City Bank Ltd.	http://www.thecitybank.com
56	The Hong Kong and Shanghai Banking Corporation. Ltd.	http://www.hsbc.com.bd
57	Trust Bank Limited	http://www.trustbank.com.bd
58	Union Bank Limited	http://www.unionbank.com.bd/
59	United Commercial Bank Limited	http://www.ucb.com.bd/
60	Uttara Bank Limited	http://www.uttarabank-bd.com
61	Woori Bank	http://www.wooribank.com

Source: Bank of Bangladesh, Accessed on 19/04/2022

<https://www.bb.org.bd/en/index.php/links/links/9>

Non-Scheduled Banks of Bangladesh

No	Organization
1.	Ansar VDP Unnayan Bank
2.	Karmashangosthan Bank
3.	Grameen Bank
4.	Jubilee Bank
5.	Palli Sanchay Bank

Source: Bank of Bangladesh, Accessed on 19/04/2022

<https://www.bb.org.bd/en/index.php/financialactivity/bankfi>

Appendix 2. Mobile Finance Service Provider in 2022

No.	Name of the MFS service	Name of the organization
1	Rocket	Dutch Bangla Bank
2	bKash	bKash Ltd
3	MYCash	Mercantile Bank Ltd
4	Islami Bank mCash	Islami Bank Bangladesh Ltd
5	Trust Axiata Pay (TAP)	Trust Axiata Digital Ltd
6	First Pay SureCash	First Security Islami Bank Ltd
7	UPAY	UCB Fintech Company Ltd
8	OK Banking	One Bank Ltd
9	Rupali Bank SureCash	Rupali Bank Ltd
10	TeleCash	Southeast Bank Ltd
11	Islamic Wallet	Al-Arafah Islami Bank Ltd
12	Spot Cash	Standard Bank Ltd
13	Meghna Bank Tap n Pay	Meghna Bank Ltd

Source: Bank of Bangladesh, Accessed on 19/04/22

https://www.bb.org.bd/fnansys/paymentsys/mfs_provider.pdf

Appendix 3. Data Set

No.	Year	Revenue of bKash	No. of avg daily trans	Mobile banking customers	Mobile phone subs
1	2018	21791.3	5309919	68	147
2	2019	24160.8	6141542	80	158
3	2020	26245.0	7786236	99	166
4	2021	31962.8	9529947	111	172

Data compiled by author's own calculations based on 48 months of raw data.

Source: Bangladesh Bank, Bangladesh Telecommunication Regulatory Commission (BTRC) and Brac Bank, Accessed on 19/04/2022.

For more information, please see:

<https://www.bb.org.bd/en/index.php/financialactivity/mfsdata>

[http://www.btrc.gov.bd/site/page/0ae188ae-146e-465c-8ed8-d76b7947b5dd/-](http://www.btrc.gov.bd/site/page/0ae188ae-146e-465c-8ed8-d76b7947b5dd/)

https://www.bracbank.com/financialstatement/BRAC_Annual_Report_2021.pdf

Data Analysis with the rejected values.

X3->X2->X1->Y

Model 1 (X1-Y)

<i>Regression Statistics</i>	
Multiple R	0.982743
R Square	0.965783
Adjusted R Square	0.948674
Standard Error	984.9518
Observations	4

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	54764169	54764169	56.45033	0.017257
Residual	2	1940260	970130.1		
Total	3	56704429			

$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + E$

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-200.907	33.38356	-6.01815	0.026517	-344.545	-57.2694	-344.545	-57.2694
X Variable 1	1.809114	0.207646	8.712504	0.012919	0.915687	2.702541	0.915687	2.702541

$Y = a + b_1X_1 + E$

$Y = -200.907 + 1.809114 * (\text{number of average daily trans})$

Model 2 (X2-Y)

<i>Regression Statistics</i>	
Multiple R	0.951557
R Square	0.90546
Adjusted R Square	0.85819
Standard Error	1637.198

Observations 4

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	51343597	51343597	19.15508	0.048443
Residual	2	5360832	2680416		
Total	3	56704429			

Model 3 (X3-Y)

Regression Statistics

Multiple R 0.936558
R Square 0.87714
Adjusted R Square 0.815711
Standard Error 1866.371
Observations 4

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	49737749	49737749	14.27875	0.063442
Residual	2	6966681	3483340		
Total	3	56704429			

Model 4 (X1X2-Y)

Regression Statistics

Multiple R 0.992263
R Square 0.984586
Adjusted R Square 0.953757
Standard Error 934.9109
Observations 4

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	55830371	27915185	31.93744	0.124154
Residual	1	874058.4	874058.4		
Total	3	56704429			

Model 5 (X2X3-Y)

<i>Regression Statistics</i>	
Multiple R	0.951706
R Square	0.905745
Adjusted R Square	0.717236
Standard Error	2311.853
Observations	4

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2	51359766	25679883	4.804771	0.307009
Residual	1	5344663	5344663		
Total	3	56704429			

Model 6 (X1X3-Y)

<i>Regression Statistics</i>	
Multiple R	0.936558
R Square	0.87714
Adjusted R Square	0.815711
Standard Error	1866.371
Observations	4

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	49737749	49737749	14.27875	0.063442
Residual	2	6966681	3483340		
Total	3	56704429			

Model 7 (X1X2X3-Y)

<i>Regression Statistics</i>	
Multiple R	1
R Square	1
Adjusted R Square	65535
Standard Error	0
Observations	4

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	56704429	18901476	#NUM!	#NUM!
Residual	0	0	65535		
Total	3	56704429			

Model 8 (X2-X1)

<i>Regression Statistics</i>	
Multiple R	0.988951
R Square	0.978024
Adjusted R Square	0.967036
Standard Error	339097.3
Observations	4

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1.02E+13	1.02E+13	89.00858	0.011049
Residual	2	2.3E+11	1.15E+11		
Total	3	1.05E+13			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-1202448	905767.6	-1.32755	0.315587	5099652	2694755	5099652	2694755
X Variable 1	93833.66	9945.869	9.434436	0.011049	51040.04	136627.3	51040.04	136627.3

Y=-1202448+93833.6*number of mobile banking customers

Model 9 (X3-X2)

<i>Regression Statistics</i>	
Multiple R	0.987081
R Square	0.974329
Adjusted R Square	0.961493

Standard Error 3.862703
 Observations 4

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1132.58	1132.58	75.90773	0.012919
Residual	2	29.84096	14.92048		
Total	3	1162.421			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-200.907	33.38356	-6.01815	0.026517	-344.545	-57.2694	-344.545	-57.2694
X Variable								
1	1.809114	0.207646	8.712504	0.012919	0.915687	2.702541	0.915687	2.702541

$Y = -200.907 + 33.38356 * \text{number of mobile phone subscribers}$