

Leveraging FinTech to Enhance Access to Finance for Small Enterprises in Bangladesh

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Sub: Submission of Revised Doctoral Thesis titled ‘Leveraging FinTech to Enhance Access to Finance for Small Enterprises in Bangladesh’

Dear Madam,

With reference to letter no. 5082-83/Sa-2/Pa dated October 3, 2023 from the office of Controller of Examinations, please find enclosed the revised thesis titled ‘Leveraging FinTech to Enhance Access to Finance for Small Enterprises in Bangladesh’ and a CD along with it. The revisions based on the comments are documented in the enclosed annotation tables.

Yours sincerely,

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Certificate from the Supervisor

This is to certify that Shila Mamtaz, Reg. No. 06/2017-2018 Date of joining: 07.02.2017 and Re.reg. No. 09/2021-2022 Date of Re-joining: 07.02.2021, IBA, University of Dhaka, undertook the research for the thesis titled ‘Leveraging FinTech to Enhance Access to Finance for Small Enterprises in Bangladesh’ under my supervision and guidance in order to obtain the degree of Doctor of Business Administration from IBA, University of Dhaka.

To the best of my knowledge and belief, the author embraces and takes on the entire thesis by herself, has complied with the DBA program-relevant ordinance, and did not submit the thesis in its entirety or in part elsewhere to receive any credit.

She has my admiration and best wishes.

Dr. Melita Mehjabeen
Supervisor
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List of Abbreviations

a2i	Access to Information
ACD	Alternative Credit Data
ACPR	The Autorité de contrôle prudentiel et de resolution (French Prudential Supervision and Resolution Authority)
ADB	Asian Development Bank
ADBI	Asian Development Bank Institute
AFI	Alliance for Financial Inclusion
AI	Artificial Intelligence
API	Application Programming Interface
ATM	Automated Teller Machine
AMD	Additional managing Director
AML	Anti-Money Laundering
AMLD	Anti-Money Laundering Directive
ANOVA	Analysis of Variance
APAC	Asia-Pacific Region
AVP	Assistant Vice President
BFI	Banking Financial Institutions
B2B	Business to Business
B2C	Business to Customer
BASIS	Bangladesh Association of Software and Information Services
BB	Bangladesh Bank
BBS	Bangladesh Bureau of Statistics
BBVA	Banco Bilbao Vizcaya Argentaria (Spanish multinational financial services company)
BEFTN	Bangladesh Electronic Fund Transfer Network
BGMEA	Bangladesh Garments Manufacturer and Exporters Associations
BIBM	Bangladesh Institute of Bank Management
BIS	The Bank for International Settlements
C2C	Customer to Customer
CC	Cloud Computing
CC	Cash Credit (a type of traditional bank loan)
CCAF	Cambridge Centre for Alternative Finance
CCP	Conduct, Culture and People
CF	Crowd Funding
CFT	Combating the Financing of Terrorism
CGAP	Consultative Group to Assist the Poor Business
CIB	Credit Information Bureau
CRM	Customer Relationship Management
CRM	Credit Risk Management
CRMD	Credit Risk Management Division
D2C	Direct to Customer
DFS	Digital Financial Services
DLT	Distributed Ledger Technology
DMD	Deputy Managing Director
ECB	European Commission Bureau

EFT	Electronic Fund Transfer
EIF	European Investment Fund
EMI	Equal Monthly Installment
ESAF	EIF SME Access to Finance Index
EVP	Executive Vice President
EU	European Union
FCA	Financial Conduct Authority
FID	Financial Inclusion Department
FSB	Financial Stability Board
FSI	Financial Stability Institute
FT-FinTech	Financial Technology
FTTF	Financial Technology Task Force
G20	Group of Twenty (the world's largest 20 economies formed in 1999)
GAFAA	Google, Apple, Facebook, Amazon, and Alibaba
GDP	Gross Domestic Product
GDPR	The General Data Protection Regulations
GFC	Global Financial Crisis
GFI	Global FinTech Index
GO	Geometric Operations (locations)
HKMA	Hong Kong Monetary Authority
IAIS	International Association of Insurance Supervisors
IBM	International Business Machines Corporation
ICT	Information and Communication Technology
IDTP	Interoperable Digital Transaction Platform
IFC	International Finance Corporations
IMF	International Monetary Fund
IP	Intellectual Property
ISDP	Integrated Service Delivery Platform
ITU	International Telecommunication Union
ITUFGDFS	ITU Focus Group Digital Financial Services
KYC	Know Your Customer
LSE	London School of Economics
MAS	Monetary Authority of Singapore
MFS	Mobile Financial Services
MFI	Micro Finance Institutes
ML	Machine Learning
MSME	Micro, Small, and Medium Enterprises
NBFI	Non-Banking Financial Institutions
NFC	Near field Communications
NPL	Non-Performing Loan
NPCI	National Payment Corporation of India
NPSB	National Payment Switch Bangladesh
OD	Bank Overdraft (a type of traditional bank loan)
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
P2P	Peer to Peer

PCB	Private Commercial Banks
POS	Point of Sales
PRA	Prudential Regulatory Authority
PRC	People's Republic of China
PSD2	Payment service Directives 2
PSP	Payment Service Providers
PSO	Payment Service Operator
RFFO	Regulatory FinTech Facilitation Office
RMG	Ready-Made Garments
SAVP	Senior Asst. Vice President
SaaS	Software-as-a-Service
SAFE	Survey on the Access to Finance of the Enterprises
SAFEST	Soundness, Accountability, Fairness, Ethics, Skills, and Transparency
SDG	Sustainable Development Goal
SE	Small Enterprises
SMAF	SME Access to Finance Index
SME	Small and Medium Enterprises
SMEF	SME Foundation
SMESPD	SME Special Programmes Department
SMI	Survey of Manufacturing Industries
SNAP	Sub-Network Access Protocol
SPSS	Statistical Package for the Social Sciences (a statistical software)
SSB	Standard-Setting Bodies.
TTP	Third-Party (Service) Providers
UIS	Universal Identity System
UPI	Unified Payment Interface
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
VIF	Variance Inflation Factors
VL	Virtual Ledger
WTO	World Trade Organization

Abstract

The study explores and demonstrates, as it aimed to, the prospects of leveraging FinTech to enhance access to finance for small enterprises (SEs) in Bangladesh and recommends the required policy measures. Individual sets of preceding studies on issues including small business growth, financial inclusions, access to finance, the FinTech revolution, or bank FinTech collaboration have identified different sets of individual findings. These are brought together into a coherent whole in the study, with the broader aspect of lessening the long-cherished financing problems faced by SEs through leveraging FinTech, the disruptive phenomenon in the global financial service industries of recent days.

The research ascertains that the global studies on access to finance for small businesses have reached a new era (starting from Beck and Demirguc-Kunt's 2006 study to the present studies), firmly stating that 'technology-driven and innovation-led models' can have their enhancement despite market imperfections. But in this regard, Bangladesh studies are lagging behind, mostly showing the demand and supply-side constraints or the market imperfections of debt finance for SEs following the earlier global studies (of the 1980s to 2006). Further, bank lending in Bangladesh is still characterized by the traditional lending mechanism with the problems of information asymmetry, lack of collateral security, and high interest. Even where banks are digital finance service-oriented, they mostly deal with the application of FinTech payment systems. The lending aspect of FinTech is still the least emphasized. Whereas, in current days, the funding problems are found to be resolved by the cutting-edge features of 'collateral-free instant lending at minimum cost' offered by FinTech credit in many parts of the world's SME finance practices. To lessen the above gaps both in Bangladesh literature and practices, the prospects of FinTech credit in the banks' lending mechanisms were found to be mandatory to be explored.

In assessing this prospect, the study first conducted a 'document analysis' (Cresswell, 2014) to get an idea of the current regulatory base that will help get the required policies to enact FinTech credit in Bangladesh. Quantitative research was conducted on a survey of 311 small enterprises covering all three trade, manufacturing, and service industries from the country's SME hubs that looked into whether leveraging FinTech would be a viable option in Bangladesh. This was accompanied by two qualitative researches. At first, in-depth interviews with the finance providers (primarily bankers) were held to assess their attitude toward working with FinTech. Then another set of in-depth interviews was conducted to understand the regulators' and financial experts' opinions on the challenges and opportunities of bank-FinTech collaboration.

Major explorations came up, showing that significant numbers of relevant legal and regulatory initiatives have already been taken in line with the global standard that might facilitate a FinTech credit environment. The quantitative research findings show that using FinTech by SEs can significantly enhance the relevant indicators of access to finance for SEs in Bangladesh. Thus, using FinTech by SEs is found to be prospective from a market point of view, or the demand side of debt financing. From a supply-side perspective, it is also found to be promising, as most of the responding banks agreed to work in a motivated state with FinTech to finance SEs. The regulator and experts also found the bank's FinTech business model to be a prospective one in the Bangladesh case, as it will provide collateral-free real-time loans, ensure financial inclusion, provide comfort to banks, support banks, sustaining and already have the country's present regulatory base and FinTech ecosystem.

Another prime focus of the broad research objective was to identify the policy issues to be addressed further to enact FinTech credit. Based on document analysis on the regulatory basis of world-leading FinTech countries and of Supreme Banking Regulation Authorities, reviews of the debt finance market here in Bangladesh, debt providers' approaches, opinions from the country's banking regulatory authorities and financial experts, and last but not least, from the experience of the pilot projects run by the newly initiated bank-FinTech collaboration for debt finance, this study proposes required policy recommendations in eight important areas.

Thus, the study contributes to the SE finance literature by providing an alternative theoretical view (technology-driven and innovation-led) for combating major barriers to SE growth. It presents, for the first time of its type, an immense elaborative research work by hosting several quantitative and qualitative research methods on FinTech applications in debt finance for small enterprises in Bangladesh. In addition, it recommends required policy measures to enable a more FinTech-intensive environment for debt finance and further move toward a bank-centric FinTech model in a transition economy where the adoption of FinTech in the real market is still supposed to be in question. The study provides the scope to work with further details on the products, policy enablers, or enabling technology-wise sub-sections of FinTech for SME finance in the future.

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Whenever I became exhausted doing the doctoral research besides carrying out all other responsibilities, I used to recite " Our Lord, do not burden us with that which we have no ability to bear " (Chapter 2, verse 285).

Whereas, even before that, the Almighty had already responded by saying " A soul is not loaded (from its Lord) beyond its capacity" (Chapter 2, verse 285).

Straightaway, whatever stress we face, we may turn to managing it gracefully since, for sure, nothing is imposed beyond our capacity.

CHAPTER 1 INTRODUCTION

1.1 Background of the Study

SMEs (Small and Medium Enterprises) are widely regarded as major driving forces behind global socioeconomic development for their critical contribution to the GDP (Gross Domestic Product) of all nations (OECD, 2010; Karadag, 2016; Manzoor et al., 2021). Generally, advanced countries have 90 percent of their businesses in the SME sector, which is one of the main reasons for their financial progress (De Giorgi and Rahman, 2013). In developing nations as well, the sector contributes to the achievement of sustainable development by creating jobs, alleviating poverty, stimulating innovation, and reducing economic inequality (Oba and Onuoha, 2013; Holt and Littlewood, 2014).

In the literature on SMEs' role in inclusive development, two main ideas, 'classical and modern theories,' predominate (Tambunan, 2008). Where the classical theories assume the expansion of SMEs will decrease over time, the modern theories' perspective is that, conversely, the sector plays two critical roles in the pursuit of sustainable development. They accelerate GDP growth and alleviate poverty by creating jobs and producing income from the benefits of their output growth. Indeed, numerous studies conducted both in emerging and developed nations show a direct positive relationship between SMEs and cross-national economic growth. (Anderson, D., 1982; Beck et al., 2005; Leegwater, A., 2008; Tambunan, T., 2008; Dixit, A. Kumar, A. Pandey, 2011; Cravo et al., 2012; De Giorgi and Rahman, 2013ss; S. Vijayakumar, 2013; Karadag, 2016; Littlewood and Holt, 2018). The World Bank also provides assertions in coherence with the 'modern' pattern on the significance of the SME sector in any economy (EIF, 2018).

Furthermore, according to the neoclassical theory of economic growth the share of GDP that is financed, must be increased. But in contrast to this, *"lack of access to funding is the most robust barrier to SME initiation and growth among the barriers to small enterprises' growth in developing markets"* (Dinh et al., 2010). Here, financial inclusion or access to finance presupposes the absence of barriers to using financial services (like lending for this study). Thus, enhancement of access means increasing the degree to which financial products and

services are available to all end-users at a reasonable price (Dinh et al.,2010). However, it is demonstrated that *“40 percent of SMEs—65 million firms—in developing economies are not being served by the formal financial sector, having an unmet financing need of \$5.2 trillion a year”* (World Bank, 2019).

Like other emerging countries, Bangladesh's economy also relies significantly on its SME sector. The sector is an important contributor to economic growth and rejuvenation, technological innovation, large-scale sourcing, and social progress. SMEs account for 80 percent of all private businesses and employ nearly 90 percent of the business population (BBS, 2019; Khatun & Amanullah, 2021). Despite this, from inception to date, SME contribution to Bangladesh's GDP is far behind (20–25 percent) from its required rate of 40–50 percent (ADB, 2015; Hoque et al., 2016), as formal SMEs contribute up to 55 percent of national income (GDP) in developed economies and up to 40 percent of GDP in emerging economies (World Bank, 2019). From the study of SME growth in Bangladesh also, the lack of SME finance is found to be the most commonly cited prominent factor in low SME growth in the country (Choudhury & Raihan, 2000; BIBM & Hossain, 2013; Billah, 2021) with a financing gap of \$2.8 billion (World Bank, 2019). Again, here, in bank lending, reliance on traditional debt finance (short-term or long-term bank loans, overdrafts, or credit lines) is very high. These are defined as "straight debts," which place a straight, unconditional claim on the borrower's principal and interest repayment regardless of their business condition (OECD, 2015). The challenges of having straight debt are even greater for SMEs, owing to (i) information asymmetries, (ii) a lack of collateral, and (iii) banks' low revenue per client (Andrew et al., 2013; World Bank, 2017).

Since the early 2000s, in line with the increased interest in access to finance, a large number of studies have attempted to find ways to overcome the limited access to finance around the world. These cross-country studies have followed two alternative approaches. One set of studies concludes that 'institutional development' (of both financial service providers and borrower firms) is the most important factor that explains the financing obstacles to enterprises. But going beyond that, another set of studies highlights an 'innovative financing' system can help facilitate SMEs' access to finance even in the absence of well-developed institutions or in market imperfection (Beck et al.,2004; Beck and Demirguc-Kunt, 2006).

At the same time, after the 2007–8 financial crisis, the issue of lack of access to finance for small enterprises gained new prominence, having been formally recognized as an issue of urgent importance at the G20 summit in Pittsburgh in September 2009 (ACCA, 2014). Consequently, these well-documented problems of the banking system in many parts of the world contributed to the increasing attention this topic is currently receiving. Regarding this, Firstly, the dimension of this financial crisis and the policy and regulatory measures taken subsequently- have had a notable impact on the lack of ability and willingness of the conventional banking system to fund small businesses in many parts of the world. Second, as an obvious contributor, the dimension has contributed to the emergence of innovative alternative forms of small finance. Finally, perceptible technological developments and increasing access to online services, the availability of electronic data from a growing variety of sources, and innovative financial instruments all contributed to the creation of new ways for savers, borrowers, investors, and entrepreneurs as well to meet their needs and conduct business.

Lastly, it is evident from the most recent studies that, while new technologies have long facilitated lending to SMEs using more quantitative information, they have rather progressed beyond this. Today, lenders can compensate for a lack of information, collateral, and data processing costs by using alternative data sources for potential borrower firms. It is also found that financial intermediaries may also boost the rate of technological innovation by helping identify entrepreneurs that are more likely to successfully carry out profitable projects. Following the trend, several non-bank innovative and alternative financing options, including risk-sharing facilities, asset-based finance, and FinTech credit, have come into existence and altered traditional risk-sharing mechanisms (Abraham, 2017; OECD, 2019). Among them, *"FinTech (financial technology) credit is one of the rapidly expanding global debt and equity-based alternative financing mechanisms"* (Cornelli et al. 2019).

According to BIS- Bank for International Settlement (known as the bank of the central banks or the central banks' hub), FinTech refers to *"technology-enabled innovation in financial services"* (FinTech, 2017). It refers to a new financial industry made up of a new generation of companies that provide financial services outside the traditional banking sector using innovative technologies and business models.

The emergence of these FinTech companies acting in parallel with traditional banking services has been enabled by the economization and increased regulation of the traditional banking system, notably following the global financial crisis of 2008. As Milian EZ, Spinola M de M, & Carvalho MM de (2019) demonstrate, *"At the time being, financial institutions are changing because of FinTech."* Money transfers, business credit card payments or loan approvals, once cumbersome processes, now have user-friendly digital interfaces as FinTech companies continue to develop appealing alternatives. According to Feyen et al., 2021, presently FinTech is at work in every link of a financial operator's value chain, including those that deal directly with clients (front office), support functions on specialized products (back office), facilitate processes between these two (middle office), and serve users on behalf of financial institutions (intermediaries) (BIS, 2021).

These changes, currently taking place, have piqued both industrial and scholarly interests. The penetration of FinTech in the financial services industry is being referred to as a **"revolutionary shift"** (Romnova & Kudinska, 2016; Gomber et al., 2018) or a **"paradigm shift"** (World Economic Forum, 2015; BIS, 2018; Gupta, A. & Xia, C., 2018) away from the traditional banking system towards a more innovative and customer-centric financial industry. In other studies, these companies (in narrower terms) are said to be part of a **"new generation of firms"** (Schmukler S. & Lorente C., 2018) in the financial service sector that rely on innovative technologies and business models. Lending, payments, cross-border transfers, and wealth management—almost all the financial sectors have already experienced extensive influxes of FinTech entrants at a substantial volume. Different assumptions have appeared regarding how the traditional financial system would respond to this development. But all are becoming identical to the point that the disruption of the industry by FinTech is inevitable. So, it is the current **"disruptive phenomenon"** (Brummer, 2015; Riyanto et al., 2018; OECD, 2020) in the world of the financial industry.

Some of the evidence for these views are *"the global investment in FinTech companies was 22.3 billion USD in 2015. It was 82 percent more than the 12.2 billion USD invested in 2014, which had increased by 201 percent over the investment in 2013. Again, the 2015 investment gross was 12 times greater than that of 2010"* (Accenture, 2016).¹ According to the Cambridge Centre for Alternative Finance (CCAF), the alternative financing industry within which FinTech is dwelling is in a sound-rising trend.

The United States and the United Kingdom are the global leaders, but in recent years, Asian countries (China, Singapore, Hong Kong, Korea, some African countries, India, and others) have also experienced rapid growth in FinTech. Global debt-based alternative finance (including FinTech credit) volumes grew by 26 percent in 2017, from \$287 billion in 2016 to \$373 billion in 2017. Investment in Asian FinTech companies accounted for 19 percent of the world's total FinTech investment in 2015, up from 6 percent in 2010 (Frost et al. 2019). Indeed, technology is revolutionizing the global economy as well as small business funding. In this regard, FinTech (which is increasingly being used interchangeably with DFS, Digital Financial Services) promises to deliver a new set of products tailored to the needs of small businesses (ADBI, 2019; Eça et al., 2021). Furthermore, FinTech companies have emerged with innovative solutions that can deliberately improve proficiencies at each stage of any lending process, including loan origination, underwriting, disbursements, and collections, along with monitoring. Above all, it has significant advantages in terms of speed, convenience, and lending terms (like no collateral, among others). As a result, FinTech's commitment to financial inclusion for the unbanked and underbanked in emerging nations has gained important impetus. Although there are a variety of approaches to increasing financial inclusion the benefits of FinTech adoption, as indicated above, are the reasons why these new technological initiatives should lead the charge. In short, they are developing and offering more innovative solutions with faster, inexpensive, soft lending terms and more convenient features and thus are capable of serving the left portion of the customer base, mostly small enterprises.

Given this, the study started with the primitive interest in exploring the prospects and finding ways Bangladesh can capitalize on or leverage the benefit of using FinTech to enhance the access of SEs to finance and thus confront the biggest constraint to the SEs' growth.

¹Accenture is a leading global professional services company, providing a broad range of services and solutions in strategy, consulting, digital, technology, and operations running their operations across more than 40 industries in 120 countries.

With that motive, document analysis was conducted, the relevant literature was reviewed and presented in Chapter 2. From there, the major gap in the issue is identified and studied further throughout this research. Accordingly, research questions are identified in a definite way, and the research objectives are deliberately set. In doing so, the scope of the study is also well-defined and clarified. All these sections are summarized in brief in this chapter.

1.2 Research Questions

While exploring the prospects of leveraging FinTech in Bangladesh for the enhancement of access to finance for SEs, the question arises as to who the major initiators will be, who the interest group are, and for whom the business model of bank-FinTech collaboration to manage debt finance for SEs in the proposition can or cannot be prospective. Hence, the stakeholders' views on FinTech in debt finance are one of the major concerns. This query also paves the way for gaining a market perspective on the acceptance and use of FinTech.

This is to see whether using FinTech can enhance the required access in the context of Bangladesh as well, as it has in other developed and emerging jurisdictions. Further, if Bangladesh joins Frey regarding FinTech's ability to enhance access, then whether the debt finance providers will agree at all to provide the finance in collaboration with FinTech, and if yes, then why will they do this? Many other preliminary queries were there, all of which are chalked out in the following set of questions:

1. Is there any built-in regulatory and other infrastructure in Bangladesh to begin with FinTech activities, particularly in debt finance?
2. To what extent will the use of FinTech enhance access to finance for small enterprises (SEs) in Bangladesh?
3. What are the motivations of the debt finance providers (primarily the commercial banks) to provide finance to SEs through collaboration with FinTech?
4. How far do the relevant financial experts view the issue the way the end users and the suppliers of debt finance do?
5. What immediate policy measures are required to initiate FinTech credit here in Bangladesh?

1.3 Research Objectives

The questions identified in an order paved the way for deliberately setting specific objectives. Attainment of these objectives might accumulate issues to attain the ultimate broad research objective the study is employed for. Under the above research context, this study addresses the following research objectives.

The Broad Objective of the study is:

To explore the prospects of leveraging FinTech to enhance access to finance for SEs in Bangladesh and recommend required policy measures.

The Specific Objectives are:

1. To find out the current status of relevant regulatory guidelines for FinTech in Bangladesh.
2. To assess the extent to which the use of FinTech by SEs will increase access to finance for small enterprises in Bangladesh.
3. To explore the determinants of motivations of the debt finance providers (primarily the commercial banks) to provide finance to SEs through collaboration with FinTech.
4. To understand the regulators' and experts' opinions on the challenges and opportunities of bank-FinTech collaboration.
5. To recommend policy measures that are required to provide an enabling environment for FinTech collaboration and further move toward a bank-centric FinTech model.

1.4 Scope of the Research Study

1. It should be clarified at first that for the purpose of the research, through **leveraging FinTech**, the study refers not to all the activities (including lending or credit, payment, and asset management) of FinTech in the financial services industry, rather it refers to having a bank-centric FinTech model (World Bank, 2019) under the purview of open banking (OECD, 2020) to manage the debt finance for SEs.

This is because FinTech credit deals effectively with the main barriers that SMEs face in financial markets, like information asymmetries, collateral shortages, and cost and time ineffectiveness. It enables higher approval rates for lending with a relatively low default rate

(OECD, 2017). Therefore, the study chooses FinTech credit for SE finance solutions. But, "*FinTech Credit covers credit activity facilitated by electronic (online) platforms that are not operated by commercial banks*" (Claessens et al., 2018) and works in two ways (reference section 2.4.3) :

a. having P2P (peer-to-peer lending) in the marketplace. It includes crowdfunding, balanced sheet lending and invoice trading or factoring using instruments like crypto currencies (like Bitcoin), bonds, and others.

b. FinTech also provide supportive Digital Financial Services (DFS), like in lending— loan origination, underwriting, disbursements, collections, and monitoring.

Thus, not being a commercial bank, FinTech can serve banks or adopt a bank- centric model based on its activities as a digital financial service provider.

Again, following early studies, a country is to have its own country-specific models for adopting innovations. As Bangladesh Bank regulations (1972 Bangladesh Bank Order, Sec. 16-1), do not allow other organizations except BFI (Banking Financial Institutions) to have a public deposit base and go for financing, in this regard the country specific model for Bangladesh would be to have a bank-centric collaboration model where FinTech provides the DFS only to the banks. Following development agencies (World Bank Group, 2019 and others), the partnership under the **bank-centric FinTech model** is the most pragmatic financing solution for MSMEs in Bangladesh right now, in the short run (World Bank, 2019).

2. In **access to finance** (access to debt and equity finance), the study focused on debt finance arranged by commercial banks.

3. Among the MSMEs (Micro, Small, and Medium Enterprises), the selected segment to collect objects that share similar characteristics, is the **SEs** (small enterprises). Here, SEs are chosen because, according to BBS studies (the Bangladesh Bureau of Statistics), small businesses hold the most 88.07 percent of the total number of businesses registered in Bangladesh.

1.5 Research Methodology

As stated above, this study was initiated from a query or area of interest to explore the way Bangladesh can capitalize on the use of disruptive FinTech to increase the access of small enterprises to formal finance. Thus, it began with a "pragmatic worldview" (also known as pragmatism) as the research guiding philosophy. Hence, "*pragmatism is the way of thinking that accepts that there can be single or multiple realities that are open to empirical inquiry*" (Creswell and Clark, 2011). Knowledge and realities, according to Kaushik and Walsh (2019), are socially constructed and can only be encountered through human actions and experiences. The study makes an effort to initiate and facilitate such a human action of adopting the dominant FinTech application in Bangladesh and gaining experience with a view to improving SEs' access to debt finance.

To attain the research objective, as stated, mixed research methods are employed in this study. A qualitative research is conducted through document analysis to find out the current regulatory status for FinTech applications in Bangladesh. A survey of SEs is used to conduct quantitative research on the extent to which the use of FinTech can increase SEs' access to finance. A qualitative session is conducted through interviews with bankers of various generations to investigate the determinants of the motivations for which they will agree to provide debt to SEs in collaboration with FinTech firms, and another qualitative research is done to understand the regulators' and other relevant financial experts' perspectives on the challenges and opportunities of bank-FinTech collaboration. The qualitative parts comprise the characteristics of induction, exploration, and understanding of the specialists' views. Through all these exertions, the prospects of leveraging FinTech to enhance access to finance for SEs in Bangladesh are being explored. In the sections on research methodology in Chapter 3, the particulars of the methodological approaches are covered in detail.

1.6 Expected Contribution

This study intends to make an important contribution to access to finance for SEs and FinTech studies in Bangladesh. The major gap area it worked with (please refer to Section 2.8) and the contribution area it claimed to have made (section reference 8.4) are both depicted in detail in the respective sections. But, at a glance, the main three broad areas expected to have benefits can be summed up as follows:

1. Different studies from different segments, including small enterprises' growth, access to finance, the FinTech revolution and its worldwide exposure, or bank FinTech collaboration and world practices, are brought together with the expectation of making a contribution to lessening the long-cherished financing constraints faced by small enterprises through leveraging the potent FinTech trend, which has penetrated the global financial industry.
2. The country's current FinTech ecosystem is expected to benefit from thorough lessons from FinTech-led nations in terms of the most fundamental regulatory and other pertinent systems. Furthermore, required policy measures are recommended.
3. Theories on 'FinTech credit' being an underexplored phenomenon (IMF, 2020) in the world literature, is expected to be explored from an emerging country perspective.

1.7 Organization of The Research

With the above primitive interest, this study proceeded further with the extensive research study, which is demonstrated in the thesis's subsequent chapters with the interpretation of the empirical findings. The thesis is organized as follows:

Chapter 2: Chapter Two provides the theoretical basis used in this study and develops the continual issues necessary to have an insightful understanding of the proposition. This chapter also discusses the technological, and infrastructural context and relevant landscape of the research location, Bangladesh.

Chapter 3: This chapter reviews the research methodologies employed for the study. To attain the research objectives, the researcher uses mixed methods, combining a total of four

complementary qualitative and quantitative research. The reviews of these empirical works undertaken in the context of Bangladesh include the respective research's design, strategy, data collection, and analysis in detail.

Chapter 4: This chapter discusses current regulatory and other relevant technological infrastructure bases being built in Bangladesh that can expedite FinTech credit activities in a bank-FinTech setup. Using BIS (Bank for International Settlement) studies on 31 leading FinTech countries in the context of major regulatory areas covered in directing their successful FinTech industry, Bangladesh's current regulatory track is compared and that is how further development areas are sorted out.

Chapter 5: This chapter presents the quantitative empirics of the association between using FinTech and the indicators of access to finance by small businesses. The ESAF index developed by - EIF and the London School of Economics is used here on merit grounds. This empirical survey assessed the extent to which the use of FinTech by SEs can enhance access to finance for SEs in Bangladesh.

Chapter 6: Bankers' views on their acceptance of the proposition are explored through in-depth interviews and offered in this chapter. Thus, the prospect of using FinTech was attempted to be implied from the perspective of debt finance providers. The emphasis was on the determinants of motivation of debt suppliers, which could provide a good foundation for both assessing the prospects of using FinTech from this stakeholder group and developing the necessary policy measures.

Chapter 7: The views of the regulators themselves, along with other academics and experts in practice, were derived from another set of in-depth interviews and readily presented as having a feasible and authentic basis for the study.

Chapter 8: This chapter sheds light on the ultimate policy recommendations for creating an enabling environment and moving toward the bank-centric FinTech model for small business debt financing and draw a concluding remark.

CHAPTER 2

LITERATURE REVIEW: CONCEPTUAL ISSUES

2.0 Introduction

This chapter gives a comprehensive overview of the literature developed over a few past decades on small enterprises, their access to finance, and FinTech. Since these are broad and interdisciplinary concepts, this review considers the relevant literature mainly from the debt finance perspective. From the review, conceptual issues are developed in deliberation to provide unique insights into the context in which the prospects of bank FinTech collaboration for managing debt for the small enterprise can be examined. The objective of the literature review also was to explore and demonstrate the way Bangladesh can capitalize on the benefits of using FinTech in order to improve the access of small enterprises to finance and thereby face the biggest constraint to small enterprises' growth. With that purpose, besides the development of the relevant concepts, this chapter also brings forward the contemporary FinTech context of Bangladesh to find a precise match in the adoption of a bank-centric FinTech model for debt finance here in Bangladesh.

Section 2.1 defines small enterprises and 2.2 the ways to enhance access to finance for SEs with its importance. Sections 2.3 and 2.4 elaborate on the FinTech concept, while Section 2.5 relates the ways FinTech can enhance access to finance for the SEs developed so far in the literature. Section 2.6 introduces the concept of bank FinTech collaboration as a way to mitigate the financial constraints in a bank-led finance industry with the rationales, and lastly, Section 2.7, as stated above, brings forward the country context with a view examining the adaptability of the business model of bank FinTech collaboration for debt finance of SEs, which is the study's ultimate focus.

2.1 Small Enterprises(SEs)

As a universal definition of what constitutes an SME is not yet available. The regulators and authors commonly refer it to non-subsidary, independent firms, where the definitions are differentiated based on the number of employees, properties, sales, and/or loan size (Ardic

et al., 2011). Again, this number under the given definitions varies across countries, such as with the most frequent upper limit of 250 employees for SMEs and of 50 employees for small firms (OECD, 2005). The definition of SME in Bangladesh has also changed over time in different industrial policy pronouncements, including the Industrial Policies of 1991, 1999, and 2005 (Ullah, 2006), and the latest of 2016. For this paper, the study considered the definition provided by Bangladesh Bank’s latest circular made based on the latest Industrial Policy 2016 of the country.

Table 1: Small Enterprise Definition

Enterprise	Sub-sector	Parameters			
Small		Capital Expenditure excluding Land and building less accumulated depreciation (BDT)	No. of employee		
	Manufacturing	From 75 lac- less than 15 crore	31-120		
	Service	From 10 lac- less than 2 crore	16-50		
		<i>Parameters</i>			
		Capital Expenditure excluding Land and building less accumulated depreciation (BDT)	No. of employee	Business Turnover/ Annual Transaction	
	Trading	From 10 lac to 2 crore	16-50	From 2 to 20 crore	

Source: BB’s latest SMESPD circular 2, dated September 05, 2019, and Walther (n.d.)

It is noteworthy here that, in this study, small enterprises (SEs) have to be used almost interchangeably with SMEs and MSMEs as well on three grounds. *Firstly*, from the literature, it is evident that studies on small enterprises are far more scarce than those on SMEs and MSMEs. *Secondly*, FinTech services in lending strive to finance overall SMEs in all economies. That is why most theoretical and empirical studies on FinTech lending also cover SMEs. *Further*, all the findings on SMEs are true for small enterprises (SEs), as SEs are covered both in SMEs and MSMEs. However, the study scope covers the small enterprise (SE) segment only in Bangladesh (reference section 1.4).

2.2 Access to Finance for Small Enterprises: The Concept, Importance, and Its Enhancement

2.2.1 Access to Finance: The Concept

Understanding the small business access to finance problem is crucial because a lack of access to finance makes it difficult for new small businesses to start and operate, as well as for existing businesses to sustain and develop, stifling overall economic growth. The literature review made in this study (from Atkinson et al., 2002; Öztürk & Mrkaic, 2014; OECD, 2008; Claessens & Tzioumis, 2006; Beck et al., 2006) reveals there is no universal or objective approach to having a composite definition for access to finance for enterprises. Most of the discussions entail a significant amount of subjectivity, defining it. However, there remain some identical approaches among experts to certain common issues. Researchers, on relevant grounds, tend to develop working definitions for their study purposes. To develop a measuring index for SME access to finance, the European Investment Fund (EIF) defines SME access to finance in terms of *"the availability and cost of different financing instruments, where availability refers to the supply of external capital, its type, range, and quality, as well as SMEs' capabilities to access it, and cost refers to the price of acquiring financing"* (EIF, 2018). For measuring factors influencing firms' access to finance, Claessens & Tzioumis (2006) stated, *"Access to finance commonly refers to the availability of a supply of quality financial services at reasonable costs, though what one considers 'quality services' and 'reasonable costs' vary."* Beck et al. (2009) demonstrated that 'access to financial services or financial inclusion' implies the absence of barriers in the way of using financial products or services, regardless of relation to pricing. Thus, improving access means increasing the degree to which financial services are available for everyone at a fair price. Unlike the use of financial products or services, which is determined by supply and demand, access aims at providing financial products or supplying financial services to all end-users.

In this study, being largely influenced by Beck et al. (2009) and EIF (2018), the working definition for the lack of 'access to finance' is referred to as the inability of small enterprises to obtain financial services of credit and other risk management services (excluding deposit,

payment, and insurance) from those who involuntarily have no or only limited access to the services and are termed the unbanked or underbanked, respectively.

2.2.2 Importance of Adequate Access to Finance

Theories of Finance, Growth, and Inequality (including the studies of Levine, 2021; Demirguc-Kunt & Levine, 2009; IFC, 2013) demonstrate that a lack of access to finance generates persistent income inequality and impedes growth. Small business financing in the appropriate forms is critical at all stages of the business life cycle to enable these businesses to start up, develop, and grow, contributing to employment, growth, and social inclusion. If a large proportion of SMEs does not have access to formal credit, it severely limits their growth opportunities.

Theories of financial intermediation like the theory of information production and liquidity transformation (Allen & Santomero, 1997) also highlight the role of access to finance in promoting economic growth. Financial intermediaries and markets emerge to address market frictions like information asymmetry and transaction costs, and by reducing these frictions, the intermediaries can have a substantial impact on resource mobilization and allocation. Some arguments stress the role of financial intermediaries in increasing financial depth by making more financial resources available. According to OECD (2015) "*Financial intermediaries may also boost the rate of technological innovation by helping identify entrepreneurs that are more likely to successfully carry out profitable projects and launch new products.* "

Other empirical studies (including cross-country and panel studies; time-series analyses; individual country studies; case studies; and firm- and industry-level analyses) have also supported the view that institutional financing is not only correlated with but also one of the drivers of economic growth. The core views of the Schumpeterian argument, absorbingly restated by Rajan and Zingales (2003), show that financial development promotes growth by facilitating the "creative destruction" process by transferring resources to efficient incumbents and innovators. Earlier, Demirgüç-Kunt & Maksimovic (1998) study showed that companies in nations with developed financial systems expand faster than those whose financing is limited to internal sources and debt. Ardic et al. (2011) have found a positive

correlation between the overall economic development (measured by income per capita) and the financial development (measured by the ratio of credit to GDP) of small enterprises' funding levels. Rajan & Zingales (1998) show that businesses expand comparatively more rapidly in nations with more developed financial markets, improved information exchange and risk management, and better resource allocation to successful investment initiatives. On the other hand, financial restrictions that hinder businesses from funding new projects, grabbing growth opportunities, or undergoing reorganization in times of financial distress have a detrimental impact on productivity, employment, innovation, and income disparities. For these reasons, most governments and leading international institutions have increased focus on SME support (World Bank, 2019).

2.2.3 lack of Access to Finance for Small Enterprises

Despite its importance, several research studies based on various surveys show that lack of access to finance is one of the key impediments to enterprise growth and development, particularly for small businesses. A study based on a survey of 10,000 firms from 80 countries by Beck et al. (2004) reflects that small businesses confront higher challenges in obtaining financial resources. In another study, they found that the financial and legal limits to firm expansion are inversely related to the size of the firm when compared to large firms, based on a survey of firms from 54 nations (Beck et al., 2005). According to numerous World Bank polls, small enterprises frequently cite access to finance as one of the most significant hurdles to their success and expansion. For example, the surveys conducted by the World Bank in 2006–2009 found that, for 31 percent of the studied firms, lack of access to finance is a major stumbling block (Chavis et al., 2010). The 2013 Enterprise Survey by the Bank estimates that only 27.5 percent of small firms have bank loans, compared to 44 percent of large firms and 30 percent of medium-sized enterprises in developing countries. Small firms rely more on informal sources of funds and face higher collateral requirements when borrowing from formal sources relative to large enterprises (World Bank, 2019).

This evokes questions: Why are small enterprises financially more constrained than large firms?

According to the studies, the low observed use of bank finance is caused by both the supply and demand sides of bank finance. A supply-side (financial) problem occurs when SEs have profitable investment projects but cannot get sufficient external funds from creditor companies. A demand-side (enterprise) problem exists when SMEs are not capable of having finance, such as for **lack of collateral security** or financial ability (Andrew et al., 2013; Chowdhury et al., 2015; Hoque et al., 2016; World Bank, 2019), or for a **lack of creditworthiness**, including a lack of a good credit report, credit score, or transaction history. Again, many small enterprises are also informal (i.e., not legally registered or licensed). All of these factors contribute to the problem of **asymmetric information** or the lack of information causing market imperfection, which in turn leads to suboptimal lending to viable SMEs (Darvas, 2013; Kraemer et al., 2010). Furthermore, banks in developing economies are less exposed to SMEs than banks in developed economies and charge small businesses **higher interest rates** and fees (Beck, 2008).

Another study shows that ‘principal-agent problems’ are common occurrences in any real economy. Due to the challenges of obtaining information and enforcing contracts, certain borrowers with viable projects might be excluded from financial markets. It is a rational response by economic agents to these frictions. Thus, asymmetric information and agency problems, including high transaction costs and SMEs’ opacity, limit access to credit by small businesses and start-ups, in particular, which are often under-collateralized, have a limited credit history and may lack the expertise and skills needed to produce sophisticated financial statements (OECD, 2013a).

2.2.4 Ways to Enhance Access to Finance for SEs: A Theoretical Perspective

The second pertinent question might be how well the problem can be addressed or what are some new (and feasible) methods to assist SMEs in obtaining better access to finance.

Two sets of composite indicators that aim to measure SMEs’ access to finance were developed: the ‘SME Access to Finance Index’ (SMAF index) by the European Commission (2012) and the ‘Perceived External Financing Gap Indicator for SME’ (Ferrando et al., 2013). The first index utilizes a wider variety of sub-indicators and enables cross-country

comparisons. However, it was discontinued in 2014. On the contrary, the later index uses only perception-based sub-indicators.

Then came the **EIF SME Access to Finance Index (ESAF index)**, which aims to fill the void by reintroducing a composite indicator that is periodically updated. This most comprehensive ever Index summarizes access to the financial status of SME financing in Europe for all EU (European Union) 28 countries. It was first introduced in 2016 (Kraemer et al., 2016), being developed by the European Investment Fund (EIF) in cooperation with the London School of Economics (LSE). The index, having the following indicators with the sub-indicators, provides perhaps the most convenient tool to compare and benchmark country performance in the context of SMEs' access to finance in the EU. It summarizes this complex and multidimensional phenomenon of SME access to finance in one simple and easily interpretable statistic for policymakers and relevant stakeholders.

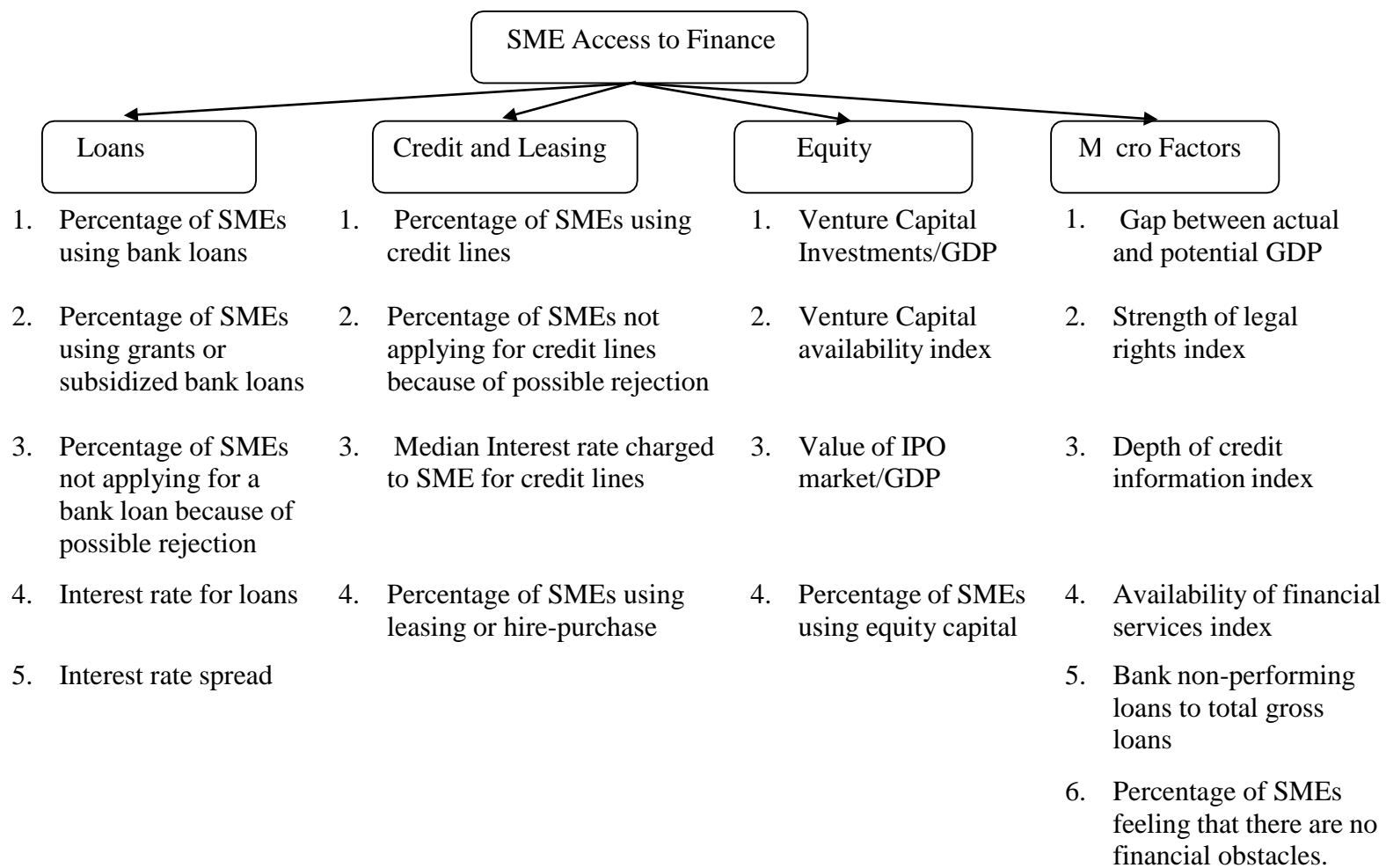


Figure 1: ESAF Index Indicators. Source: ESAF Index by EIF Research & Market Analysis Working Paper 2018/47

If a country can increase the scale in one or more of these sub-indicators, the access to finance by the SMEs (and SEs as well) of that country might be enhanced.

And lastly, it is evident from the most recent studies that although, new technologies have long been facilitating lending to SMEs using more quantitative information (de la Torre et al., 2010), they have progressed well beyond that. Lenders can compensate for the lack of information, collateral, and data processing costs by having alternative data sources for potential borrower firms. It has also been discovered that, through increased use of technological innovations, financial intermediaries can even help identify entrepreneurs who are more likely to effectively carry out profitable projects. New research shows that banks can offer a wide range of services on a large scale through the use of these new technologies, new business models, and risk management systems. In connection with this, by no means exhaustive, the most significant innovations and developments in access to finance for SMEs that have emerged in recent years are 'FinTech'.

2.3 What is FinTech (Financial Technology)?

2.3.1 Definition

The term 'FinTech' (financial technology) describes the phenomenon of digital technologies (BIS, 2021) or new technologies that are being used in different financial sectors. It has become the symbol of a powerful trend and one of the most frequently used terms in today's financial world, referring primarily to companies that provide and assist financial services by leveraging cutting-edge technologies to maximum advantage.

In more specific terms, the terminology only refers to one type of company: FinTech companies. These companies are active in the domains of e-banking, online payments, money transfers, and transaction clearing (Theophanes, 2017). They also significantly deal with lending and wealth management, the other two most important segments of the financial industry.

A wide range of tech-driven FinTech companies, functioning alongside traditional banking services, have emerged as a result of the contraction and tightened regulations of the conventional banking system following the global financial crisis of 2008 in particular.

Currently, the banking industry has been seeing a fundamental change in the need for new financial services that are developed and made accessible to customers by these businesses. (Romanova et al. 2016). Thus, "*FinTech refers to the new financial industry comprising a new generation of firms that rely on innovative technologies and business models to provide financial services outside the traditional financial sector*" (World Bank, 2019). FinTech could therefore be classified as an emerging category of financial service providers for the twenty-first century that wants, among other things, to lower transaction costs for consumers, or it can be referred to as the companies that provide financial services using mobile phones, the internet, cloud computing, and open-source software at a low cost. Most importantly, "*FinTech is gaining significant momentum and disrupting the traditional value chain*" (Global FinTech Report, 2016) in both developed and emerging economies throughout the world.

But a wide range of literature has reviewed FinTech in a broader context. To them, it is rather an "*ecosystem*" as a whole that describes the phenomenon of inclusive digitalization and the application of newer technologies in financial sectors. It has been described as the structural shifts in the financial system that have enabled more internet and smartphone adoption along with the growth of sizable online e-commerce ecosystems, both of which have boosted the pool of prospective customers. Some examples of applied technologies in financial transactions are peer-to-peer payment, peer-to-peer lending, digital wallets, mobile banking, machine learning, cloud computing solutions, Blockchain, and information technology, which aim to increase the advantages and efficacy of financial transactions while also assisting clients in cutting expenses.

However, the study adopts a working definition (FSB, 2017) by the FSB² of BIS (said to be the Central Banks' Hub) and that of the CCAF, 2018.

The Financial Stability Board (FSB)² outlines FinTech as "*technologically enabled financial innovation that could result in a new business model, application, process, or even a product, with an associated material effect on financial markets and institutions and the provision of financial services*" (BIS, 2021; FSB, 2017).

² FSB-Financial Stability Board- A Bank for International Settlements (BIS)-hosted association that monitors and recommends changes to the global financial system. It was established following the G20 London summit held in April 2009 with G20 member countries.

To the Cambridge Centre for Alternative Finance (CCAF), "*FinTech is the ecosystem made up of companies, technology, and processes that improve traditional methods of finance through innovative technologies*" (CCAF, 2018) and helps businesses better manage their financial operations (Kagan, 2019).

FinTech has been spelled differently in different studies: FinTech, Fin-Tech, Fintech, Fintech, or FinTech. But it is used as **FinTech** in this study.

2.3.2 FinTech Evolution

Several quantitative studies (Haddad & Hornuf, 2016; Buchak et al., 2017; Shim & Shin, 2016) provide evidence of the reasons for the emergence of FinTech. An empirical study suggests that traditional banks' regulatory burden accounts for 30 percent of financial technology growth. Shim and Shin (2016) used an actor-network theory based on technology literature to explore the factors contributing to the emergence of China's FinTech industry. The study of Dhar & Stein (2016) described the new business models and investigated the impacts of FinTech innovation on the incumbents (BFIs and NBFIs). They offered a framework for comprehending the value produced by diverse platforms in the financial services industry. The framework made it possible to identify which companies are vulnerable because of the gaps they have. They provided a framework for understanding the value created through various types of platforms in financial services. The framework provided a way to understand which businesses are vulnerable due to their incompleteness. For them, any model of an abandoned platform might be disturbed by FinTech platform completion initiatives.

However, Since FinTech has been for a while, it isn't promoted as a recent advancement in technology. Rather, whenever new technologies evolve over time, people continued to use and advance it, transforming the conventional financial industry (The Economist, 2015). In literature, FinTech's evolution is shown in the different distinguished eras by different authors (Buckley et al., 2016). Summing up the findings, this study found FinTech to have evolved in the following ways:

A. The early years of FinTech

FinTech has its roots, as reported, in the advent of the printing press, which allowed nations to have paper-printed money as a more flexible and accessible form of cash. The first trans-Atlantic cable was laid in 1866, which also marked the beginning of financial globalization, and the telegraph was invented the following year. The Fedwire Funds Service was established by the Federal Reserve Banks in 1918, when a telegraph-based communication network for the first time coordinated the monetary transfers among the 12 Reserve Banks. Money transfers through banks were handled by the system up until the early 1970s via the telegraph (Zerucha, 2016).

B. The modern era of FinTech

Starting with the launch of the modern credit card in 1950, a significant portion of the financial technology infrastructure was built between 1950 and 1970. Automated teller machines (ATMs) were first developed in the 1960s, but it wasn't until the 1970s that they started to take the place of bank employees. The Quotron system, the first electronic device to offer stock market quotes, started to emerge on brokers' tables in 1960. The Global Telex was founded in 1966 to establish the framework for the forthcoming financial technology advancements on a global scale. The Clearing House Interbank Payments System was subsequently developed, allowing US dollar payments to be sent and settled by the largest banks in the world.

Banks started utilizing the sophisticated data and record-keeping systems provided by mainframe computers, some of which took up whole floors, in the 1980s. The majority of FinTech developments took place in the back offices of banks and financial companies. E-trade was made available to private investors in 1982, which was essential in bringing FinTech to the public's attention. Online stock brokerage websites were the first real FinTech firms, which made the e-Trade model accessible with the development of the Internet in the 1990s. Banks started offering clients internet banking starting in or around 1998 (Zerucha, 2016).

C. FinTech in the digital era

With the development of internet connectivity in the 2000s, FinTech started to enhance much of the financial technology infrastructure by providing financial institutions with more advanced data-analysis capabilities, risk management, trade and cash management. It also cleared the door for a ton of new FinTech businesses that are striving to develop consumer-facing solutions. One of the first FinTech businesses to change how individuals handle their money through payments was **PayPal**. **eBay** was one of the leading e-commerce websites that gave users the authority to form markets and set auction item prices.

Around 2007 and 2008, several other factors came together to give developed nations' adoption of FinTech a boost. The reputation of banks, particularly in the UK and US, was badly damaged during the global financial crisis (GFC) of 2008. Americans were more likely to trust technology companies that manage their accounts than banks. The same thing seems to be happening in China, where more than 2000 P2P lending platforms (peer-to-peer) operate without a defined regulatory framework. Despite this, millions of creditors and borrowers continue to use these platforms because they are more convenient and cheaper, offering potentially higher returns. Regulation following the financial crisis tightened credit and raised banks' compliance costs and liabilities. A shift in the regulatory capital requirements for banks affected their ability or motivation to originate low-value loans. FinTech merely took advantage of the opportunity to target the underbanked and unbanked clientele on the left of the payment and lending industries.

In addition, when the World Wide Web launched Web 2.0, it made the Internet's democratization happen by enabling anybody with coding skills to develop a dynamic and interactive website that used the cloud as the middleman for the transfer of data. For FinTech companies looking to replace current financial channels and upend established business models, this opened up an entirely new market. All of a sudden, the movement of money between individuals and organizations, as well as between individuals and other individuals, was reduced to informational bits that could be sent immediately via a smartphone.

Consequently, a sharing economy has developed. For a small portion of what human advisors would cost, algorithmic programming-based Robo-advisors might offer individualized investment advice and build unique investment portfolios. With traditional

banks mainly ignoring this neglected sector of customers and businesses, online lenders have started to proliferate and offer credit. Numerous entrepreneurs are using crowdfunding websites to access new sources of finance for their FinTech firms, which is fueling an ongoing wave of innovation (Zerucha, 2016; Desai, 2015).

2.3.3 FinTech Industry Today in Developed Economies (2008–present)

Following several studies, FinTech today encompasses the major five areas in the developed economies of the United States, and the United Kingdom (also in developing state China).

1. Finance and investment, including crowdfunding, peer-to-peer lending, Robo- advising.
2. Financial operations and risk management, i.e., financial institutions' prime drivers of IT
3. Domestic and international electronic payment systems
4. Data security
5. User interface

Corporates, venture capitalists, equity firms, and several other stakeholders have expended an unparalleled amount of money on global FinTech companies.

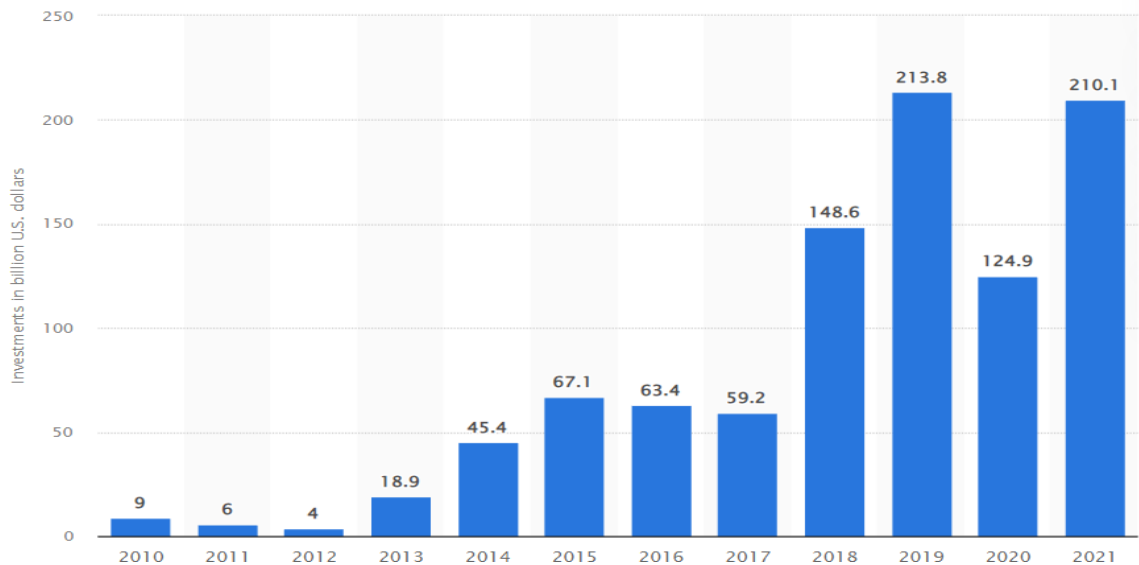


Figure 2: Total investment worldwide in FinTech companies from 2010 to 2021 (in billion dollars). Source: Statista³ Report of March 18, 2022

³ Statista is a German company specializing in market and consumer data, based on its research work provided statistics and survey results

The figure above shows that between 2010 and 2019, the total amount invested in FinTech businesses globally increased significantly when they received the highest investment of 213.8 billion U.S. dollars. Except for a few, the investment value continues to increase each year. Investments raised 210.1 billion U.S. dollars in 2021. The USA attracted the greatest amount of investment in the sector.

2.3.4 FinTech Industry at Current Emerging Markets (2008–present)

According to the OECD (2012), in emerging economies, FinTech applications are reinforced by a set of recent underlying features. These features of the economies include:

1. mobile device-equipped youthful folks who are technologically literate;
2. a rapidly expanding middle class;
3. Ineffective banking and capital markets that are providing room for informal alternatives;
4. lack of physical banking infrastructure;
5. an impulse to prioritize convenience over integrity and trust;
6. untouched market opportunities; and
7. less rigorous data privacy regulations and competition.

With 24 nations forming the Asia-Pacific Market (APAC), it currently ranks second behind North America in terms of FinTech investment and represents 19 percent of all global finance activity. China receives the majority of investments, with 45 percent of all investments in 2015. India receives 38 percent of all investments and is rapidly expanding. According to the volume of agreements, the top FinTech centers in the area are Mumbai, Bangalore, Tokyo, and Beijing. Looking at transaction volumes, 78 percent went to FinTech businesses that target the banking industry, 9 percent went to wealth management and asset management organizations, and 1 percent went to the insurance sector. The amount invested in FinTech firms in the Asia-Pacific area swiftly climbed to more than 4 billion USD in 2015 as compared to 2014. China and India contributed the most to this increase, each with more than 1950 million USD and almost 1650 million USD, respectively (Accenture, 2016).

In China, a well-known FinTech company, **Alipay** (of the Alibaba Group), processes over one million transactions every day, which resembles covering the transaction volume of a

traditional bank without being a bank. Alibaba has also accomplished two main government policy goals by creating 2.87 million direct and indirect job opportunities and providing more than 400,000 SMEs with loans in the range of \$3,001 to \$5000. China's leadership in FinTech is evident in many other ways. For example, SME lending by **Alibaba** in 2010 using alternative credit-scoring data is now being used in the US and Japan and by Amazon in Europe (Buckley et al., 2016).

In terms of FinTech prospects, Africa is seen as being rich. In this country, the lack of development in banking and other financial services and the rapid spread of mobile phone use were the two main reasons why FinTech evolved at the start of the twenty-first century. According to KPMG (2013), Kenya and Tanzania have had the most success with mobile money, which offers basic savings and payment services through e-money on a cell phone. By giving users a secure means to store money, transfer money, pay their bills, and receive government payments, mobile money has considerably boosted economic growth. M-Pesa, which debuted in 2007, is the continent's most well-known success story. In the first five years of its introduction, payments made through M-Pesa exceeded 43 percent of Kenya's GDP (Runde, 2015). Furthermore, numerous FinTech accelerators for start-ups have opened in Singapore, Hong Kong, Sydney, Brisbane, and Melbourne, as well as in Korea.

However, after having emerged as the aftermath product of the financial crisis of 2008, it has only been since 2014 that the FinTech sector has grabbed the intense focus of regulators, academics, those in business, and consumers as FinTech continued to have undisrupted intense growth in the financial services industry of the world. P2P lending platforms and other FinTech companies are being supported in China, in particular with the government's Internet Finance Guidelines issued in July 2015. In most Asian and African countries, recent FinTech developments have been primarily aggravated by deliberate government policy application in the pursuit of their economic development.

2.3.5 Future Prospects of the FinTech Industry

The findings, following the conduct of several studies, were supportive of the revolution brought to the financial world by FinTech. The less-regulated FinTech businesses that can gain a significant market share by offering services that are nearly identical to those of banks

should be a concern for banks as they face increased competition. It is also stated that the future of banking is inextricably linked to innovation, and FinTech refers to the technology-enabled innovation in financial services where a technological sea change is transforming the financial sector and the wider economy (FinTech, 2017).

At the same time, following the literature, FinTech companies in the industry should be able to operate under a regulatory framework that permits them to incur high compliance costs. Therefore, the way forward can be to get involved in creating country-specific convergence of regulation for the nations that have not regulated FinTech concerns.

Few could have expected many of the current changes in the financial industry even a decade ago. The only thing that is definite about the direction FinTech will take in the future is that it will advance and reach a critical mass that will compel conventional institutions to change. (World Economic Forum, 2015b). Following the Accenture report from 2016, FinTech created an industrial revolution in which products and services were upgraded and innovated more. *"FinTech continued to develop and became one of the sectors attracting the most investment in the world, and the global investment in financial technology firms will continue to grow rapidly in the coming years"* (Accenture, 2016). New technologies will shape payments, investment, lending, and all other subsectors of the financial services industry. That includes biometrics, data mining, machine learning, predictive behavioral analytics, data analytics, and distributed ledger technology. With these advancements in the financial industry, there is no way to go back. The faster conventional institutions and traditional mechanisms adapt to them, the better.

2.4 How Does FinTech Work?

This section is based on a vast, but not exhaustive, list of FinTech activities to gain an understanding of how FinTech operates and why their impact on the financial markets is regarded as being so ample. In this section, specific focus is given to the impact of FinTech on *'the lending sector'* of the financial services industry to comprehend the issue of access to finance for small enterprises.

As stated earlier, *"FinTech is at work in every link of a traditional financial operator's value chain, including those that deal directly with clients (front office), support functions on*

specialized products, facilitate processes between these two (middle office), and serve users on behalf of financial institutions (intermediaries)" (BIS, 2021). For instance, the following is a brief description of some relevant FinTech services:

- Payment and transfer in e-commerce crowdsourcing platforms for enterprises to obtain capital from investors against debt instruments or equity.
- Investment tools for the operators to optimize the profitability of the investment portfolio with risk prediction and measurement tools.
- Banking services without physical infrastructure (i.e. no bank branches or ATMs)
- Managing databases, and data analysis.
- Platforms for financing existing and innovative projects with or without donations.
- Prevention of fraudulence and securing security and authentication through big data analysis and many other algorithmic methods.
- Digital currency management
- Digital Financing platforms for MSMEs and
- Managing personal finance using virtual markets, e-commerce platforms, invoice discounting services, and others (IDB, 2017).

According to Kagan (2019), The FinTech industry covers a wide range of operations, including retail banking, investment management, wealth management, payments and money transfers, fundraising, lending, borrowings, and many more.

A study of 2020 by the Financial Stability Institute (FSI) of the Bank for International Settlements (BIS) gave a conceptual framework, based on their cross-country survey results on worldwide FinTech activities, in a more comprehensive form. The framework was conceptualized as a “**FinTech Tree**” (FSI) of the Bank for International Settlements (BIS) and gave a conceptual framework, based on their cross-country survey results on worldwide FinTech activities, in a more comprehensive form. The list of FinTech activities comprised, without being limited to:

- *Digital banking.* According to the study, banks like Kakao Bank and K Bank in Korea, We Bank and My Bank in China, Monzo in the UK, Nubank in Brazil, and N26 in the EU provide tech-based banking services largely through electronic channels and not through physical offices.

- *FinTech balance sheet lending.* FinTech electronic platforms (such as **Welend** in Hong Kong, SAR, and the United States, and **Quicken Loans** in the United States) promote online lending by acquiring funding from their own capital or debt issuance and taking on credit risk by retaining originated loans on their balance sheet.

- *Crowdfunding.* Without the use of conventional financial institutions as intermediaries, it includes connecting those seeking funding with the masses looking to invest for a profit. There are primarily two sorts. The first is equity crowdfunding, in which a FinTech platform connects potential investors with businesses they wish to invest in, allowing them to take part in capital raising. The second is loan crowdfunding, which is the pairing of borrowers and lenders using internet-based platforms not run by conventional banks.

- *Robo-advice.* Financial advice on investment goods that is offered using algorithm-based technologies with little to no human participation is referred to as ‘automated digital advice’. E-money is the creation of instruments that resemble debt and reflect a fixed value claim on their issuer (the e-money provider), ensuring redemption at a predetermined face value (Adrian and Mancini-Griffoli, 2019).

- *Digital payment services.* Instead of using real money, the providers employ technology to speed up payment processes.

- *Insurtech.* It refers to the FinTech branch that uses digital technology specifically for the insurance industry (IAIS, 2017).

- *Financial activities related to crypto-assets.* Employing cryptographic tools and distributed ledger technology (DLT) or comparable technology to create, transfer, store, exchange, or use crypto assets for payment or investment purposes (FSB, 2019).

Based on the analysis, drawn from the studies reviewed (BIS Study, 2020; 2021; Policy Discussion Briefs, 2017; Kagan, 2019; Adrian and Mancini-Griffoli, 2019; IAIS, 2017; FSB,

2019b) and numerous other related literature, it becomes evident that FinTech activities can be broadly categorized under Payment and Transfer, Savings and Investment, and Lending Services of Finance.

2.4.1 Payments and Transfers

"FinTech companies have truly created a payment transaction breakthrough by launching a series of applications with different forms of payment to meet the needs of the consumers" (Parker, 2016). With the emergence of FinTech platforms, rather than going to the bank, users can now make all of their payments whenever and wherever they want in an easier, faster, and cheaper way. FinTech companies like **World Remit, Western Union, Ria, Kantox, or Currency Fair** offer international money transfer and foreign exchange services. Companies such as **M-Pesa** (Kenya) and **Eco Cash** (Zimbabwe) are challenging banks in mobile payments.

The measures that FinTech is adopting in the domain of money transfer and payment, are as follows:

A. Peer-to-peer online payment

The peer-to-peer payment model is a cutting-edge method of exchange that enables counterparties to send money from one bank account to another at any time and from any place using the Internet or mobile devices. Therefore, the cost of payment has gotten much lower. Most importantly, it reduces cumbersome procedures while also increasing user benefits like *speed, simplicity, and convenience* (Santamaria, 2020). Below is a list of some successful P2P payment service providers.

* **Venmo** Users of the free Venmo smartphone app in the USA can transfer and receive money within one business day. If users' bank accounts are authorized up to a particular amount, the sent money can be transferred from their 'Venmo balance' which is kept in the app (McAlone, 2016).

* **PayPal** is one of the biggest online payment processors and is accessible in over 200 regions and 26 different currencies. Besides, since working with eBay, PayPal has evolved into a payment method used by all online retailers worldwide (Digital Trends, 2021).

* **Square Cash** is a free application through which money may be transferred by email using a free program created by the Square Corporation. When asking for money, the user contacts the debtor and sends a cc to "request@square.com" on the email. After receiving the email, the sender and the recipient must both provide their banking information, and the money transaction is completed in two days (Eckstein, 2022).

B. Mobile wallet

Customers can make in-store payments swiftly and securely with a mobile wallet. It's a digital wallet that use technology to save digitally converted assets like debit or credit cards (Gomber et al., 2018) to completely replace physical wallets for carrying and to improve the user's convenience, speed, and security. It paves the way for building society's safety (Kling, 2014). Mobile wallets utilize near-field communication (NFC). When two payment terminals are close to one another, "radio frequency identification technology" is used to transfer the information of payments. simply by holding the phone for a few seconds within the network of the NFC reader, a customer can make the payment.

* **Apple Pay** is one of the mobile wallet options available for use with Apple devices, including the iPhone 6, iPhone 6s, iPhone SE, and later. If a consumer places his phone or Apple watch in the payment scanner at the store and presses the Touch ID button to confirm the purchase, the transaction is finished in only a few seconds (Apple Support,2021).

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* **Android Pay** for Android handsets running version 4.4 or later, Google also developed Samsung Pay. It is only available to users in the US and the UK. (DeMuro, 2021).

* **Samsung Pay** allows consumers to make purchases by just waving their Samsung cellphones in front of the payment scanner. It is built for the newest Galaxy smartphones, such as the Galaxy S6 and Galaxy S7. Samsung Pay is compatible with more than 30 million merchant locations worldwide and a large number of payment terminals (Cipriani, 2015).

These payment systems are being upgraded to the point that they will be able to replace cards, thus enthrusting the development of a cash less society.

C. Cryptocurrency

A cryptocurrency is a type of electronic currency that can be exchanged for real money when using computers. Digital currencies like Bitcoin, which were introduced in 2009, enable consumers to exchange for products and services with merchants that accept Bitcoin as payment (Carrick, 2016). The method is low-cost, sometimes called "cut-rate" (no-fee transaction).

D. Blockchain or the distributed ledger technology (DLT)

According to Rometty (2016) *"The most profound change in the global payment system is made through the use of Blockchain, which is known as a data structure that allows users to create a digital book for their transactions and share it widely through a distribution network of computers"*.

With the Blockchain, ledger operations are done safely even without the use of an intermediary agency like a bank. This is because once information is entered to a Blockchain ledger, it cannot be changed, manipulated, added to, or even removed. If someone tries to do any of these things, the software runs a series of algorithms to verify the authenticity of the proposed manipulation and submits the information to all parties using the software in real time regarding the transaction. Furthermore, the majority of the persons interested in the Blockchain must click the 'accept' button to confirm the legitimacy and authenticity of the manipulation or any simple addition of information. Besides, instead of keeping a private database of records like traditional banks, the Blockchain keeps track of all actions and makes the information available to anybody using the program. Therefore, the transactions implemented in the Blockchain software are the safest, fastest, easiest, and least expensive transactions to operate with (Scheibach, 2016).

2.4.2 Investment and Savings

A. Crowdfunding

FinTech has also introduced many advances to the global financial industry in the sector of investment. Crowdfunding is one of them. *"It is online peer-to-peer fundraising that allows the users to mobilize the funds from various individual investors through social media or social networking sites by way of lending money or buying stakes in projects or companies"* (Conrad, 2012). The rewards of using a crowdfunding platform are that users may easily set up online fundraising, market their projects or products rapidly, and receive useful feedback and funds for the project at the same time (Augustine, 2015). Some crowdfunding platforms are-

* **Kickstarter**, one of the largest and best-known sites for fundraising, has raised more than \$2 billion USD for the most successful projects since it was founded and has assisted in funding over 100,000 creative initiatives (Bose, 2013).

* **IndieGo** is also a very well-known crowdfunding platform for raising money for charities, start-up companies, and both profit and non-profit projects, including several top projects garnering financing of over 10 million USD (Taylor, 2013).

* There are other renowned crowdfunding websites like **GoFundMe** (Garland, 2016), **Rocket Hub** (Taylor, 2013), **Motif**, and **SigFig**, all of which assure computing and cyber security and evaluate investment risk using a virtual currency portfolio (Neuman, 2015).

B. New budgeting apps

FinTech firms have created several budgeting apps that assist users in managing their finances daily and personal savings more meritoriously without constant monitoring (Maurer, 2015).

***Virtual Savings Jars, Virtual Ledgers**-like platforms use sophisticated software to track income from a specific bank account or credit card, classify costs, and adjust each month's or day's spendable cash after every transaction in accordance with the target savings' financial circumstances (Augustine, 2015).

C. Automated portfolio management by Robo-advisors

Previously, investors' ability to invest might have been restricted by portfolio management through the bank due to the high yearly fee paid to the bank, which ranged between 1 and 3 percent (Maurer, 2015). FinTech businesses are now developing new automated portfolio management tools employing automated algorithms. These programs or software choose the most effective ways to distribute and manage the assets of investors in order to control the risks involved.

**“Robo-advisors are one of the most remarkable developments, helping investors manage their investment portfolios more effectively based on a series of pre-programmed algorithms at lower costs than the banks” (Accenture, n.d.-a).*

***Acorns and Betterment** are some well-known asset management platforms.

D. Expert advises on financial planning at a lower price

FinTech companies are also arranging professional guidance and advice from financial experts at a very low price.

* **Learn Vest** is one such financial planning website that offers all users free access to professional financial advice from online advisors to help them develop their own methods for managing their personal wealth, keep track on their income and expenses, make investment portfolios, and better manage their cash flow. (Nath, 2015).

***Personal Capital** (Fontinelle, 2015), **eToro**, **Nutmeg**, **Betterment Zopa**, **Transferwise**, **Simple**, or **Lending Club**, are some other instances.

2.4.3. Lending

The outstanding innovation in lending that FinTech brought about may have been the biggest change in the global economy (Conner,2013). This revolutionary contribution by FinTech to the lending sector of the financial services industry is mostly referred to as **FinTech Credit** in literature. Though there is no internationally agreed definition of FinTech credit (Claessens et al., 2018; BIS, 2018), the most inclusive one for this study is the one originated by BIS, as they stated, FinTech credit encompasses all the “credit activities” facilitated by

platforms that match borrowers with lenders. *“Depending on the jurisdiction, these platforms are referred to as marketplace or peer-to-peer (P2P) lenders or loan-based crowd funders. It also includes platforms that use their balance sheet for intermediate borrowers and lenders. In principle, facilitating credit activities through platforms provided by technology-based companies can also be included” (BIS, 2018).*

In connection with this, this research study found the most comprehensive conceptualization of credit activities in the National Consumer Credit Protection Act, 2009, developed by the Australian Investment and Securities Commission. According to it, a “credit activity” may include:

- * arranging credit under a credit contract or lease
- * performing obligations of a credit provider or lessor (either as the credit provider or lessor or on behalf of another person who is the credit provider or lessor)
- * performing as an intermediary between a credit provider and borrowers
- * assisting a credit contract or consumer lease

(Source: Australian Investment and Securities Commission, 2009)

In regards to these activities, the FinTech industry provided many technology applications, brought unique financial products, and further expanded financial support services in lending. This research paper for the first time as is found - (i) accumulated all these unique activities along with associated products and support systems, (ii) segregated all FinTech credit activities based on the source of funds, and listed them as a bunch in Table 2 below.

Table 2: A List of FinTech Activities

	Source of Fund	Role of FinTech Companies	Provided Services
A.	FinTech company	Providing credit	1. Balance sheet Lending
B.	Investment Crowd or Investing people	Functioning as an intermediary between the credit provider mass and the borrowers	1. Peer-to-peer(P2P) Equity Crowdfunding 2. Peer-to-peer (P2P) Loan Crowdfunding or marketplace lenders 3. Factoring and Reverse Factoring
C.	Banks or other Financial Institutions	In credit contracts, suggesting, assisting or acting as an intermediary between credit providers BFIs, NBFIs and the Borrowers	I. Referral 1. Outbound Referral 2. Inbound Referral II. Software-as-a-Service (SaaS) 3. Automated Loan Advice 4. Loan Portfolio Management 5. Loan application Dash Board/On-Boarding 6. Document Tracking 7. Automated Underwriting/ Credit Scoring 8. Disbursement Management 9. Customer Management 10. Repayment
[Compiled from World Economic Forum (2015), Srethapramote et al (2015),OECD(2015), CGFS-FSB (2017), The Economist(2017), Claessens et al.(2018),Jacobson(2018), CCAF(2019), Morales (2020), Finextra (2020), Huang et al.(2020), IMF(2020)]			

A. 1. Balance Sheet Lending by FinTech:

FinTech balance sheet lending, also known as lending at risk, is the phrase used to characterize loans from online platforms that use their balance sheet in the normal course of business to lend borrowers money. Since these non-bank lenders do not accept deposits, they must rely on alternative funding sources like their own stock capital, the issuance of debt, or the securitization of the loans (Claessens et al., 2018). Such a firm doing lending activity using its capital base is **Kabbage**.

B. 1. Peer-to-peer (P2P) Equity Crowdfunding

Equity crowdfunding (CF) platforms that operate online typically gather structured data from investors or borrowers, carry out due diligence reviews, assign scores, weed out unviable funding requests, set prices for various levels of risk, and initiate or carry out payments between investors and borrowers (FSB, 2017). Instead of receiving profits from taking on risks, the CF platforms make money from origination, servicing, or other sorts of fees.

B. 2. Peer-to-peer (P2P) Loan Crowdfunding or Marketplace Lenders

These are well known all across the world as peer-to-peer (P2P) *marketplace lenders*. These platforms connect lenders and borrowers and do not bear the risk of default. Some companies that are successful in the field of P2P lending are **Lending Club**, **Prosper**, and **Earnest**.

FinTech loan crowdsourcing is growing fast. Global transaction volumes increased from USD 145 billion in 2015 to USD 304.5 billion in 2018, more than doubling. With a market share of 71 percent, China was by far the largest market in 2018, followed by the Americas (21percent), and Europe (6 percent). Further, loan crowdfunding comprises roughly 83 percent of the overall volume of lending. It is followed by stock crowdfunding, which makes up 3 percent of total volumes, and FinTech balance sheet lending, which accounts for 14 percent (the World Economic Forum in 2015 and the CCAF in 2019).

B. 3. Factoring and Reverse Factoring

Technology firms are also capitalizing on invoice factoring or debt factoring (i.e., factoring) and supply-chain finance or supplier finance (i.e., reverse factoring), supporting the integration of financial services directly into small enterprises' (SEs') value chains. Small business owners can use their accounting software to connect directly to the invoice finance platform, apply for a loan, and receive payment almost instantly. Here, *"reverse factoring is similar to the concept of account receivables financing or traditional factoring, but the buyer initiates the financing for the supplier, which is again backed by the buyer's creditworthiness in fulfilling the accounts receivables"* (OECD, 2015).

C I. Referral

In the case of FinTech activities where the source of funds for FinTech credit programs is banks or other FIs, bank-FinTech referral partnerships are at the core of this sort of FinTech success.

A few companies, like **OnDeck**, **Lending Club**, **Funding Circle**, and **TSYS**, have created referral partner programs with various banks in an effort to increase customer retention, offer broader product selections, and target new consumer demographics. Banks in the UK are required to direct business clients they are unable to assist to other service providers. **Funding Circle** and **H&R Block** are two further examples of this sort of referral partner arrangement between banks and FinTech. Through this referral partnership, H&R Block (a bank) made Funding Circle (a peer-to-peer lending marketplace) their partner lender for all their small business customers.

This referral model directs consumers who fall outside of the bank's lending guidelines, for credit or infrastructure-relevant limitations—to an online lender in exchange for referral fees. This is known as outbound referrals. Alternatively, a FinTech firm itself may refer its loyal customers to a bank for funding which is known as inbound referrals. Both referral methods are gaining momentum. In co-branded models, banks and fintech companies offer each other's products to customers.

In an outbound referral, referring Banks can typically place parameters on the features of loans or pricing that a non-bank referral partner places on their customers. Likewise, in the inbound referral, banks can specifically indicate to their FinTech partner the types of loans they want to offer or the credit profiles they are willing to buy (Jacobson, 2017).

C. II. Software-as-a-Service (SaaS)

Another common option for FinTech activities to receive bank funding is to lease or sell the bank's program under Software-as-a-Service (SaaS) model (Morales, 2020). It is a technique for distributing and licensing software that makes use of subscription-based licensing and centralized hosting. SaaS applications are also referred to as web-based, web-hosted, and on-demand software. Gartner (2021) showed that Software as a Service (SaaS) is the largest market segment for cloud-based services and is forecast to reach \$122.6 billion in 2021.

Indeed, SaaS has established itself as a popular method of delivering a wide range of business applications, including payroll management, customer relationship management (CRM), service desk, and many others. Lending-related platforms are the most commonly used software for centrally managing and automating different stages of the loan (Software Advice, n.d.). These loan activities are further discussed in detail in the discussion of measuring variables for the quantitative data analysis part (Section Reference 3.2.2).

2.5 The Way FinTech Can Enhance Access to Finance for Small Enterprises: Theoretical Perspective

"While new financing opportunities for entrepreneurs open up, the entry of big tech companies into the SME finance market might be disruptive for traditional players" (OECD,2018). All-inclusive results of these changes in SME finance are required to be better understood.

FinTech is offering digital products or services that can solve customers' problems initiated in the traditional forms of payment, investment, and lending in the financial services industry. In connection with this, it has endorsed some innovative and inherently digital financial services to be offered to small enterprises as well. Technology-driven changes in financial services are making a significant difference to small enterprises that were rejected for financing because of their low profitability or lack of information.

It is found that systematic analysis of small enterprises' financial profiles using alternative data analysis (including data on bank account information, e-commerce transactions, invoice data, and customer surveys) can provide adequate insight into borrowers' profitability assessments. While it has long been difficult for financial service providers (FSPs) to measure the creditworthiness of small enterprises in many markets due to lack of assets to pledge as collateral, there abundant tools to conduct digital "Know Your Customer" (KYC) compliance are found to be reducing the time and cost of maintaining such due diligence for FSPs. These tools are also making the acquisition of customers easier. Furthermore, *"the automation of previously labor-intensive tasks like contracting and compliance is making lower-value loans to small enterprises more viable"* (Nemoto & Yoshino, 2019). Some of these improvements would certainly be disruptive to incumbents. Still, as new SME-focused

FinTech firms are taking some market share from traditional financial institutions, it is apparent that they will serve many borrowers that traditional firms rejected earlier.

Even in a conservative scenario, innovation in small business financing can unlock liquidity and working capital that allow small businesses to survive the volatile stages of growth and development. *"It holds the potential to revolutionize SME financing, as it can offer unprecedented solutions to deal effectively with the main barriers that SMEs face in financial markets: information asymmetries and collateral shortages" (OECD, 2017a)*, and again, *"having greater access to finance might also create a benevolent cycle as access helps rebuild good credit histories that financial institutions can use to better price SME loans, amplifying the benefits to long-term economic growth" (ADB, 2014)*.

2.5.1 FinTech Credit: Designed to Serve SME Finance in Particular

The findings from the literature review let it become apparent that FinTech credit is designed to serve small businesses with the prime focus of facilitating their financing. Following the OECD, such developments are more relevant to emerging economies and small businesses that find it hard to have access to the formal financial sector (OECD, 2017).

For instance, **peer-to-peer (P2P)** marketplace lenders or platforms are providing growing volumes of direct credit to consumers and small enterprises. *"The emergence of P2P lending has its roots in the crowdsourcing idea, where it taps into the power of the crowd to increase efficiency and realize tasks that would be difficult to accomplish by one individual firm" (Brabham, 2008)*. Following the World Economic Forum, alternative sources of financing such as P2P lending and equity crowdfunding have meanwhile experienced rapid growth in many regions of the world, as they make many investment projects viable that were found to be too small or too risky for traditional banks to address (World Economic Forum, 2015b). These lending platforms arrange for investors to make diversified and fractional investments in multiple loans from different debtors, thereby diversifying their risk. Thus, these platforms can provide significant benefits to the unbanked, underbanked, and other small enterprises in emerging markets. The most substantial and obvious benefit is the improved access to finance that was not available before or was too expensive. The World Bank conducted a study on crowdfunding in 2013, and it explored that there is an opportunity for up to 344 million households in the developing world to make small crowdfund investments

through P2P in community businesses (infoDev, 2013). The report also highlights the fact that by having access to the loans through P2P lending platforms, the marginalized can improve their credit histories, which may allow them to obtain loans from traditional banks in the near future.

Despite the benefits of P2P lending, there remain a few risks and challenges that need to be addressed so that this innovative business model may continue to scale up and drive greater financial inclusion. Firstly, except in the UK and USA, in many developed and emerging markets as well, there are no clear regulations established yet for P2P lending. Jenik et al. (2017) added a few more challenges related to essential infrastructure and individual behavior. According to the authors, limited access to technology may impede access to P2P lending platforms. In many emerging countries, access to the internet is still limited to urban areas. Finally, a major obstacle to overcome is the lack of general awareness and trust among customers. As P2P lending is an innovative and fairly new model, there is still limited awareness among potential borrowers and investors.

Nevertheless, in some transition economies where e-commerce is not yet as structured as it is in advanced markets, some market players have initiated new business models with **e-commerce platforms** facilitating their small businesses' buying and selling of goods online. For example, in Kazakhstan, one of the leading banks, Kaspi Bank, has created a marketplace where its small business customers can trade their goods online. Through this platform, a small business can establish an e-shop in just a few clicks, without the need for any advertising, security systems, or payment services. These e-shops can also be connected with certain third-party service providers for additional services, including storage of goods, deliveries, insurance, and translation of product descriptions to facilitate export. In addition, access to finance is enhanced for both the supplier and buyer enterprises, and the bank has a provision to provide a lending facility to its customers to enable them to acquire these particular goods or services sold online. This study has explored a case of the same business model's application in Bangladesh. (ShopUp case in Bangladesh) (ref Sec 2.7.5).

Furthermore, emerging economies, like those of Asia, represent a natural place for such innovation, given the region's growing share of e-commerce. In 2016, the PRC (People's Republic of China) became the world leader in e-commerce with sales of nearly \$400 billion

(ADB, 2018). Other countries like Japan, the Republic of Korea, and India are among the top 10 (The Economist, 2017). Asia as a whole was estimated to have roughly 80 percent of the global total (USD 2.7 trillion in 2020) of the B2B e-commerce market (Statista, n.d.).

Likewise, technology-driven changes to business models can also enhance access to financial services for Asia's small enterprises involved in **trade finance**. Several studies show that the growing standing of Asia in world trade has turned enhanced access to trade finance into a potentially game-changing opportunity for small enterprises. Expanded trade finance in the PRC and India contributes to over 32 percent of the world's exports (Wignaraj, 2011). But on the contrary, an estimate by Di Caprio, Kim, and Beck (2017) demonstrates that *"firms in Asia face an annual trade financing gap of \$600 billion, with roughly one-quarter, or \$150 billion, of the gap faced by SMEs"* (ADB, 2018). Technology-driven changes to the business model can expand this access by modernizing inefficient processes and reducing the role of costly intermediaries. In this regard, technologies such as Blockchain or distributed ledger technology (DLT), APIs, and others are applicable to a wide range of models.

Technology can also offer different improvements to expand the **factoring** market to more small enterprises involved in local and global supply chains. Asian firms already account for roughly half of the world's supply chain exports (Banomyong, 2010), but several surveys in the related field find limited funding as a common constraint on doing business in an expanded way in a global supply chain network. Hence, the use of Blockchain contracts, centralized digital platforms, or other business modes can standardize the format of invoices, making them easier to verify, facilitate more trade, and have financed. An example (though applicable to the European context) is the fact that invoices between small businesses are becoming increasingly digital. They are offering an online interface to issue and track e-invoices and are integrating this interface with a bank account that supports small enterprises and, on the other hand, enables the intermediary FinTech company to provide receivable-based credit services or factoring finance. Small firms are more familiar with factoring than large firms and might face more liquidity constraints, so more factoring finance by FinTech is anticipated for small businesses. Factoring also enables small businesses to offset their lack of expertise and bargaining power while collecting late payments from big customers by outsourcing these undertakings to a third-party FinTech company.

Alternative data that supports credit analysis could be used to assess the creditworthiness of business customers in funding the accounts receivables in **reverse factoring** also. These firms can rely on the creditworthiness of comparatively larger customers to facilitate borrowing for their small suppliers. World-renowned online retailers like **Alibaba and Amazon** are using such data in their own affiliates' lending activities.

Again, technology platforms can streamline processes for both invoice finance (factoring) and supply chain finance (reverse factoring). For example, it can allow small business owners to directly connect their accounting software to the platform, apply for a loan, and receive payment almost instantly.

Last but not least, the increasing availability of online data is changing the landscape of **credit scoring** (that can be undertaken by a third-party Fintech on behalf of a financial institution to assess the creditworthiness of a potential borrower firm) in both nations, with or without a developed national credit bureau (Creehan, 2018). The benefits can include more accurate estimates of default risk using thousands of data points from a number of traditional and alternative data sources and a resulting decline in small enterprises' risk premiums.

2.5.2 The Cutting-edge Features of FinTech Credit that Ensure Finance to SEs

1. FinTech credit fosters faster services

Since data analytics has become more mainstream and the cost of data storage and computing power has significantly declined, FinTech companies have used their alternative credit assessment methods to offer more convenient, quicker, and lower-cost unsecured loans to the unbanked, underbanked, and other small enterprises.

Indeed, it is stated that the most competitive advantage of Fintech is that it offers faster services in loan origination, i.e., loan application, approval, and funding, compared to traditional banks. Customers and business organizations can borrow short-term funds on a 'single deal basis' in a simple and fast way without many administrative procedures through many options such as **On Deck Capital, Kabbage, and PayPal Working Capital** (Neuman, 2015). For instance, a loan that may take 15–30 days on average to obtain approval from a traditional bank may take only 1-3 days to obtain approval when using a P2P lending

platform. **Lending Club** and **Prosper** typically take two days to process loans (Lending Club, n.d.). On Deck Capital is considered the best short-term loan provider for small businesses because it allows small and medium-sized businesses to borrow loans with a maximum limit of \$500,000, repayable in 3 to 36 months. The borrower can easily complete the loan application online, a task which requires some basic information such as a social security number, a business tax ID, and three months of credit card or bank statements, via On Deck's official website or smartphone within minutes. In addition, no collateral is required (Nicastro, 2016). The approval result is noticed by the borrowers very quickly, within a few minutes, and, if the loan applications are approved, the borrowers receive the loans as quickly as in 24 hours, or in a few days (Nicastro, 2016). For this, On Deck requires one year of business transaction history with an annual sale of over 100,000 USD or at least the owner's business credit score of over 500 points to successfully obtain the loan (Prakash, 2016).

For some small businesses with an annual profit of less than 100,000 USD or a minimum of \$50,000 USD, borrowing is possible through Kabbage. Kabbage is an online FinTech company based in Atlanta that allows customers and small businesses to borrow money quickly within seven minutes via an automated lending system connected to all available data (Nicastro, 2016). Following Peter Renton, the founder of the global peer-to-peer conference, Kabbage is the most innovative small business lender in the world. They deliver a loan to a small business lender in seven minutes. The way they do it is they connect the client's **eBay**⁴ data and see what's the client's daily sales volume, and ratings. They also pull data from **Amazon** and **Facebook**, among other sources (Williams, 2015).

Along with self-development, On Deck Capital, and Kabbage, PayPal Working Capital is known as the lowest-cost and most flexible lending option in the marketplace today for small business organizations (Brown, 2014). Nesta (2014) also reports that the speed of P2P lending is the feature that users appreciate most.

⁴ eBay Inc. is an American multinational e-commerce company that facilitates consumer-to-consumer and business-to-consumer sales through its website. It is a multibillion-dollar business with operations in about 32 countries, as of 2019. [eBay, Inc. 2021 Annual Report]

2. Resolves the information asymmetries and collateral shortage problems

Several studies in the relevant field provide evidence supporting FinTech's contribution to small business funding. According to the OECD, *"it holds the potential to revolutionize SME financing, as it can offer unprecedented solutions to deal effectively with the main barriers that SMEs face in financial markets: information asymmetries and collateral shortages"* (OECD, 2017).

Blockchain (i.e., Distributed Ledger Technology or DLT) technology is making a significant contribution in this direction, which addresses information asymmetries and collateral shortages innovatively and is pertinent to any online transaction involving digital assets. Its application opens up opportunities to reduce small business funding limits in a variety of ways.

Firstly, as stated in an earlier chapter, the use of alternative data is being used to enhance the **credit scores** of small businesses previously disadvantaged by limited credit histories. New companies have emerged that are using combinations of non-traditional alternative data—mobile data records, user location and movement patterns, psychometric data, utility bill payments, in some cases (under an API setup), bank account transactions, ATM and POS transactions, internet browsing patterns, even social media behavior—and analyzing them with predictive and complex algorithms to develop a new way to assess the creditworthiness of borrower enterprises. Again, some of these firms perform as pure data science companies, offering algorithm-driven credit scores to the relevant financial institutions, while others are developing credit scores to directly lend to consumers. Some are using data on buying and selling transactions from the associated e-commerce platform and business behavior, while others are using alternative data from other sources.

For instance, through buying and selling data on **eBay** and **PayPal**, the lending companies determine the number of sales or turnover the borrowers have achieved and based on this data, they take seemingly appropriate loan decisions, meaning they decide on the loan ticket size for *the borrowers* (Williams, 2015). *"With **Kabbage**, which beats the banks in lending by using a range of alternative data more intelligently and more effectively, a business can get loans up to 100,000 USD almost immediately after completing the simple loan application online"* (Meola, 2016).

Following Tapscott and Tapscott (2016), Blockchain technology represents a new paradigm—a decentralized approach to trust, as the validation of transactions is no longer done by a centralized trust body but by a network of autonomous computers that confirm and validate the content by using a unique algorithm that compels them to act in the common interest. According to Claessens et al. (2018), more information and greater transparency tend to increase this trust. Following the conduct of study by the Asian Development Bank Institute (ADBI), if alternative data is utilized besides the bank account information (such as information on deposits and cash flows), *"banks can enhance their credit risk scoring accuracy and reduce their loan review time and costs, making small business financing smoother and more efficient"* (Nemoto & Yoshino, 2019).

Secondly, Blockchain can further expand small enterprises' collateral for borrowings. It may attach **movable assets** like accounts receivable, vehicles, machinery, and inventory to a loan. Whereas, such assets have frequently been disqualified, despite having a legal framework in their favor (in countries like the People's Republic of China (PRC) and Thailand), because of the borrower's disability to physically transfer the custody of the assets to the lenders (a pledge) or transfer the ownership (a hypothecation). In addition, intangible assets such as patents, software, and contractual agreements could be valued more precisely by banks when making lending decisions (Brassell & Boschmans 2019).

Thirdly, the use of a Blockchain network in foreign trade finance can also potentially reduce the time and cost of dealing with correspondent banks, which add time and cost to **trade finance** transactions. By tradition, if an exporter's local bank has no recognition in international financial markets, it has to seek a correspondent bank that can provide cross-border services, linking the customer to another country's financial system. These cross-border payments using traditional correspondent banking networks can take a full business week. Blockchain networks can allow banks to form bilateral relationships for quicker transfers in a few minutes at a lower cost (Higginson, 2016).

In this way, utilizing consumer data and analytics might aid in risk assessment and lessen the requirement for collateral verifying the clients' creditworthiness (Gambacorta et al., 2019). However, the credit scoring model based on alternative data has several obvious weaknesses (Hand and Crowder, 2005). Many researchers argue that they require a training

period of at least one year. Further, updating the scorecard is resource-intensive (Hopper and Lewis, 2002).

Even with these, Agarwal et al. (2019) show that mobile and social footprints outperform the conventional credit ratings employed by banks in terms of their predictive potential for loan approvals and defaults, studying exclusive and proprietary loan-level data from a leading fintech lending business in India. Similarly, to this, Frost et al. (2019), based on a case study in Argentina, reveal that FinTech lenders have an informational advantage over typical credit bureaus when determining credit risk. Jagtiani and Lemieux (2019) demonstrate using a transaction data set from Lending Club that the use of alternative information sources enables some borrowers classified as subprime by conventional criteria to be placed into "better" loan grades and subsequently obtain credit at a lower cost. By studying data from a Chinese FinTech company, Gambacorta et al. (2019) demonstrate that a model built on machine learning and unconventional data is more accurate than a standard model at forecasting losses and defaults. According to Fuster et al. (2020), the increased use of information combined with new technologies like machine learning and Blockchain might raise forecast accuracy.

Contemporary financial experts and practitioners also recognize the opportunities offered by this new technology and are moving accordingly. For instance, in Europe, the Digital Trade Chain Consortium was created in 2017, gathering major commercial banks to build a new cloud-based platform based on Blockchain technology, directed at small business clients (IBM, 2017).⁵

⁵International Business Machines Corporation (IBM) is an American multinational BigTech corporation with operations in over 171 countries. Inventions by IBM include the automated teller machine (ATM), the hard disk drive, the SQL programming language and so many more (*Wikipedia*).⁷ European Banks formed Blockchain Consortium for SMEs' being hosted by IBM in January 2017, later it became a Blockchain-based trade finance network owned by 12 banks by May 2020 (Forbes,2017 June 28).

3. Ensures safety

All FinTech credit functions or lending services can be viewed as new alternative fundraising systems that are built on the connection of computer networks with high-security profiles. The regulatory obligations across countries ensuring security are subject to discussion in detail in the later part of the paper under the secondary data finding and analysis section. Different non-manipulative, flawless safety walls or measures like SNAP (an internet network that is protected by a core firewall and is connected to the core router) and Blockchain are used to save all sorts of financial data in FinTech.

4. Offers low cost

In the lending process, the handwritten data inputs with wearisome paper processing have long been replaced by tech-based data inputs, which again are being replaced by the use of optical character recognition-like technologies combined with machine learning(ML) and artificial intelligence(AI) today by Fintech firms that radically improved operational efficiencies and made the costs lower. The ways costs are being cut off are as follows.

- i. New digital "Know Your Customer" compliance systems are taking advantage of collecting authentic data for free from an increasingly large number of national databases in countries like Singapore, Thailand, and India to ensure due diligence and reduce the time and **cost of** small business customer **acquisition** at the same time (Son, 2017).
- ii. When processing new loan paperwork and generating loan agreements, automated legal functions help save time and money, making smaller-value loans profitable. For instance, the use of machine learning has **decreased legal costs** for JP Morgan, which previously required 360,000 hours of annual work by lawyers and loan officers (FindLaw, 2017).
- iii. Since marketplace equity fundraisers, e-commerce platforms, lenders, borrowers, and other related parties operate online, they do not need to have a physical presence. Thus, technology has reduced the cost of much of the traditional physical infrastructure, which diminishes the **fixed and marginal costs** of producing financial services.
- iv. Most lenders use innovative algorithms to determine the creditworthiness of applicants and have a streamlined application and approval process. The result is lower operating costs. In accordance with this, Autonomous Research (2016) found that the operating

expenses of **Lending Club** are currently equivalent to less than 2 percent of its outstanding loans, compared with a ratio of 6 percent for large US lender companies (Dudley, 2017).

- v. Apart from all these, digital technologies also help reduce the costs of collecting, storing, processing, and exchanging information—including **search costs, replication costs, tracking costs, and verification costs** (Goldfarb & Tucker, 2019).
- vii. Thus, the application of FinTech technology ensures a reduction in all the above costs that were supposed to be passed on to the borrowers in the form of interest. That is how, in the marketplace, an e-commerce platform, or other lending models under FinTech, a borrower can borrow money from many different lenders with a **lower interest rate** than the banks. Conversely, a lender can also be a creditor of many other borrowers (to diversify his investments) where the interests obtained are much more than the deposit interests in the banks (Milne & Parboteeah, 2016).

5. Makes convenience certain

Firstly, online platforms are available 24/7, ensuring the comfort of users. Yet again, all the encompassing steps from the initiation to the end of any deal with a tech-based financing firm, or FinTech, are rendered with convenience as the use of technology enables the processes of application, approval, and disbursement to be more streamlined and efficient. For example, a FinTech firm can help borrowers more quickly find a suitable offer on a loan or help savers find an investment product that suits their specific needs by making the product more customized. Even after the automation of all the stages in loan origination, it can also ensure sustained follow-up even after the accomplishments of the deals.

In the article ‘This is how a new crop of companies is trying to reinvent banking’ (2015), Peter Renton, the founder of the global P2P conference, stresses that “ *P2P makes lending easier, simpler, more convenient, and effective for the customers than spending so much time and effort and waiting for the consent of the banks for their loans*” (Truong, 2016). Other studies also show that these technological applications make each of the lending steps more user-friendly and easier to understand. For instance, the amount of repayment to be paid back to **PayPal’s** working capital loan is calculated based on the annual PayPal sales of each business. Again, the requisite for borrowing money in PayPal working capital is that the

business must make a profit of a given minimum amount annually through using PayPal, and a maximum of 15 percent of total annual sales can be borrowed at a time from there (Conner, 2013). According to a survey conducted by Nesta in 2014 in the UK, almost 90 percent of retail investors stated that, when making decisions about lending through P2P platforms, the ease of the lending process is important. Similar responses were given by borrowers there (Chambers & Richmond, 2014).

6. Makes accessibility possible from a remote area

FinTech companies are entering the market, addressing the increasing demand for being fully digital, remote land accessible, and fully digital. By ensuring this, these companies are enabling investment projects in remote areas that are too small or too risky for traditional banks to address (World Economic Forum, 2015). The extensive use of information technology and online options allows FinTech platforms to provide this much convenience to customers.

7. Assures a high approval rate with a relatively low default rate

As stated earlier, FinTech companies introduce accounting technology to help manage small enterprises' financial statements, as well as more viable alternative credit scoring using non-traditional sources of information. They enable lenders not only to address information asymmetry cost-effectively but also to provide borrowers with higher approval rates and a relatively low default rate.

8. Offers customized /contingent products

"FinTech is enabling the customization of financial services to construct more complete markets. This can bring financial services closer to the general equilibrium of the classic Arrow-Debreu (1954) model" (BIS, 2021). This model suggests that, under certain economic assumptions of convex preferences (an individual's ordering of various outcomes of a product), perfect competition, and demand independence, there must be a set of prices such that aggregate supplies will equal aggregate demands.

Traditional core banking systems have no opportunity to adopt a fully consumer-inclined product development approach, as doing so can provide only standardized products irrespective of customers' contingency needs. In contrast, FinTech enables the automation of processes and reduces the setup costs for customized products. In addition, the increased

availability of data and computing power enables it to better price risk, tailor a product or service to the specific needs of the consumer, and thus construct a range of business-contingent products (Feyen et al., n.d.). For instance, most FinTech credits are used to arrange small-ticket loans that are disbursed on a "single deal basis." Through this, a small-ticket new loan is disbursed only on the adjustment of the earlier one.

9. Involves interoperability

Typical information exchanges in trade finance involve exporter-importer data exchange, contracts, commercial invoices, shipping documents, a correspondent bank, a confirming bank, an issuing bank, transportation, insurance, certificates, and many more. On the other hand, by providing a single mechanism for tracking various steps of the trade finance process—contracts, orders, documentation, insurance, multimodal shipments, customs, and delivery—a Blockchain network alone can enhance interoperability throughout the systems to improve accuracy and eliminate redundancy, reduce end-to-end transaction time, and increase transparency. A Blockchain letter of credit, for example, could be scheduled to execute upon delivery of goods to the port of entry and customs verification. By inserting the contract with a geolocation trigger, the letter of credit could be executed immediately upon the good's arrival in port and its clearance through customs online. *Barclays* claims to have issued the 'first Blockchain-based letter of credit in 2016', executing a transaction in 4 hours, which normally takes up to 10 days (Jemima, 2016). *"With the power of such innovation in mind, the Hong Kong Monetary Authority (HKMA) and the Monetary Authority (MAS) of Singapore are each developing distributed ledger technologies in collaboration with major banks, with plans to link the systems eventually"* (Barreto, 2017). Another prominent application, as mentioned above, is application programming interfaces (API), a software intermediary that allows many programming languages of interlinked authorities to share data.

2.5.3 The Features Work in a Mutually Inclusive Way

Applications of FinTech credit do not provide a single benefit to small businesses through their business models. For instance, "*the transactions implemented in the Blockchain software at a time are the safest, fastest, easiest, and cheapest transactions to work with*" (Scheibach, 2016). On the other hand, since the cost of data storage and computing power has significantly declined and data analytics been mainstreamed, FinTech companies can use their alternative credit assessment methods to offer *convenient, quicker, and lower-cost* unsecured loans to more unbanked and underbanked small enterprises in comparison to traditional banks. Unlike traditional lenders, FinTech lenders use alternative data and complex AI/ML algorithms to make fast (almost instant) credit decisions that are collateral-free, customized, low-rate, safe, convenient, and accessible from a remote location (Jagtiani & John, 2018). FinTech credit disruption has gained an edge over incumbents, mainly due to these all-inclusive offers in a single package.

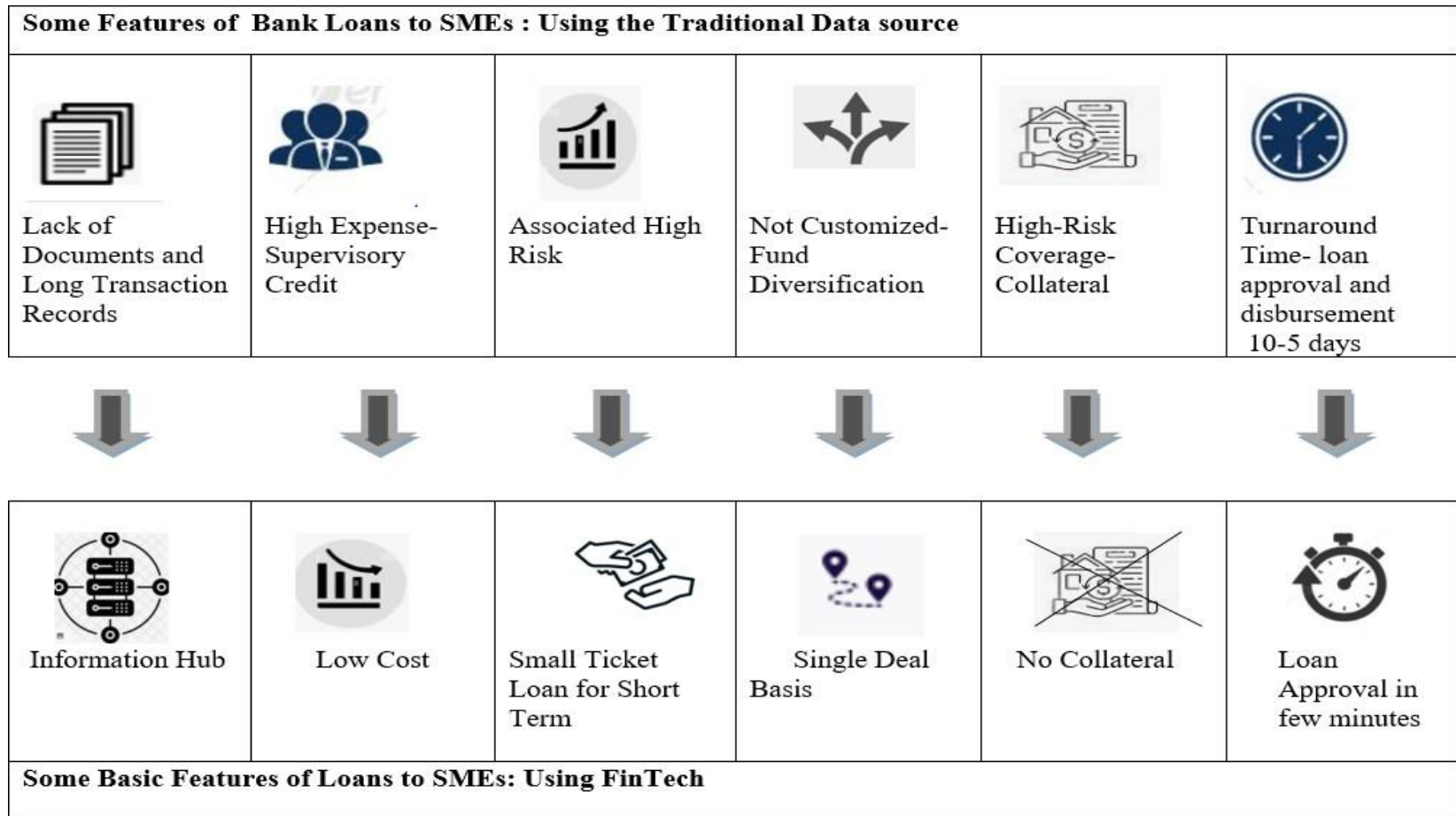


Figure 2: The Cutting-edge Features of FinTech Credit

[Compiled from Ullah (2006), Zaman & Islam (2011), Andrew et al. (2013), Chowdhury (2015), Islam (2016), Hoque (2016), Rahman et al. (2017), Accenture (2016), Schumukler (2017), Cornelli (2019), World Bank (2019), OECD (2017a) BIS (2018)]

The cutting-edge, inclusive features of FinTech that are replacing and disrupting the traditional lending mechanism can be seen at a glance in **Figure 2** above. For instance, the problem of a lack of documents could be replaced by alternative data sources from the information hub; the supervisory credit charging a high-interest rate could be provided at a low cost; the fund diversification could be replaced to many extents by a customized single-deal basis loan; or a collateral-based loan could be replaced by a no-collateral provision of FinTech. Again, the enabler instruments FinTech uses in replacing the traditional lending mechanism and other financial services are depicted in **Table 3** below.

Table 3: Lending Process Enablers in FinTech

Alternative Data Source	Large Scale Data Accumulation	Onboarding	Data Scoring	Automated Loan Approval
✓ Digital Payment (ATM, POS, Online purchase, Using Barcode)	✓ Machine Learning and Artificial Intelligence (AI)	✓ Ensuring Country specific Acts on-	✓ Hundreds to Thousand of Data points	
✓ Phone usage (MFS, Transaction messages, GO location)	✓ Blockchain /DLT	1. Data Protection		
✓ Psychometric data(OCEAN Model, Financial psychology)	✓ Open Banking	2. Cyber Security		
✓ Bank accounts	✓ Application Programming Interface (API)	3. Anti-Money Laundering		
✓ Repayment history				
✓ Biometric data				
✓ Cloud computing				

Source: A compiled list by the author from various sources

Sophisticated e-KYC (electronic Know Your Customer) solutions can be embedded for digital onboarding and customer verification; data can be accumulated and processed using ML, AI, and DLT; shared and communicated through APIs in an Open Banking setup; and loans can be processed, assessed using credit scoring, and approved automatically. The benefits could include more precise estimates of default risk and a resulting decline in SME risk premiums. This way, FinTech is providing nothing but these sorts of digital products and services that carry the ability to solve customers' problems that have long been carried in the traditional forms of payment, investment, and lending sectors of the world financial services industry.

According to Costa, Deb, and Kubzansky's study (2016), the use of digital data sources by FinTech has the potential to support between 325 million and 600 million people (including business people) only in Brazil, China, India, Mexico, Indonesia, and Turkey (the world's six largest emerging economies) to gain access to formal credit for the 'first time' ensuring more access and inclusion to finance.

2.6 Bank FinTech Collaboration

2.6.1 The Concept

The fact has become evident that the global banking industry is currently experiencing a fundamental transformation in the way new financial services are shaped and offered to customers. The field of financial services is being opened up with more innovative services by FinTech, which is driving competition forward. As previously stated, technological advancements and new services are based on: Artificial Intelligence (AI), Machine Learning (ML), Blockchain or Distributed Ledger Technology (DLT), Application Programming Interfaces (APIs), Natural Language Processing, and many others. It demonstrates a need for industry incumbents to adapt to this rapidly changing competitive environment. These shifts currently taking place have also been discussed by industry and academic professionals as being very significant, even revolutionary, toward a more innovative and customer-centric financial industry (Cortet et al., 2016; Romnova & Kudinska, 2016; Gomber et al., 2018).

Banks have traditionally been a safe place to save money, earn interest, and arrange the lending of funds from the surplus segment of the society to the deficit segment of society. Now, studies show that, for several reasons, FinTech firms are changing the way society views banking, money lending, investing, and purchasing. This is because:

Firstly, as stated earlier, traditional banks have lost much of the public confidence because of the great recession of 2008. To many, there is an underlying distrust on banks and an aspiration for better, more customized customer service. According to the CCP Research Foundation, as of June 2015, the top 16 global banks incurred \$306 billion in conduct-related costs since 2010 (Mead, 2016). Taking from the working definition (not exhaustively) by the 'CCP (Conduct, Culture and People) Research Foundation', the term "conduct costs" means all costs borne in connection with conduct risk (systemic risks by undermining trust for a bank's business models, decision-making processes, behavior, breach of any code of conduct and even the underlying culture). This risk may incur any costs, losses, fines or penalties imposed on the bank by any regulator (CBR, 2020). In this regard, FinTech startups have been trying to find their niche by supplying customers with services that large banks are unable, or unwilling, to provide. Because of most of the FinTech firms' size and proficiency in technology, they possess the ability to provide lower-priced services with well-designed programs and to generate customer-focused business models that traditional banks struggle to achieve (Mead, 2016). FinTech, according to some other authors, is more concerned with how a bank operates and increasing market share through competition (Kagan, 2019). These radical changes have thus been a bigger challenge for the companies like banks that have highly formalized operations and are operating in a heavily regulated industry. Cortet et al. (2016) also added that the entry of FinTech into the financial services industry is proving to be challenging to the incumbents, as FinTech has the comparative advantage of agility due to its smaller size and a lighter regulatory burden compared to the incumbents.

Secondly, many traditional business models began to portray themselves as irrelevant or less appealing to a new customer segment, namely millennials. This new category of customers comes with new consuming habits and technological abilities that match these

new technology offerings. Cortet et al. (2016) also found this momentous change in consumer behavior to be a significant source of change in the financial services markets. According to him, consumers are becoming accustomed to having services that are accessible anytime, anywhere, and so the supply of different customized, convenient, and seamless experiences provided by different platforms is providing a challenge for traditional financial service providers in innovation.

Thirdly, by dint of the abundant use of technology, FinTech firms can improve their customer experiences by providing services that cost less than the traditional banks charge. By taking over banking services and specializing in any facet, like mobile banking or lending to underbanked demographics, FinTech firms can compete with banks (Glas & Truszel, 2016).

From the above study, it may be apparent that FinTech firms were driving away conventional, outdated banks. But this is not the case. Still, there were chances left for the banks to react to this new threat to their market share. While they might potentially face a decrease in revenues of 29–35 percent in the long term (Temelkov, 2018), they could also stand to increase revenues with a growing market share. Although there was a risk of losing revenues, it has been found that the growth in funding for FinTech startups is more likely to have a positive effect on bank stock prices. Experiences showed that the financial sector has faced many series of transformation waves over the years and that they managed to adapt and survive successfully despite these changes, and for this time being, the industry is changing because of FinTech applications (ADB, 2021). That is all about. A group of authors (Vasiljeva & Lukanova, 2016; Romanova et al., 2018) rather is showing that, if banks decide to **collaborate** with FinTech firms, it could be beneficial to all parties involved.

2.6.2 Competitive advantages of Banks over FinTech

Kasasbeh et al. (2017) noted that any firm's competitiveness comes from factors such as core competencies, innovative product developments, responsiveness to customer needs, and cost-effectiveness. Notably, these competitive dimensions can remain at the core of the bank and FinTech's competitive relationship.

Traditional banks have established a solid heritage in their activities. This implies compliance, products or services, their standing as well as their **corporate culture**. *"The culture of most traditional banks is quite open to novelty. Banks' most valuable asset is their reputation"* (Gromek, 2018). Regardless of increasing competitive pressure from FinTech firms, banks still hold multiple advantages over FinTechs by having an established **trust** with clients (Dhar & Stein, 2017), an abundance of customer data (Brodsky & Oakes, 2017), a **regulatory foundation** (Nienaber, 2016), **financial proficiency or expertise, and extensive experience** in the market (Zalan & Toufaily, 2017). Banks also have a **broad offering of services** and products that gives them the likelihood of cross-selling and further deepening customer relationships (Döderlein 2018, Romanova et al. 2018). Furthermore, banks benefit from existing processes such as risk management, legal compliance, and data security (Bratasanu, 2017). Banks possess a **massive customer base** and a huge amount of data on those customers. Banks are accustomed to having these benefits that many FinTech firms require to be successful (Nienaber, 2016). The need for these resources drives many FinTech firms to collaborate with banks instead of simply acting as competitors.

2.6.3 Competitive advantages of FinTech over Banks

On the other hand, by assessing gaps in functionality and convenience provided in existing solutions, FinTech can gain competitive advantages by placing better alternatives to the banks' offerings (Cortet et al., 2016; Zalan & Toufaily, 2017).

Some other research shows that FinTech has multiple advantages over banks regarding **technological expertise, speed, and customizability**. According to Zalan & Toufaily

2017 *"Many traditional banks have built their technology on legacy systems that are becoming outdated, whereas FinTech is often operating on a more modern and modifiable technological architecture"*. With new technology based on AI and ML, FinTech also has an upper hand in more data analysis, not only with more efficiency but also with its optimization (Bratasanu, 2017). Furthermore, while most banks operate on a national or regional scale, FinTech frequently provides services on an international scale from the start. If FinTech receives enough traction, the opportunity is there for FinTech to quickly expand its service portfolio (Cortet et al., 2016). FinTech has harnessed technologies such as AI, ML, DLT, and natural language processing to offer highly automated services to customers in an 'Omni-digital environment' (that involves a strong aspect of connectivity)(Romanova et al. 2018). *"The use of technology enables FinTech to provide services more cost-efficiently than banks by automating labor-intensive tasks and to operate completely online, i.e., without establishing physical branches"* (Pollari, 2016; Zalan & Toufaily, 2017).

Buchak et al. (2018) noted one reason why FinTech has succeeded in providing convenience to customers: the efficient use of data to personalize offerings, even requiring less input from the customer. Besides generating disruptive innovations, FinTech companies also contribute 'incremental innovations' to the financial industry. Disruptive changes introduce entirely new services or processes; incremental innovation increases the efficiency and functionality of existing processes, eventually causing a fundamental impact (Puschmann, 2017). An example of a financial service segment is consumer lending, which has been seen as both incremental and disruptive change from FinTech. By digitizing and automating loan applications online, FinTech firms have generated an incremental change by increasing efficiency and decreasing handling time.

Again, FinTech can bring services directly to consumers (D2C). It can provide a consumer-created service or focus on a business-to-business (B2B) service model. For instance, with ACD-alternative credit data (Gomber et al., 2018), lenders calculate credit scores for customers based on more comprehensive data than traditional models and thus provide loans to customers directly that wouldn't otherwise be approved for them. In effect, *"the*

use of AI and machine learning in ACD processes has enabled previously unserved or underserved consumers to become a rather viable customer segment for lenders" (Buchak et al., 2018). Some other fintech firms operate in a B2B model, acting as technology providers for other businesses, which then may act as the consumer-facing channel and distribute the service. In such a model, "a bank may own or take part in a FinTech to have a user interface and distribution channels and distribute 24/7 automated FinTech services to consumers, which is well known as white labeling" (Puschmann, 2017). According to Kagan (2019), "The core of FinTech is to help business owners, corporations, and customers better handle their financial transactions, operations, and lives by taking advantage of algorithms and specially designed software."

2.6.4 Banks' Move Towards Collaboration with FinTech: Rationale

Unquestionably, it is an extremely challenging process for banks to innovate their all-through services and directly compete against FinTech. Thus, the most appropriate response would be to swiftly implement innovation through collaboration (Tah, 2016). Indeed, banks and FinTech firms can complement each other's strengths by collaboratively improving their financial strength and customer experience and achieving mutual benefits (Dunkley, 2016). Following Icar (2016), there has been markedly more and closer collaboration between the two industries. Many global banks appear to be moving toward nonphysical means of distribution alongside their brick-and-mortar operations, which is likely to be the major means of communication between banks and their clients in the future.

Banks are also found to be shifting toward viewing FinTech companies as enablers and partners rather than disruptors and competitors (Economist Intelligence Unit, 2015). In this regard, banks can choose platforms that best match their needs and fill the gaps in their information technology infrastructure. Each platform has different levels of expertise, maturity, complexity, and product offerings.

According to Accenture, fintech companies can be classified into two major categories: competitive fintech ventures and collaborative fintech ventures. According to Accenture's 2016 report, competitive FinTech companies are those that will pose challenges to financial

services institutions (Accenture, 2016). On the other hand, it also emphasized the importance of collaborative FinTech companies that consider existing financial institutions as their potential customers. Therefore, they always try to support, cooperate, and provide solutions to the problems of these financial institutions in the market and serve their interests.

By collaborating with FinTech firms, banks have the opportunity to provide new services with an enhanced user experience to their customers with fast implementation and improved conversion, whereas FinTech firms can benefit from the customer base, reach, and market knowledge of banks as well as the more sophisticated compliance and risk procedures that are trusted by customers (Cortet et al., 2016). The fintech industry is still gaining the reputation and trust necessary for its sustainability while having the advantages of being more client-centric, flexible, and creative, as well as the capacity to resolve consumer issues in innovative ways. Conventional banks could be beneficial in this instance. In this regard, Gromek (2018) stated, *"With the FinTech firms' impressive innovation and the banks' consistency and trustworthiness, they can both benefit from this symbiotic relationship (a close ecological mutual relationship between individuals from two or more different species) and establish a successful collaboration."* Wonglimpiyarat (2017) gathered data on the circulation of FinTech innovation in the financial markets and, during her study, documented the motives for bank and FinTech collaborations. She demonstrates that FinTech firms can enter into partnerships with banks to extend the reach of their services to new customers or market segments, whereas banks can benefit from collaboration by extending the reach of their services to better serve existing and new customers.

Again, in other studies, a new kind of current threat is now being termed **TechFins** (or, in some cases, "BigTech). TechFin is a combination of technology and finance. They are the large-scale companies that produce technology as their core business. Unlike FinTech, they have splendid capital, enough experience, and an unlimited customer base. Moreover, the vast customer data and the ability to analyze that data give them a great advantage over FinTech firms and other financial institutions. Though there are plenty of tech firms that

exist in the sector, **GAFAA** is named as the biggest tech firm. These technology giants—Google, Apple, Facebook, Amazon, and Alibaba (GAFAA)—are redefining customer service and experiences and increasingly playing around the periphery of financial services. Gomber et al. (2018) stated that Apple and Amazon pose a competitive threat to banks by developing their financial service initiatives. These big tech companies are operating at scale, which makes it difficult for banks to directly compete with them. With their prevalence among consumers, GAFAA is starting to offer targeted financial services that satisfy specific banking needs. **Amazon**, for example, is making loans to small businesses trading in its marketplace through a service called Amazon Lending. The service uses trading data and vendor reviews to make highly reliable credit decisions. **Google Wallet** allows customers to make online purchases via email, and Apple has integrated payments into its new touch authentication devices, such as the iPhone 6 and iPad Air 2. Also, Facebook has launched its free "Friend to Friend" payment service (Accenture, 2016). Given how fast this digital financial ecosystem is evolving, few experts are thinking in this way; even learning from and collaborating with GAFAA will be high on the agenda for bank leadership. As such, incumbent banks are increasingly looking forward to FinTech to enable them to continue operating in a *vertically integrated model*, or find a specialist role as a platform service provider. According to some other experts, indeed, FinTech firms and banks have no choice but to collaborate. If non-traditional FinTech firms and traditional financial institutions can bond their strengths together, they can survive the TechFin invasion of the financial world.

2.6.5 The Ways Banks Can Collaborate with FinTech

In their report, 'The Future of Fintech and Banking,' Accenture (2015a) identified three critical behaviors of banks. These are to **act open, collaborate, and invest.**

Act Open

The concept of 'Act Open' remains at the core of the digital revolution, indicating the open-source movement that has embraced so much of the new technology developments in recent years. It involves opening up an organization's intellectual property (IP), assets, and expertise to outside innovators to help generate new ideas, identify and attract new skills,

and discover new areas for growth. According to Cortet et al. (2016), in practice, 'open banking' refers to an open financial market where third-party companies offer financial services to customers without establishing themselves as highly regulated financial institutions. They further added, in the context of open banking, FinTech can be generally referred to as 'Third Party (Service) Providers (TPPs)' (Cortet et al., 2016). In this connection, Brodsky and Oakes (2017) define open banking as *"having advanced data-sharing capabilities between banks and TPPs to bring new services to the financial markets. A third party can be an external risk assessment and scoring provider (e.g., **Lenddo**, **First Access** FinTech companies) that offers risk assessment based on non-traditional data."*

Open banking is also featured by the application of Application Programming Interfaces or APIs. Brodsky & Oakes (2017) described open banking as the global development of API-based banking in a market combination of incumbent and FinTech companies. APIs are channels of communication, sharing data between different platforms, or it is the agreed-upon way to integrate two or more systems. Cortet et al. (2016) defined APIs as *"a pathway through which TPPs can retrieve specific data that is hosted on another platform like a bank. The use of an API notably provides a more secure and transparent way of communicating information between systems."* This Information shared between organizations usually relates either to know-your-customer procedures (this avoids having to re-capture a customer's information over and over again when they get enrolled in new institutions), or, most importantly, to a customer's past transactions (e.g., deposit, transfers, payments, and withdrawals) and previous loan history (e.g., capacity to repay and on time or late payments). A few instances of institutions that follow this model are **Mint and Yolt** in the United States, **Yolt** in the UK, and **Money Forward** in Japan.

Another means of collaboration between banks and FinTech firms, from the open banking perspective, is the growth of digital platforms. Platformization of financial services offers opportunities for FinTech to supplement different services provided through different platforms, such as mobile banking applications (Jackson, 2018). Or, in a more integrated cooperation between institutional investors and platforms, the bank commits a substantial

amount of capital to be lent through the platform. For example, only in 2012 did **Goldman Sachs** provide a noteworthy share of a \$100 million credit facility to the small enterprise through **OnDeck**.

Collaborate

Collaborating (though collaboration, in general, is a wider term including all these three-Act Open, Collaborate and Invest) can take different forms depending on the joining state of both parties. In their research study, Drasch et al. (2018), based on 136 bank and FinTech cooperation cases, classified the collaboration models into four alternatives consisting of **alliances, joint ventures, acquisitions, and incubation**. They found alliances to be, so far, the most common model.

The bank can also buy a single form of service offered by the FinTech companies. This model allows the banks to co-develop solutions with nominal risks. One of the most common approaches is 'white-labeling'. In such a case, the banks usually provide a purchased service. FinTech labels its solution under the brand of the bank. Banks may employ white-label solutions to the extent that the initial investment is made. In 2015, the Premier Community Bank of the US endorsed a cloud-based small business lending platform provided by the external provider **Mirador** (World Economic Forum, 2015).

Invest

Venture investment in FinTech is also like all other venture investments. However, more than ever before, established financial institutions or banks are taking this route to generate business innovation. **American Express, BBVA, and HSBC** have all developed corporate investments over the years, each with at least US\$100 million of investment. (The Trade News, September 17, 2015) Instead of chasing in-house development, banks are directly acquiring marketplace lenders to obtain the underlying technology or the expertise, a practice normally referred to as 'acquirehire.'

However, there are various issues with the implementation of these models. For example, differences in operations, business models, organizational models, and company culture

between banks and FinTech firms may impede serving the purpose; even legal policies and regulations may be confusing or insufficient for this newly emerging industry.

2.6.6 Bank FinTech Collaborations Around the World

By now, there are proceedings of collaboration between incumbents and FinTech businesses. Incumbent financial institutions are found to be pouring an increasing amount of funds into the FinTech sector. A few examples of collaboration that are currently taking place include:

Tandem Bank + Stripe

A new auto-save tool has been introduced by Tandem Bank, a UK-based digital-only bank, in collaboration with Stripe, the largest FinTech by valuation.

JPMorgan Chase + Plaid

Due to its API solutions and daily transaction volume, Plaid is an industry unicorn. The relationship was established to better assist clients in controlling personal data.

PNC Bank + OnDeck

Small businesses are generally a challenging market to get into, especially for new companies, but OnDeck is a digital lender that is assisting PNC in offering online loans.

American Express + GreenSky

Together, the two businesses have enhanced point-of-sale lending technology that offers customers a variety of purchase alternatives seamlessly.

Barclays Bank+ Ant Financial

To facilitate their payment solution, UK-based Barclays Bank has partnered with Chinese FinTech giant Ant Financial (Barclaycard, 2019).

Goldman Sachs + Apple

Apple and Goldman Sachs have partnered to create the Apple Card, which is issued by Goldman Sachs while Apple serves as the platform that consumers interact with (Apple Support, 2021). (Source: respective institutes' websites)

To elaborate, investment in worldwide FinTech companies seeking to collaborate with the traditional banking industry increased by 138 percent, while investment in FinTech companies seeking to compete with banks increased by 23 percent from 2014 to 2015.

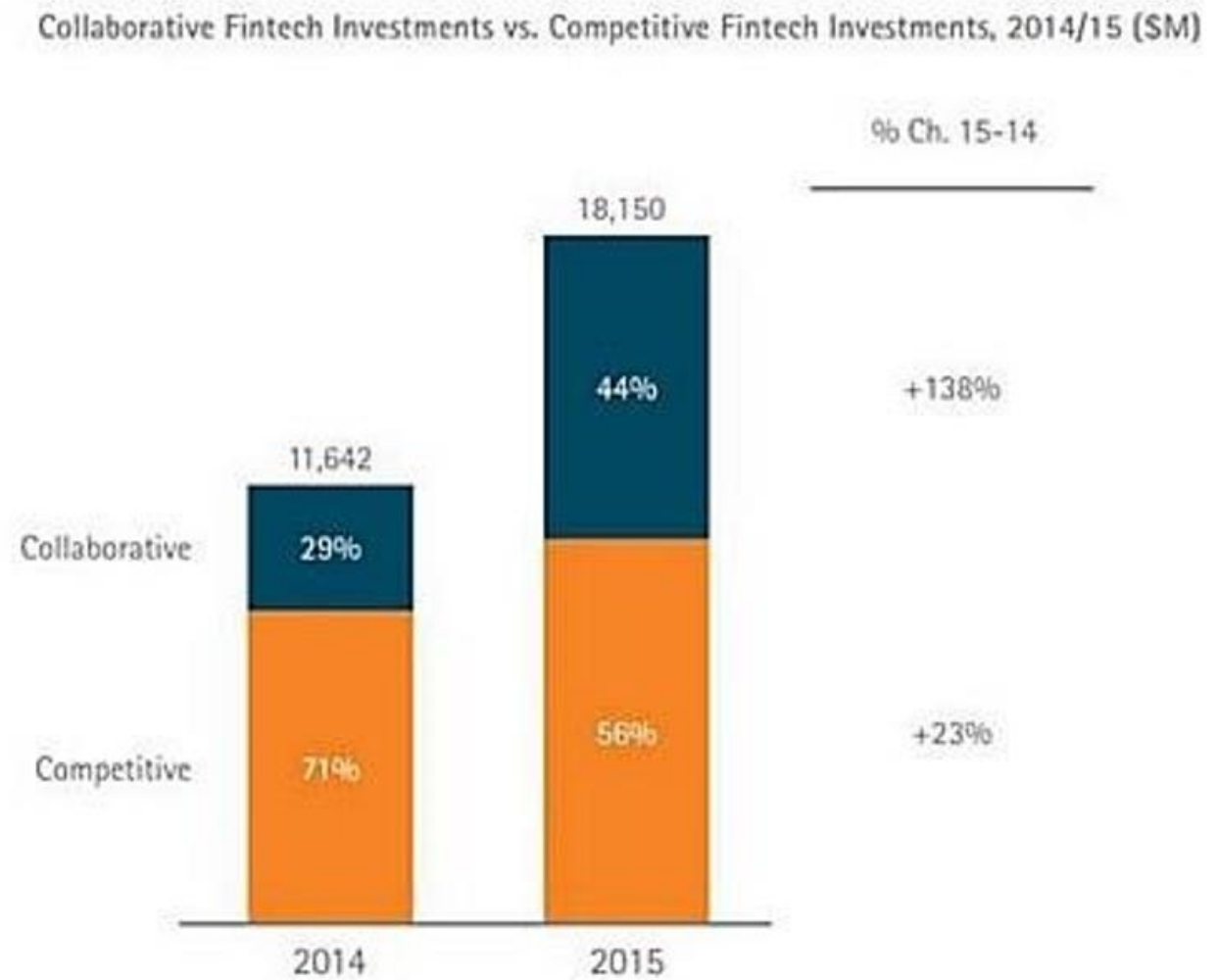


Figure 4: Collaborative FinTech Investment vs. Competitive FinTech Investment 2014/15. Source: Accenture (2016)

In Korn, Miller, and Polsky’s Banks and FinTech Report (2016), they found that 81 percent of responding banks were currently collaborating with fintech firms, while 86 percent of those not currently collaborating were planning to do so within the next few years.

Even more interesting is that only 5 percent of bank respondents saw FinTech as a threat. Another study shows that the shift to collaboration has been strong in New York, where the proportion of investment in collaborative FinTech companies has grown from 37 percent in 2010 to 83 percent in 2015. These are indicative of a collaborative environment existing between banks and fintech. They indicate that the current investment trend of investors and financial institutions is gradually shifting from a competitive to a collaborative attitude to create a favorable environment for long-term sustainable growth and relentless innovation to meet the needs of the market.

Furthermore, collaborative involvement with FinTech firms has already become so prevalent that a new form of approach has been added to the FinTech ecosystems and can be termed ‘facilitator institutions’ for the collaborations. For instance, the **FinTech Innovation Lab** model brings together several banks to collaborate and provide mentorship to the most promising FinTech start-ups that enable businesses to have potential services. The lab is funded by Accenture and the Partnership Fund for New York City. Within a few years of its formation, the institute has generated many successful collaborations with banks across the four lab locations: London, New York, Hong Kong, and Dublin (Accenture-a, n.d.).

However, the FinTech Innovation Lab is not alone in this approach. In February 2015, in Sydney, the Australian banks set up an AUS\$2 million not-for-profit **start-up center** to support new FinTech firms in cross-industry collaboration, which they find to be crucial for future value generation. There is also **the SME Finance Forum**, managed by IFC and the World Bank. It enables banks, FinTechs, and development banks to learn from one another, connect to new partnership opportunities, and take the lead in industry-policymaker dialogues (SME Finance Forum, n.d.).

2.7 The Research Context: Bangladesh

As stated in the earlier chapters, SMEs (including SEs as well) have been a major key source of economic growth in all economies (Beck et al., 2004). But, lack of access to formal finance has been identified as the most significant constraint to SME growth (AFI, 2019 & ref. section 2.2.2). Bangladesh also joined the fray.

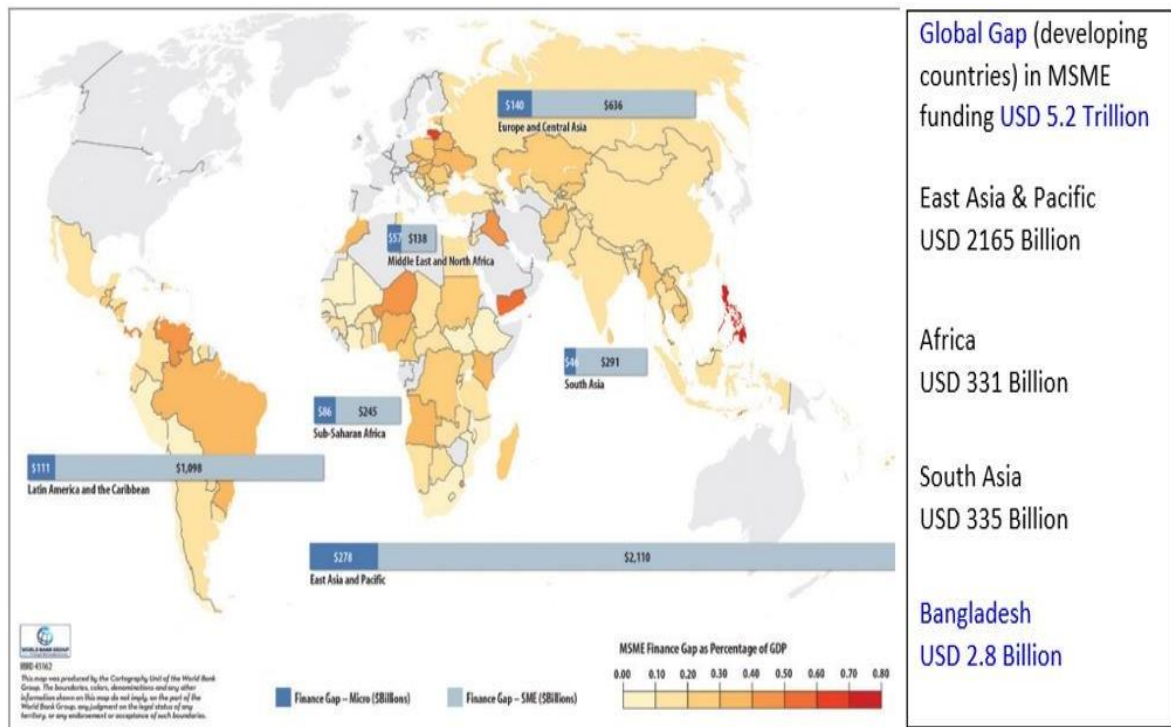


Figure 5: Formal MSME Finance Gap in Developing Countries

Sources: MSME Report, 2017; MSME Finance Gap, n.d.

As stated in Chapter 1 of this study, the SME contribution to Bangladesh’s GDP is far behind (20–25 percent) its required rate (of 40–50 percent) (MoF, 2012; Hoque et al., 2016). Here also, the lack of formal finance is found to be the most commonly cited prominent factor for its low SME growth (Choudhury & Raihan, 2000; BIBM & Hossain, 2013; Billah, 2021). The figure above depicts that "40 percent of formal (registered) MSMEs, which is about 65 million firms in developing economies, are not being served

by the formal financial sector, having an unmet financing need of \$5.2 trillion a year (MSME Report, 2017). The financing gap varies in regions, and this is USD 2.8 billion, or Taka 237 billion in Bangladesh (World Bank, 2019). The International Finance Corporation (IFC) SME Finance Gap Study (2017) observed in the context of developing countries that 55 percent of all MSMEs were reported to be at least partially financially constrained, of which 39 percent were reported to be ‘fully constrained.’

2.7.1 SEs Finance Gap in Bangladesh

The financial constraints faced by small businesses in Bangladesh are widely recognized in academic literature and other studies. In a study, Alam and Ullah (2006) found that one of the leading causes of this slow growth among MSMEs in Bangladesh was a lack of credit. Similar findings are made by Haider and Akhter (2014), who find that just half of small enterprises can receive bank financing. In a survey by the Bangladesh Integrated Support to Poverty and Inequality Reduction through Enterprise Development, small enterprises cited access to financing as a major constraint to growth in 69 percent of cases (Bakht and Basher 2015). Indeed, Bangladesh is not an exception to the discussion of how and why small businesses are more financially constrained in developing countries, which is described with elaboration in Section 2.2.4 of this study.

Here in Bangladesh, funding for small businesses is still bank-centered (OECD, 2015), where small enterprises are among the massive sufferers of having funding against collateral (Andrew et al., 2013; World Bank, 2017), with extremely high-interest rates. Again, small-ticket loans to SMEs that are accustomed to higher monitoring costs can generate only low revenue per client for banks suffering from having funding against collateral (Andrew et al., 2013; World Bank, 2017), with extremely high-interest rates. Again, small-ticket loans to SMEs that are accustomed to higher monitoring costs can generate only low revenue per client for banks. All over again, even the minimum information required to process a loan is missing in many cases. Bangladesh is ranked 159th out of 190 countries in the World Bank Group's 2018 Doing Business assessment for the criteria ‘getting credit’, where a significant barrier to obtaining credit is a lack of credit information.

However, to review the prospects of FinTech in an emerging country like Bangladesh, this research study finds it fundamental to first have a thorough understanding of the relevant landscape of the research context.

2.7.2 The Landscape of FinTech Ecosystem in Bangladesh: Regulatory and Infrastructural Context

Several enabling factors, such as regulatory and other related infrastructural bases, are critical to the successful adoption of any 'new ecosystem' because they provide the foundation for growth and sustainability. In this study, the landscape of the ecosystem built so far can prove to be relevant to FinTech credit adoption here in Bangladesh, is as follows.

1. Bangladesh is the world's eighth most densely populated country. As of June 2022, its population was 178 million (World Meter, n.d.), with over 52.58 million Internet users (Data Portal, n.d.) and 141.1 million mobile subscribers (BTRC, n.d.) as of December 2021.
2. According to the International Telecommunication Union (ITU) and the ICT Development Index 2017, despite the fact that only 2 percent of the population has a fixed- broadband connection, 30 percent of residents have a mobile broadband subscription. Again, the e-Commerce Association of Bangladesh's (e-Cab) 2017 report stated that currently, Bangladesh has 99 percent geographical coverage in terms of voice and data connectivity.
3. Again, *"there are 700 e-commerce sites and around 8,000 e-commerce pages. Many businesses forego creating websites. Ten billion taka in transactions take place on e-commerce sites per year,"* according to a 2017 e-Cab report. Currently, four types of e-commerce are popular in Bangladesh: business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer (C2C), and business-to-employee (B2E).

Several B2B websites in Bangladesh are engaged in providing manufacturing and supply-chain solutions. For instance, the Bangladesh Garment Manufacturers and Exporters Association (BGMEA) has deployed B2B e-commerce solutions for international RMG orders and procurement. There are also B2B websites that feature

business directories, trade deals, and information about suppliers, such as **Bangladesh Business Guide**, **Address Bazar**, and **Bizbangladesh**. B2C websites have become popular in large urban areas, as evidenced by the growth of online food delivery sites like **HungryNaki** and **FoodPanda**. Other examples of B2C initiatives include e-commerce platforms such as **Shop.bd** and **Shopto.bd**, which allow Bangladeshi customers to purchase products from leading online shopping sites in the United States, UK, India, and China, e.g., **Amazon.com**, **ebay.co.uk**, **Amazon.in**, and **Alibaba**. C2C businesses are also growing. The leading players in this category include **Bikroy**, **Ekhanei**, and **ClickBd**. These sites are individual, auction-based online marketplaces similar to **eBay**. More recently, the C2C sector has seen some consolidation, with Telenor Group purchasing **CellBazar** and **Ekhanei.com** from **OLX** (Bangladesh-e-commerce, n.d.).

4. Despite the fact that online payment remains limited, it is growing in Bangladesh as a result of increased internet and mobile phone penetration, growing per-capita income levels, and stacked traffic that discourages in-person shopping and other movements. Almost all e-commerce websites offer multiple payment methods (including cash-on-delivery, credit card transactions, online bank payments, and transfers).
5. However, the ICT (Information and Communication Technology) Act was first enacted in 2006. The Act (as amended in 2013) included provisions for punishment in the form of imprisonment and/or fines for cybercrime. The Act has significant effects on e-commerce and mobile commerce practices in Bangladesh.
6. *"Till 2010, the FinTech landscape of Bangladesh was limited mainly to the operations of the banks' debit and credit cards, ATM booths, POS terminals, and limited use of Internet banking" (Islam, 2021)*. Prior to it, with the advent of the Bangladesh Bank's permission, the country's central bank authority, a private commercial bank, DBBL, first launched internet banking in 2003. From then until the next decade, its usage was indeed limited. However, in 2009, Bangladesh Bank began permitting online transactions.

7. New waves of change began to emerge in 2011 with the advent of the ‘Bangladesh Electronic Fund Transfer Network’ (BEFTN) by Bangladesh Bank to develop a modern tech-based payment system infrastructure and enhance its adaptability in Bangladesh. This has expanded business avenues for financial institutions and entrepreneurs and brought the opportunity to have electronic or mobile payment processing services to the unbanked population as well. Electronic funds transfer (EFT) transactions have sharply increased.
8. Bangladesh Bank gave approval for Mobile Financial Services (MFS) to the banks and defined regulatory policies for it in 2011. In continuation of MFS, *agent banking* also came up and got a large following. Both the MFS and agent banking guidelines by Bangladesh Bank are currently in their second versions.
9. Next came the ‘National Payment Switch Bangladesh’ (NPSB) in 2012, another initiative by the Bangladesh Bank to enhance the interoperability among the banks.
10. Then, in 2013, Bangladesh Bank also permitted the purchase and sale of goods and services using international credit cards.
11. Bangladesh Bank then executed the ‘Bangladesh Payment and Settlement System Regulation’ (BPSSR) in 2014. Under this regulation, the bank divided the FinTech companies in gross into Payment Service Providers (PSPs), who serve the end-users like **bKash**, **Rocket**, and PayPal, and Payment Service Operators (PSOs), who serve the PSPs, banks, and MFS companies. PSOs include **VISA**, **Master Card**, **ITCL**, and **SLCOMMERZ**.
12. Apart from these, some landmark initiatives by the government in facilitating digital dealings include -Digital Bangladesh, A2i⁶, digitization of government payments, upgrades to BACH, and others.




⁶ Access to Information (a2i) Program is an UNDP and USAID supported project (program) having its office at the Prime Ministers' Office, Dhaka






13. Lastly, in 2021, a ‘Digital Financial Service Lab’ is established to facilitate experiment-based work on FinTech applications and progression in the FinTech ecosystem in a joint initiative of Bangladesh Bank and A2i (Islam, 2021).

2.7.3 Bangladesh's Present Reach: Towards Adoption of FinTech

The adoption of FinTech in Bangladesh is constantly increasing these days, utilizing the internet and mobile technology. According to the latest Global Findex Database of 2017, the financial inclusion rate has been raised to 50 percent from only 32 percent in 2011. According to *Tracxn*, there was a total of 118 FinTech startups in Bangladesh up until June 2022 (FinTech Startups in Bangladesh, n.d.). Total transactions processed by FinTech in Bangladesh have reached USD 4 billion per month (The Rising FinTech Star in South Asia, n.d.). The list of some renown FinTech companies in Bangladesh will give an overview of the country’s FinTech sector.

Table 4: Some Renown Companies from the Total 118 FinTech in Bangladesh

FinTech	Since	Services
1.  bKash⁶ Limited	2010	Mobile Financial Services and payment system
2.  Nagad	2018	Digital banking solution for businesses. offers an app-based wallet for providing banking services like money transfers, bill payments, online/offline payments.
3.  Aamartaka	2015	“Online comparison platform for consumer loans, credit cards, and insurance services.

4.		SureCash	2010	Mobile wallet. Payment network-utility bills, education fees, personal remittance, and online purchase”.
5.		SmartKompore	2015	it compares financial products of financial institutions- best loans, insurance, credit cards, and deposits.
6.		Projekt.co	2015	raise funds for innovators, artists, and change-makers for a projects
7.		UCash	Aug, 2017	Mobile banking platform by UCBL
8.		Paywell	2012	Online crowdfunding platform for farming communities

[Accumulated from respective websites & FinTech Startups in Bangladesh (n.d.)]

Mostly, the digital payment services are at the forefront of the country’s FinTech industry, and MobileFinancial Services (MFS) lead the payment services. MFS began operations in the country in 2011 with the launch of Dutch Bangla Bank (DBBL) mobile banking. Popular MFS offerings include **bKash**⁷ (BRAC Bank), **Rocket** (DBBL), **mCash** (Islami Bank Bangladesh), **UCash** (United Commercial Bank), **Islamic Wallet** (Al-Arafah Islami Bank), and many others. Outside the banks, **Nagad**, an MFS of the Bangladesh Postal Department, started its journey in 2019. According to Bangladesh Bank, so far since 2011, licenses have been granted to 28 leading banks to offer MFS in the country. Among them, a total of 15 banks are operating inbuilt MFS.

⁷ The leading MFS company in Bangladesh. The best Financial Innovation award, 2018 and Bangladesh FinTech Award 2021 winner

These renowned MFS are performing with full trust and a large volume of digital payments and money transfers. *"Bangladesh Bank defined regulatory policies for Mobile Financial Services (MFS) in 2011, and the response has been positive in terms of its operations"* (Ahmed, 2017). It is also apparent from the companies' portfolios that the payment services in Bangladesh presently include cash-in, cash-out, merchant payments, utility payments, salary disbursement, foreign remittances, and fund transfers. As of July 2021, there were more than 10.27 crore registered MFS accounts in Bangladesh. The number of transactions by MFS reached a fresh record of Taka 63,478.85 crore in April 2022.

Besides MFS, several digital wallets (app-based) services are also operational here in Bangladesh. They include **Paywell**, **iPay**, and **Gpay** of the telecom company Grameenphone, **RobiCash** of Robi, **Dmoney**, and **TopUp**.

Apart from MFS and digital wallets, there are some working digital gateway payment aggregators as well. Payment gateways are the platforms that enable customers to make online payments using debit or credit cards, MFS, and Internet banking. **SSLCOMMERZ** is the initiating company and the leading payment gateway aggregator in Bangladesh. Other renowned payment gateways are **Portwallet**, **Lebupay**, and **Surjopay**. **AamarPay** also provides digital wallet services as well as payment gateway services. On the other hand, the government's A2I initiative includes a payment gateway called **Ekpay**.

Besides the in-built MFS services, some banks are also in the process of launching self-in-built FinTech platforms. For instance, Islami Bank Bangladesh Limited (IBBL) has announced its plans to launch real-time online investment banking by the end of 2020. Similarly, Dhaka Bank Limited (DBL) has intended to introduce diversified FinTech-based services to safeguard uninterrupted banking services. Bank Asia plans to form a neobank⁸ and change the banking landscape by offering

⁸ A neobank also known as an online bank, internet-only bank, virtual bank, or digital bank, is a direct bank that operates exclusively online without a traditional physical branch. Ref. Ballard, Barclay (October 11, 2018). The unstoppable rise of neobanks. World Finance.

branchless banking services. Moreover, the country's first-ever Blockchain LC transaction was executed by Standard Chartered, which was completed digitally by **Contour**, a global network of banks, leveraging the Corda Blockchain. This will make the financial transactions among local and foreign textile companies paperless, cost-effective, faster, and error-free. (The Financial Express, July 20 and July 30, 2020; The Daily Star, June 19, 2022).

According to **LightCastle Partners**, the FinTech industry in Bangladesh enjoys an unsaturated market with full opportunities for the cutting-edge features of innovative financial services, and so far, the MFS platforms have obtained the most popularity (LightCastle Partners, 2022).

Despite the fact that the FinTech ecosystem in Bangladesh has been growing and is expected to grow in the coming years, the country seems to be lagging behind its global counterparts, according to the latest 'Global FinTech Index' (GFI) for 2021. The Index presently covers 264 cities in 83 countries. The ranking scores were based on three domains: the quantity of privately-owned FinTech companies, the quality of those companies, and the local business environment. The United States, the United Kingdom, and Israel are the most active FinTech countries globally, while Singapore, Australia, and China top the Asian rankings. Japan, India, South Korea, the Philippines, and Pakistan were ranked fourth, fifth, sixth, eleventh, and fifteenth in the region respectively whereas, Bangladesh ranked 78th among 83 countries, far behind than India and even Pakistan in the index. Dhaka was ranked 225th out of 264 cities globally, while New Delhi became the only South Asian city to secure a place in the top 20. This indicates that the country is falling behind in terms of expanding technology to automate and digitalize financial dealings.

According to Syed Almas Kabir, the president of the Bangladesh Association of Software and Information Services (BASIS), *"Although MFS has garnered confidence in the local FinTech segment, almost half of the population remains unbanked, and technology penetration is approximately less than 40 percent... The country ranked out of sorts in*




FinTech due to low level of financial inclusion and technology penetration" (Dhaka Tribune, June 27,2021)

This implies that, as per the factual evidence, Bangladesh Bank’s significant support toward the adoption of a digitized payment system and the rapid growth of information and communication technology (ICT) services have definitely led to the increasing use of technology in rendering and having financial services, but the penetration is still limited in comparison to the most rapid global growth.

2.7.4 Bangladesh's Present Reach: Towards Adoption of FinTech Credit

After exploring the relevant literature, reviewing the current reach of Bangladesh in adopting FinTech, and examining the services rendered by the top FinTech companies in Bangladesh, the study found that alternative lending under FinTech credit (following the definition) is nearly non-existent yet. To put it another way, alternative lending is a relatively new phenomenon in Bangladesh. Exceptionally, a very small number of companies, as depicted below, have recently come into operation.

Table 5: FinTech Companies Relevant to FinTech Credit in Bangladesh

	FinTech	Since	Services
1.	 <i>iFarmer.asia</i>	2017	Online crowdfunding platform for financing farming communities.
2.	 <i>Fund SME</i>	2018	helps entrepreneurs raise funding from diverse investors, venture capitalists, and business sponsors.
3.	 <i>Dana</i>	2020	Lending as a Service Platform. Offers credit scoring, digital onboarding solutions, and more, that enables banks to provide digital lending to the endcustomers.

[Accumulated from respective websites & FinTech Startups in Bangladesh (n.d.)]

However, there are a few marketplaces or platforms that can be termed FinTech enablers for locating and comparing a variety of other services such as personal loans, credit cards, and insurance, as well as submitting tax returns or bank product comparisons. Some of the notable companies are **SmartKompare**, **Aamartaka**, **Banks BD**, **Phoenix Finance**, **BDTAX**, and **digiTAX**. Lastly, there is no FinTech company yet in Bangladesh that offers wealth management and insurance technology.

2.7.5 Bangladesh's Present Reach: Towards Adoption of Bank-Fintech Collaboration in Managing Debt Finance

Bangladesh has stepped further toward bank-FinTech collaboration to facilitate debt finance for small businesses, leveraging FinTech. The evidence for this is as follows:

Firstly, Theoretical implications-

A knowledge base on bank FinTech collaboration needs has been developed. Several initiatives have been taken in the form of training, seminars, paper publications, and roundtable conferences by indigenous banking experts like BIBM (Bangladesh Institute of Bank Management) and others and by foreign development agencies like the World Bank, OECD, and others. The initiatives are found to work with the aim of providing a general assessment of the regulatory implications relevant to the use of certain technologies in the context of supervised financial activity, particularly of banks. This is because the financial system is dominated by banks, which account for roughly 70 percent of total financial system assets.

For instance, a number of training, workshops, and so on have been designed in the last couple of years on FinTech, BigTech, and Blockchain applications in banks by banking institutes. A BIBM (Bangladesh Institute of bank Management) study on FinTech and BigTech discovered that 65 percent of banks have a FinTech strategy to face the financial technology wave and that 70 percent of banks are interested in investing in FinTech firms. A round table conference titled "FinTech and RegTech: Possible Impact on the Banking System in Bangladesh" was organized by BIBM in the presence of Deputy Governor of Bangladesh Bank, World Bank participants and local experts (Financial Express,



December 24, 2019). It came up with issues focused on the Bank-FinTech tie-up in Bangladesh. Another workshop on the ‘CSMES: Access to Finance in Bangladesh: Scope for Alternative Financing Options’ was arranged on August 12, 2022, there. Another publication of a paper titled ‘Financing Solutions for Micro, Small, and Medium Enterprises in Bangladesh’ by IFC (2019) is found to pursue the necessary legal and infrastructure needs for the expansion of alternative finance. According to the paper,

“The partnership under bank-centric FinTech model is the ‘most pragmatic financing solution for MSMEs’ in Bangladesh right now, in the short term” (World Bank, 2019). In an in-depth interview with the Senior Financial Economist from the World Bank, Bangladesh was conducted for this study, and it was stated that, *"Right this moment, bank FinTech collaboration is supposed to be obvious in Bangladesh "* (please refer to WBBDD in Table 6).

Secondly, The Practical Implications-

Leading banks and FinTech players have recently started exploring partnerships to offer innovative products like digital credit. To date, these products are being conceptualized, and new business models are being rolled out. To the best of this study's search, two cases of Bank-Fintech collaboration in handling debt finance were found to be in operation. In both cases, the banks are found to support FinTech in Bangladesh by giving them low-cost funds as a lending partner to the FinTech companies to be distributed to the FinTech borrowers.

Table 6: FinTech Co. in BD working in collaboration with Banks for Debt Finance

Collaboration	Involved FinTech	Collaboration since	Services
1. The City Bank –bKash Collaboration		bKash 2020	‘nano loan’ for any person or business person without collateral through FinTech channel based on bank’s funding
2. The BRAC Bank- ShopUp Collaboration		ShopUp 2019	SME loan finance without collateral on bank’s funding

The City Bank has recently launched the country's first collateral-free Digital Nano Loan service, allowing bKash (the most prominent mobile service provider or FinTech company in the country) users to receive instant small ticket loans with a range of Taka 500 to Taka 20,000 for personal and Taka 10,000 to Taka 1 lac for business through their mobile app. It has had a good response since its launch on December 15, 2021, and has already been distributed to around 12,000 customers, amounting to around Tk 4 crore.

Another case and form of bank FinTech collaboration on FinTech lending in Bangladesh were initiated by **ShopUp** (a B2B e-commerce platform since 2019 involved in sourcing, product delivery promotion, and even financing facilities for its SME client base). They do suggest and assist with a particular credit contract between their lending partner banks and their B2B client base through loan origination and underwriting, based on enterprises’ validated business transaction data from machine learning. Since 2019, BRAC Bank and IDLC (a non-bank financial institution—NBFI) have started instant lending at near-zero administrative cost to the small business client base of ShopUp. Later, ShopUp extended its financing projects to many other banking and non-banking lending partners and even under FDI (foreign direct investment).

But to this study, as both the forms of programs are somewhat recent and taken on a pilot or ad-hoc basis, so they are subject to further review in terms of their future implications.

Finally, it can't be disputed that emerging FinTech players in Bangladesh also have the potential to bring new ideas to these partnerships with traditional financial service providers, eventually leading to an increase in competition that will benefit customers and the broader ecosystem of FinTech in debt finance. This requires a discussion on new regulatory approaches, which is imperative for Bangladesh's continued progress toward greater financial innovation and financial inclusion. With this view, this research has conducted an in-depth study on required policy measures in comparison to the global context and come up with detailed findings (ref Section 4.4) and recommendations (ref Chapter 8).

2.8 Chapter Summary

This chapter describes the SEs' access to finance and FinTech literature from a debt finance perspective. The initial sections of the chapter show that the importance of enhancing access to finance is well identified and found inevitable by earlier studies as the leading enabler of small enterprises' growth. Later, the way FinTech became revolutionary in the financial services industry all over the world is brought forward with a special focus on lending. More specifically, a few other sections describe in detail how FinTech is improving access to finance through FinTech credit in SME-led countries where bank FinTech collaboration is more prevalent in financial industries dominated by banks. Lastly, Bangladesh's standpoint in terms of adoption or bringing up an overall FinTech ecosystem for FinTech credit through bank-FinTech collaboration got explicit.

Statement of The Problem: The Research Gap

The findings from the reviewed literature depicted throughout the chapter indicate major gap areas that need to be brought forward and bridged.

Firstly, the financial constraints faced by small businesses in Bangladesh are widely recognized in academic literature and other studies. In a study, Alam and Ullah (2006)

identified the lack of credit as one of the key reasons for the slow growth among MSMEs in Bangladesh. Similarly, Haider and Akhter (2014) find that half of small businesses do not have access to bank financing. According to a survey conducted by ‘Bangladesh Integrated Support to Poverty and Inequality Reduction through Enterprise Development,’ access to finance was identified as a major constraint by 69 percent of small businesses (Bakht & Basher, 2015). Thus, from the literature on SME finance in Bangladesh, the most widely identified major factor for low SME growth is a shortage of finance. But the study finds that the literature base (including but not limited to the studies of Choudhury & Raihan, 2000; Ullah, 2006; Zaman & Islam, 2011; Alauddin & Chowdhury, 2015; Hoque et al., 2016; Ali & Islam, 2018; Billah, 2021) has mostly suggested either for more finance by the creditor (including lender banks) or to minimize the limitations of debtors (small enterprises). In general parlance, according to one school of thought, there is a huge financial gap for SMEs (and so for SEs) in developing countries, while another set of studies demonstrated the disruption of FinTech in the financial service industry both in developed and emerging countries. Though a number of determinants and some cutting-edge features of FinTech credit have been identified as ensuring more finance for SEs worldwide, none of the studies examined their applicability in a developing country like Bangladesh. Indeed, no such study in Bangladesh, as was found, measured attainable access to finance using FinTech.

On the other hand, current world studies show that by altering the traditional risk-sharing mechanism, innovation-led growth in SME finance has already grown (Beck and Demirguc-Kunt's 2006, Schumukler, 2017; World Bank, 2017; OECD, 2019) and is doing better, given all the limitations of SME finance. But these alternative innovation-led debt financing solutions, including FinTech, are yet to be reviewed in the theory or literature of Bangladesh. Thus, there remains a clear **literature or research gap**. Here A ‘literature or research gap’ refers to an area of interest that has not been explored in previous literature on the subject and was revealed during a literature search, leaving scope for further research (Hasa, 2022).

Secondly, in practice, FinTech credit is yet to be mainstreamed in Bangladesh’s financial service industry. The study intends to facilitate lessening this **gap in practice** as well, to

an extent, with a focus on leveraging FinTech more comprehensively, particularly in terms of its prospects to enhance access to finance for SEs.

The above gaps gave rise to specific research questions for the study. While exploring the prospect of leveraging FinTech, these questions (discussed earlier in Section 1.2) again paved the way for deliberately setting specific research objectives and the ultimate broad research objective (discussed in Section 1.3). To attain the objective, a mixed research method is employed, elaborated in the subsequent Chapter 3, following the empirical investigations made in the study.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

This chapter discusses the research methodology employed in the study. The assertion of persuasive research questions and the use of research methods for collecting data in a form appropriate to address those questions or to attain research objectives are central to the aptitude for academic contribution (Taherdoost, 2021). To attain the research objectives, a mixed method is used in this study. This is because, following the study of Creswell, J. (2014); Teddlie, C. (2010), and others, the mixed method approach has emerged in the last decade as a research movement with a distinct identity based on its merits. The approach combines elements of both quantitative and qualitative research in order to answer research queries and help gain a more complete picture than a standalone quantitative or qualitative research, as it integrates the benefits of both methods. In this study, the approach was ‘contextualization’ under the mixed method, which allows for putting findings in context and adding richer detail to the eventual conclusions. The method could be used in any of two other approaches: ‘generalizability’, which is to have a comparative strength of a large generalizable sample, or ‘triangulation’ for credibility grounds (George, 2021). Generalizability is not the case here. On the other hand, as the mixed method in this study incorporated different quantitative and qualitative research at a time (not in a sequential manner) to illustrate different findings complementary to each other, a research finding was not verified by other research findings. So, in this study, the mixed method was used with the approach of contextualizing the findings only.

However, the first research question calls for finding out the current status of relevant regulatory guidelines for FinTech in Bangladesh, which required qualitative research through consultation of secondary data or document analysis. The second research query was on the extent to which the use of FinTech by SEs will increase access to finance for small enterprises in Bangladesh. For this, an empirical model is developed through a quantitative approach that evaluates the significance of the use of FinTech along with

other control variables to increase access to finance for small enterprises. This quantitative approach is complemented with two qualitative researches. The third research question, which had an exploratory nature due to the absence of previous literature, required the determination of the motivations of the debt finance providers (primarily the commercial banks) to provide finance to SEs through collaboration with FinTech and was attained through interviews with the bankers. Lastly, another set of interview input was added to understand the regulators' and experts' opinions on the challenges and opportunities of bank-FinTech collaboration, on which the fourth research query was made. In this way, the study employed a 'mixed method research approach.'

The overall research methodology can be summed up in the following way:

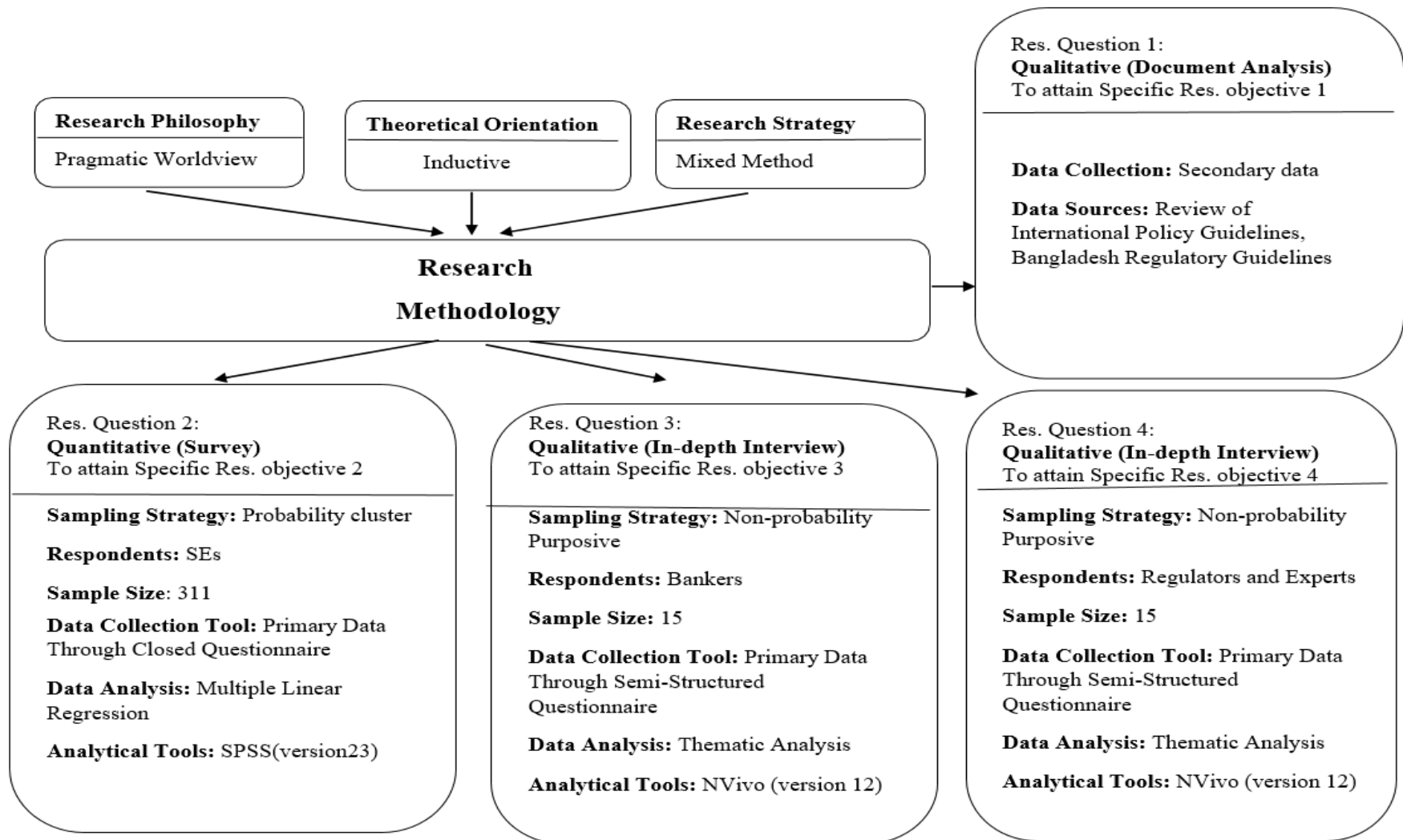


Figure 6 : The Methodological Framework

This chapter depicts all the methodologies followed to attain all four specific objectives of the research.

3.1 Qualitative Research-Document Analysis

Document analysis is done to answer Research Question 1 or to attain specific research objective 1, which was to find out the current status of relevant regulatory guidelines for FinTech in Bangladesh. Secondary data from international policy guidelines and a review of BD regulatory guidelines were collected through 'document analysis' (Creswell,2014). The findings stemming from the research work are illustrated in chapter 4 in detail.

3.2 Quantitative Research-Survey

A questionnaire survey is conducted to answer Research Question 2 or to attain specific research objective 2 which was to assess the extent to which the use of FinTech by SEs will increase the access to finance for small enterprises in Bangladesh.

3.2.1 Data Collection:

The latest government data shows that the number of small industries in Bangladesh was 23,577 as of September 2019. This had a sharp rise of 50.37 percent compared to the previously collected data from 2012, with a number of 15,666 small enterprises (BBS, 2019). The sample size is designed primarily to be 381 SEs based on Dillman's (2007) and Salant and Dillman's (1994) studies, with an allowable sampling error of 5 percent for the given number of population of 23,577 SEs.

Besides meeting the criteria of the SE definition, the following criteria were also used to select the SEs to be included in the survey. Though it may appear that only the SEs with online businesses and transaction records can use FinTech firms, this is not always the case. The research comprised SEs of both an online and offline nature with or without present account or transaction records, on the following grounds:

- i. The number of online small enterprises is not significant enough to represent all the SEs to have views on use of FinTech directly or indirectly (i.e. through a bank account).
- ii. All the small business enterprises (both online and offline businesses) were targeted to be covered under two broader categories: account holders or having no account.

iii. The research found it possible to use FinTech indirectly through a bank account, even if one is an offline business enterprise.

So, only the SEs that are not ‘existing or potential account holders’ in any bank and/or FinTech platform account, were left. Here, enterprises are considered to be ‘potential account holders’ based on criteria B1 in Table 7 below. However, the intention was executed by hurling some options at the sample entrepreneurs while they were taking part in the survey. The options are listed on the front page of the survey questionnaire. For clarification, the options are quoted here.

Table 7: Sample Selection Criteria (used in the front page of the survey questionnaire)

Account holder		No account					
A1: FinTech platform A/c holder		A2: Bank A/c holder		B1: Potential A/c holder. You don't have any Bank or FinTech platform A/c		B2:	
<input type="checkbox"/> 1	On line Borrowers- The enterprise does business through FinTech platform and borrowed from there	<input type="checkbox"/> 3	The enterprise has Bank A/c but no loan	<input type="checkbox"/> 5	Potential FinTech platform A/c holder	<input type="checkbox"/> 7	Neither of any from 1 to 6
<input type="checkbox"/> 2	FinTech Platform User only- The enterprise does business through FinTech platform but never borrowed there from.	<input type="checkbox"/> 4	The Enterprise has bank loan	<input type="checkbox"/> 6	Potential Bank A/c holder	Note: If you are in group 7, you are suggested not to take part in the survey. Thank you.	

Note: If you fit in two groups, please tick the first one

This is clarified from the table above that only the SEs segment (with option 7 above) from the countries' total SEs bunch was excluded. The universe of SEs for the research is curated to only those that meet the sample criteria defined above. It is also important to highlight that the research is also considered to cover the above B1 segment to ensure a

representation of the overall SE industry. Because the SE sector dwellings in Bangladesh mostly belong to group B1.

Here, through the 'FinTech Platform', the study refers to the platform that facilitates both technical and financial services like **bKash, ShopUp, Dana**, and other FinTech firms in Bangladesh. However, to identify the different SEs that met the criteria defined above, the research used various sources, such as internet searches, meetings with industry experts including academics and practitioners like bankers and mostly the clients of these commercial banks as well as meetings with FinTech firms like bKash and ShopUp (and their clients), who have exceptionally invested in the financial inclusion of unbanked or underbanked SEs beside their other digital financial services.

On the basis of these sources, the research was able to identify 500 SEs. Unquestionably, this list is not exhaustive, and there are a number of enterprises that the research was not able to identify as well as new ones that have formed since the time the research was conducted.

In this connection, the goal was to include as many SEs as possible from this list in the survey. After spending more than 3 months contacting the SEs, from July to September 2021, the researcher was able to meet in person and/or speak on the phone with 430 enterprises. Out of the 430 small enterprises FinTech startups that the researcher spoke to, 350 agreed to participate in the survey, which is 70 percent of the total number of enterprises identified. Lastly, 311 firms could be taken into consideration (from the agreed-upon and surveyed 350 firms) as they met all the given criteria to be included as a sample.

The demographic representation of the respondents is shown below.

Table 8: Major Activity Wise Segment of the Sample

Major Activities	Percentage of Enterprises in Bangladesh	Percentage of respondents in the sample
Manufacturing	11.10	43.50
Trade	45.91	33.28
Service	26.77	20.22
Others	16.22	4.00
Total	100.00	100.00
		0

Source: BBS Report- Bangladesh Statistics 2019, Pg-26

Table 8 shows the breakdown on an industry subsector basis (trade, manufacturing, and services) in comparison to the country's total SME subsectors with the intention of assessing the representation of the sample from this perspective. It is to be clarified that SEs in the sample are compared in percentage with the SMEs in the country as no specific segmentation in terms of percentage subsector in SEs was available. However, here the trade and service portion in the data sample tried to follow the percentage of enterprises in Bangladesh; others (including hospitals and the education sector) were not covered in the survey due to comparatively less significant coverage in population data. Because of its high GDP contribution (10.9 percent), manufacturing was attempted to be covered more thoroughly. [BD Economic Review (2012–2013); ICOSA,2020].

Table 9: Cluster Wise SME Concentration Segment. Source: SMEF, 2015.

Division	Cluster-wise SME concentration in Bangladesh (in percentage)	Respondent in sample (in percentage)
Dhaka	38	50
Rajshahi	18	20
Chittagong	15	30
Khulna	12	
Rangpur	7	
Barisal	6	
Sylhet	4	
Total	100	100 percent

Table 9 provides a summary breakdown of the SEs that the research produced using cluster segments defined and chalked out by the SME Foundation of Bangladesh. The foundation defined an SME product cluster as *"a concentration of enterprises producing similar products or services and is situated within an adjoining geographical location and has a common strength, weaknesses, opportunities, and threats."* The foundation identified 177 clusters within the geographic division of the country (Abdin, 2018). However, presently, the Dhaka and Chittagong divisions, among a total of seven, are the most industrialized divisions of the country, covering 30 and 15 percent, respectively, of total SME concentration. Another district, Bogra, under the Rajshahi division, is included as it is also renowned as one of the most prominent SME hubs in the country (CPD, 2016; Moazzem et al., 2016; SME Foundation,2021).

Table 10: Account Status Wise Segment in Data Sample

Segments of Respondent Samples	Number of Respondent Samples
Potential A/c holders/Unbanked	201
Holds Bank A/c-no loan	61
Holds Bank loan	39
Online borrowers through the FinTech platform	10
Total sample	311

The sample size is the population of ‘online borrowers through the FinTech platform’ taken from a pilot project of The City bank-bKash collaboration for debt finance to SEs in Bangladesh. Since it is very insignificant in number and the research is to reflect a representative response of the country’s SE sector, all the segments were included mostly covering the unbanked part.

The primary data collection method was a *questionnaire survey* with SEs of both online and offline business nature and with or without any account. All the data was collected through face to face survey with the SE owners only.

To create the survey questions, the researcher discussed relevant matters with the supervisor and experts and carefully examined the literature. Then the researcher conducted a survey on a pilot basis with 20 SEs in the first initiative. The data inputs from the pilot survey were made to run on the SPSS software and were found able to generate results. The only modification made to the pilot study was that, out of a total of 56, a total of 4 questions or items were found to impede the ‘data reliability’ score, so they were excluded from the questionnaire to enable the data to be more reliable.

Finally, the survey questionnaire consisted of a total of 52 questions. Among them, the first seven questions under sections A and B were asked for the descriptive analysis and the rest of the 45 questions in section C of the questionnaire for variable measurement purposes. Thus, 16,172 different data points were collected from a total of 311 SEs. In a conservative way, excluding the responses answered to the option N/A (not applicable), the netmeasured data exceeds 13,000 data points. However, the data were collected from the SEson ‘closed’ multiple-choice questions. Because the needed information was lesscritical, it didn’t need the participants’ in-depth responses and insights but rather a quick and spontaneous response. Further, the data could be easily coded, entered, and analyzed (Hyman & Sierra,

2016). At the end of the questionnaire, the participants were placed in front an open-ended question also for examining spontaneous responses, if any, that are unbiased by experimenter expectations (Connor Desai & Reimers, 2018), with an option to add consent and write the answer if they felt it was needed. However, no such response was found, so responses were used in measuring variables (Ref: Questionnaire, Appendix A). Again, the questions were designed to collect information in the form of ranges instead of actual figures; this way, the owners of the SEs felt more comfortable sharing potentially sensitive and confidential information. Due to the design of the questionnaire, a lot of the answers used in the empirical model are midpoint estimates based on the ranges supplied.

However, the survey data was then entered into an Access database, checked again, and then downloaded to SPSS to be analyzed by the researcher herself. Since most of the data provided by the enterprises were confidential, the research has been conducted anonymously—no names of enterprises have been displayed in the results, and all data were presented on an aggregate basis (i.e., by region, business segment, customer segment) so that the identity of the enterprise will not be revealed.

3.2.2 Data Analysis

A. Measurement tool

The qualitative research made use of some indices from a set model—the SME Access to Finance Index or the **ESAF Index** (EIF, 2018; EIF, 2020) (please refer to section 2.2.5). The research decided to use the index with the composite indicators on the following rationales:

1. This study finds it a comprehensive, and reliable set of indicators to work with.
2. The index summarizes the complex and multidimensional phenomenon of SME access to finance in one simple and easily interpretable statistic for policymakers and other stakeholders. The Organization for Economic Co-operation and Development (OECD) Handbook on Constructing Composite Indicators also suggests that "*indicators must be seen as a means of initiating discussion and stimulating public interest*" (OECD, 2015b).

3. As stated in Section 2.2.4 of this study, the index is not the first of its type to construct a composite indicator that aims to measure SMEs' access to finance. The 'SME Access to Finance Index' (SMAF) and the ECB's 'Perceived External Financing Gap Indicator for SMEs' are two other notable indexes (European Commission, 2012; Ferrando et al., 2013). The SMAF index also utilized a wider variety of sub-indicators and allowed for cross-country comparisons, but it was closed in 2014. The later index by Ferrando uses only perception-based sub-indicators, making it less suitable for cross-country benchmarking exercises. Rather, the ESAF Index filled that void by reintroducing a composite indicator, which is periodically updated and summarizes the state of SME access to finance. So, to the researcher's knowledge, the index is the latest. According to the EIF authority as well, the index is designed to *"monitor developments in SMEs' access to financial resources, and it fills a gap as such an index does not exist"* (EIF, 2018). So, when it is about using a set index instead of developing a further new one in terms of the emerging country context, the study finds no other index as applicable.

4. Although the index is developed in developed countries' context, the research considered it to be applicable in emerging countries as well by dint of their nature. For instance, an increase in the percentage of SEs using a bank loan or the percentage of SEs feeling there are no financial obstacles will definitely increase access to finance irrespective of any country context. The index rather identified and placed forward the indicators that are in a significant relationship with access to finance. Following the EIF authority, *"Composite indicators can be a useful tool as long as they are able to summarize a complex phenomenon in one summary statistic and are straightforward to track over time or across countries"* (EIF, 2018). Furthermore, the studies by Atkinson et al., 2002; Saisana and Tarantola, 2002; Freudenberg, 2003; Sharpe, 2004; Nardo et al., 2005; and the OECD, 2008, reveal there is no universal or objectively superior approach to constructing a composite indicator. Many of the decisions in the process involve a high degree of subjectivity. One criterion, among others, for taking a composite indicator is that it provides an overview of the decision that an index is not unidirectional but rather interactive. This process ensures that the final measure will be robust and transparent (Atkinson et al., 2002). From that perspective, this study also found the ESAF Index applicable to a developing country like Bangladesh.

However, the index is composed of four sub-indices, three representing the bulk of SMEs' financing needs- Loans, Equity, and Credit and Leasing. The fourth sub-index includes Macro Factors. Again, the sub-indices in turn contain a series of indicators relevant to the theme. Please refer to Figure 1 in section 2.2.5 of Chapter 2 which list the four sets of ESAF sub-indices and their respective sub-indicators. The resulting set of indicators claim to provide a comprehensive overview of SMEs' access to finance possibilities.

Sub indicators Relevant to this Research

From among nineteen composite sub-indicators of the index, this research found relevant five to measure access to finance by SEs on the following grounds.

1. The ESAF Index is based on an equal weighting scheme, the most frequently applied weighting method (OECD, 2008). As the name suggests, this method assigns equal weights to all subcomponents of the composite indicator. Linear aggregation is a geometric aggregation that which simply adds up all normalized and/or weighted sub- indicators (Nardo et al., 2005). The June 2018 updated version of the Index stated that the Index assigns equal weight to each of its sub-indicators when using linear aggregation. For theoretical consistency, the sub-indicators would be "preference independent". Based on that, the research preferred and found five sub-indicators relevant to describing the phenomenon of interest, which is the use of FinTech by SEs.

2. Apart from this, five factors are found to be critical in assessing whether a sub-indicator is feasible for inclusion (Jacobs et al., 2004; Nardo et al., 2005; OECD, 2008). These are:

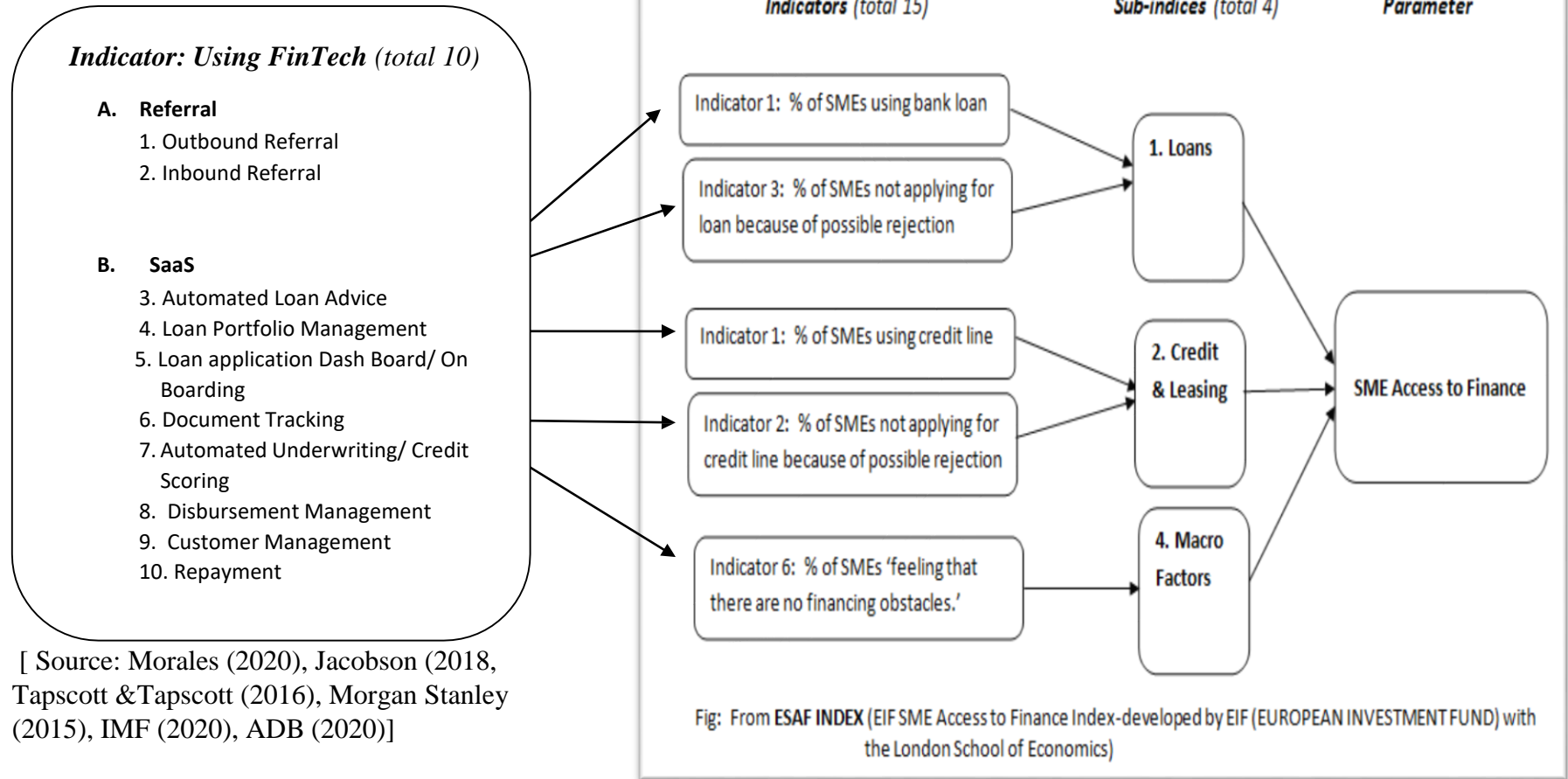
- a. theory, empirics, and expert judgment;
- b. timeliness and accessibility of the data;
- c. data quality;
- d. specific needs of the composite indicator; and
- e. internal consistency.

Accordingly, five indicators are found feasible to assign to measure access to finance by the SEs.

Selection of Sub-Indicators as Dependent Variables for this Study

If this can be proved, there is a significant relationship between the use of FinTech by SEs (FT) and the selected five sub-indicators, it might also have a significant relationship between the use of FinTech by SEs (FT) and the parameter SME Access to Finance. Thus the relevant indicators or independent variable (IVs) of the index will be the dependent variables (DVs) of the qualitative research of this study. As stated earlier, the concern of the study is SEs that are equally applicable in the broader arena of SMEs. So, the significant relationship the empirical models strived to find can be depicted as below:

SME Access to Finance Index (ESAF Index)



[Source: OECD, 2008; ESAF Index, June 2018]

Figure 7: Measurement Tool (of the relationship between FT and the ultimate parameter Access to SME Finance)

B. Measuring Variables

o Dependent Variables (Total 5)

From the above Figure 7, the 5 IVs or indicators of the index are taken as the 5 DVs of the quantitative research of this study. These are as follows:

1. Percentage of SEs using bank loans

A bank loan is a key component of SME financing. Bank loans constitute 68 percent of total SME financing in Bangladesh in terms of volume (*AFME, 2015*). The sub-indicator is selected to serve as an indicator of finance availability or access to finance by the ESAF Index authority, based on the survey data taken from a large sample survey, ‘Survey on the Access to Finance of Enterprises’ (SAFE), conducted by the ECB and the European Commission, which covers approximately 16,000 SMEs in the European Union (*EIF, 2018*).

2. Percentage of SEs not applying for a bank loan because of possible rejection

By this indicator, the index refers to how discouraged firms are in applying for loans, meaning the ease with which a firm expects to acquire a bank loan.

3. Percentage of SEs using credit line

Credit is another key component of SME financing. For clarification, a bank loan is a disbursed lump sum amount of money that is repaid over a fixed term. Examples include short-term (say three or six months’ single deal basis loan) or long-term loans (one to three years’ loan). This is not renewable and is to be repaid with interest within the fixed term as it is a non-revolving credit limit. On the other hand, a line of credit lets borrowers draw, repay, and redraw from the account’s available funds. Bank overdraft, installment loan, open credit, and credit card are some examples. The facility is renewable based on the borrower’s transaction history, as it is a revolving credit line.

For the index, the percentage of firms using credit lines, beside the percentage of firms using bank loans, can also serve as a sub-indicator for access to finance, depending on the prospective borrowers’ different business natures and needs.

4. Percentage of SEs not applying for a credit line because of possible rejection

The level of discouragement among the firms that are applying for a credit line is considered an indication of the functioning of the credit finance market for small businesses.

5. Percentage of SEs "feeling that there are no financing obstacles"

How stakeholders, in the case of being financed, experience the state of access to finance is a definite indication of removing the financing obstacles in the true sense following both the SAFE and the ESAF index.

o Independent Variable (Total 1)

1. Use of FinTech by SEs

As the objective of the quantitative research is to assess the extent to which the use of FinTech by the SEs will increase their access to finance in Bangladesh, the obvious predictor variable is the use of FinTech by the SEs in Bangladesh. Reviewing the literature, the study finds that SEs can use FinTech directly or indirectly (through banks). For instance, in the case of inbound referral, SEs use FinTech directly, and in outbound referral, SEs can use FinTech indirectly through banks (Morales, 2020).

Sub-Categories of the Independent Variable (Total 10)

Reviewing further literature, this study found other social research (including the study of Soriano, 2017) to have sub-categories under variables, for better conceptualization and understanding, and in many cases, to have appropriate variation in research findings (like different sub-categories may generate significant or insignificant levels of dependency in a relationship). Accordingly, this research is also categorized into ten subgroups under the

broad headings of ‘Referral’ (includes total 2 sub-groups) and ‘Software as a Service’ or SaaS (includes rest 8 sub-groups). This is because, according to the findings of the study, all types of Bank-FinTech collaborations can be broadly classified under these two categories of referral and SaaS (refer to Table 2). Better can be said in a way that, in whatever way a bank and FinTech may collaborate, the business models they work with can be left under any one of the two broad categories of referral and SaaS. According to Morales (2020), Jacobson (2018), and Tapscott & Tapscott (2016), both referral and SaaS can be further sub-categorized. All the categories are described below with the necessary details, that would make the perception clear (please refer to the Table12 that shows the list of variables).

A. Referrals

With reference to Section 2.4.3, nowadays, referral partnerships are at the core of bank FinTech partnerships. **Burling Bank** of the US is exploring an approach to referrals. *"If we are unable to work with a client, we may refer them to a non-profit financial institution that offers lending products as well as financial coaching that can help a small business open its doors, grow, and mature—and ultimately become bankable,"* said Burling Bank Chairman Andy Goldberg (ABA, 2018). Other examples of FinTech include **OnDeck**, **Lending Club**, **Funding Circle**, and **TSYS**, which have developed referral partnerships with banks to establish greater trust, provide a wider offering, and reach new customers (unbanked or underbanked). In the UK, banks have to refer business customers they can't serve to alternative providers. such as the **British Business Bank**, which runs multiple formal referral programs with FinTechs.

Mainly two forms of referral models have gained traction.

1. **Outbound Referrals:** Banks refer customers who are found outside their credit parameters or product offerings to a digital, non-bank lender to afford a possible alternative lending service that fits the customer's needs.

2. Inbound Referrals: It is a popular option for the lending sector. Here, a FinTech company works with a client throughout all the stages of the lending process, then transfers the ownership of the loan over to a conventional bank. (Morales,2020).

This way, under Referral (R), FinTech can be used directly or indirectly by SEs.

B. SaaS

Another common option for bank FinTech partnerships is to lease or sell a bank the FinTech program under a software-as-a-service (SaaS) model (Finextra, Sep 14, 2020). Here, **Software as a service (SaaS)** is a *"software licensing and delivery model in which software is licensed on a subscription basis and is centrally hosted"* Gartner (2021). It is reported that SaaS remains the largest market segment for public cloud services.

However, when banks choose a SaaS approach, typically it's a 'white-label' solution, which allows banks to readily offer new digital products or services online under their own brand only by taking software as a service (SaaS) from a FinTech firm. Thus, in this model, FinTech can be used indirectly by SEs through banks (Morales, 2020; Jacobson, 2018; Tapscott & Tapscott, 2016). For instance, **Burling Bank of Chicago** uses a FinTech, **Akouba** digital loan origination platform to serve digitized small business loans, thereby reducing cost per loan, increasing loan volume, loan policies, underwriting criteria, and creating a better customer experience within its current brand. Using technology from **On Deck Capital**, another world-renowned FinTech firm, **JPMorgan Chase Bank** built a digital platform for its own small and medium-sized enterprise lenders. The bank manages all the credit parameters and underwriting provided, while OnDeck provides the only technology for its digitization and automation (ABA, 2018).

In this regard, loan origination software is the most commonly used lending-related SaaS. These are the platforms for centrally managing and automating different stages of the loan servicing cycle. Reviewing only two random samples of lending-related SaaS platforms currently operating in the market —Axe Credit Portal and Auto Pal Software, the study found their work coverage as below-

Axe Credit Portal, a lending automation solution provider platform designed for small to midsize financial institutions helps users manage lending, credit limit, collateral, collection and provisioning via its credit portal. It offers client onboarding, origination, approval management, credit administration, covenant monitoring, valuation and documentation, deferrals, and more, facilitates archiving and retention, forecasting, underwriting, respond to queries, send alerts, and monitor processes.

AutoPal Software: Another cloud-based loan management solution designed for small and midsize loan servicing companies is AutoPal Software that offers interest calculation, lease calculation, auditing, loan creation and communication functionalities within a suite. The product also helps users audit loans using note tracking, insurance tracking.

Thus, a single platform may cover a vast arena of loan origination (all the stepwise processes in a loan cycle) software. So this research study found it simple and justified to club all these programs of SaaS under gross areas, as depicted below, in Table 11 with the purpose of facilitating survey data collection and its quantitative analysis.

Table 11: Loan Origination Areas Served by Software

Areas of SaaS	Description
Automated Loan Advice	Indicates facilitating services before the loan application
Loan portfolio management	Create and manage loan portfolios, including mortgage loans, commercial loans, and construction loans.
Loan application dashboard	Allow customers or loan officers to identify and apply for the loan via an online interface embedded with tooltips.
Document tracking	Create a centralized repository of files such as loan applications and customers' income reports.
Automated underwriting	Build custom loan approval rules, automating risk and viability analysis, to make faster and more accurate decisions about a customer's creditworthiness.

Disbursement management	Approve a borrower's loan requests and track records of fund delivery via online payment gateways, checks, and wire transfers.
Customer management	Capture and access details of new leads, prospects, or existing customers in a centralized location.
Billing and invoicing/ Repayment	Generate invoices of loans delivered and payments received and share them with customers via email or SMS.
Accumulated from Adebayo et al.(2014), software advice (n.d.), Morales (2020), loan advice(n.d.) Jacobson(2018), Srethapramote et al.(2015),Finextra (2020), Huang et al.(2020), IMF(2020)	

○ **Control Variables (Total 4)**

The study is controlled for SME access to finance variables. Based on prior literature, this study also explains relevant control variables' measurement and operationalization in the study with the purpose of examining whether several extraneous variables have causal effects on the dependent variables (DV) and how significantly the set of independent variables (IV) can have their effects on the DV (Crossman, A., 2020). From this perspective, the control variables in this study are found to be:

1. Information Asymmetry
2. Lack of creditworthiness
3. Lack of collateral security
4. Higher Interest of loans

All the above variables were discussed earlier in Section 2.2.4., which justifies their being controlled. Here, controlling for a variable means modeling control variable data along with independent and dependent variable data in the regression analyses. In a multiple linear regression analysis of social research, the researchers mostly add all control variables along with the independent variable as predictors (Sung, 2007). In doing so (please refer to Table 26), for instance, the results tell how the percentage of SEs using bank loan can be predicted by use of FinTech, while holding lack of collateral security fixed. This way, control variables enhance the internal validity of a study by limiting the influence of the extraneous (but controlled) variables (McClendon, M. J., 2002). That is how the study could isolate the control variable's effects, help establish a correlational or causal relationship between the variables of interest (dependent and independent variables), and help avoid research bias.

Table 12: List of Variables

Variables	Measurements
<i>Dependent Variables</i>	
1. Percentage of SEs using Bank Loan (BL)	Numbers of existing borrowers (SEs) and potential borrowers of bank loans if they are given collateral-free small-ticket loans in a few minutes through a FinTech platform. Composite score of ques. no. 30-33 ^(a) in the survey questionnaire.
2. Percentage of SEs not applying for loan because of possible rejection (BL_REJC)	A number of SEs were previously hesitant to apply for bank loans due to the possibility of rejection, and a number of SEs may reconsider if collateral-free small-ticket bank loans are made available in a matter of minutes via FinTech platforms. Composite score of ques. no. 35-39.
3. Percentage of SEs using Credit Line (CL)	Numbers of existing borrowers and potential borrowers of bank credit lines if they are given collateral-free small ticket loans in a few minutes through FinTech platforms. Composite score of ques. no. 30-34 ^(b)
4. Percentage of SEs not applying for credit line because of possible rejection (CL_REJC)	A number of SEs were hesitant to apply for bank credit lines in the past due to the possibility of rejection, and a number of SEs may reconsider if collateral-free small-ticket bank credit lines are made available in a matter of minutes via a FinTech platform. Composite score of ques. no. 35-40 ^(c)
5. Percentage of SEs Feeling that there is no financing obstacles (OBST)	Composite score based on the number of SEs who have been financed through an online FinTech platform indicates that they believe there are no financing barriers in terms of cost, collateral, terms and conditions, and so on. Composite score of ques.no.41-45.
<i>Independent Variables</i>	
<i>A. Referral</i>	
1. Outbound Referral (OUTR)	A composite score that measures the degree of outbound referral of banks to fintech in the case of bank account holders, clients' cooperation in terms of maintaining transactions through bank accounts, readiness to give consent to sharing data, and so on. Composite score of ques. no. 7-11
2. Inbound Referral (INBR)	A composite score from questions that measures the degree of inbound referral of fintech to banks and related issues including ques. no. 12-13.

Table 12: List of Variables (cont'd)

<i>B. SaaS (Software as a Service)</i>	
3. Automated Loan Advice (ADV)	Composite score from questions on both the existing and potential a/c holder SEs' views on Automated Loan Advice of ques. no. 14-16
4. Loan Portfolio Management (PORT)	Composite score from questions on both the existing and potential a/c holder SEs' views on Loan Portfolio Management of ques.no. 17-18
5. Loan application Dash Board/ On Boarding (DBOARD)	Composite score from questions on both the existing and potential a/c holder SEs' views on Loan application Dash Board or On-Boarding of ques. no. 19-20
6. Document Tracking (DOC)	Composite score from ques on the a/c holder SEs' views on DOC of ques no. 21-22
7. Automated Underwriting/ Credit Scoring (SCORE)	A number of existing FinTech platform user SEs went under credit scoring through the platform, ques.no. 23
8. Disbursement Management (DIS)	Composite score from questions on both the existing and potential a/c holder SEs' views on Disbursement Management of ques. no. 24-25
9. Customer Management (CUS)	Composite score from ques on the a/c holder SEs' views on Customer Management of ques. no. 26-27
10. Repayment (REPAY)	Composite score on both the existing and potential a/c holder SEs' views on Repayment including ques. no. 28-29
<i>Control Variables</i>	
1. Information Asymmetry (ASYM)	Tentative percentile of business information borrower SEs could answer (in applicable cases), ques. no. 1
2. Lack of Credit Worthiness (CW)	Composite score from ques, measuring the belongings of financials, verifiable transaction history of SEs of ques. no. 2-3
3. Lack of Security (SEC)	Composite score from questions, that measure the ability to offer security with ques.4-5
4. High Bank Interest (INT)	The degree of bank loan interest is measured from ques. no. 6

Note: a. All the questions for variable measurement purpose are at Section C of the survey questionnaire (Appendix A1). (please also refer to Appendix A2)
b. Please refer to the explanation of model 3 in Section 5.5 for the repetition of same set of questions to measure DV 3, from that of DV1 above.
c. Please refer to the explanation of model 3 in Section 5.5 for the repetition of same set of questions to measure DV 4, from that of DV2 above.

However, the results of this quantitative research are complemented by interview findings from the supply side of SE financing as well, and the experts as mentioned earlier. These illustrative interview findings and secondary data sources shown in sections below have corroborated most of the empirical results and, in addition, highlighted new insights not captured in the quantitative analysis.

C. Hypotheses Development and the Models Specified

Based on the five different DVs with the same set of IVs defined, the quantitative research developed the hypotheses and the models below to test the hypotheses indicating the relationships between the use of FinTech and the five indicators of access to finance for SEs.

Table 13: List of Hypotheses

Hypothesis 1	:	There is a significant relationship between the use of FinTech by SEs (FT) and the percentage of SEs using a bank loan
Hypothesis 2	:	There is a significant relationship between use of FinTech by SEs (FT) and the percentage of SEs not applying for loans because of possible rejection
Hypothesis 3	:	There is a significant relationship between the use of FinTech by SEs (FT) and the percentage of SEs using Credit Line
Hypothesis 4	:	There is a significant relationship between use of FinTech by SEs (FT) and the percentage of SEs not applying for credit lines for possible rejection
Hypothesis 5	:	There is a significant relationship between the use of FinTech by SEs (FT) and the percentage of SEs ‘feeling that there is no financing obstacle.

Model 1

With reference to the variable Table no. 12, following model tests the relationship between use of FinTech (FT) by SEs and the percentage of SEs using Bank Loan (BL).

$$BL = \alpha_1 + \beta_i (\text{OUTR}) + \beta_i (\text{INBR}) + \beta_i (\text{ADV}) + \beta_i (\text{PORT}) + \beta_i (\text{DBOARD}) + \beta_i (\text{DOC}) + \beta_i (\text{SCORE}) + \beta_i (\text{DISB}) + \beta_i (\text{CUS}) + \beta_i (\text{REPAY}) + \beta_j (\text{ASYM}) + \beta_j (\text{CW}) + \beta_j (\text{SEC}) + \beta_j (\text{INT}) + \varepsilon_1$$

Model 2

The following model tests the relationship between use of FinTech (FT) by SEs and the percentage of SEs not applying for Bank loan because of possible rejection (BL_REJC).

$$BL_REJC = \alpha_2 + \beta_i (\text{OUTR}) + \beta_i (\text{INBR}) + \beta_i (\text{ADV}) + \beta_i (\text{PORT}) + \beta_i (\text{DBOARD}) + \beta_i (\text{DOC}) + \beta_i (\text{SCORE}) + \beta_i (\text{DISB}) + \beta_i (\text{CUS}) + \beta_i (\text{REPAY}) + \beta_j (\text{ASYM}) + \beta_j (\text{CW}) + \beta_j (\text{SEC}) + \beta_j (\text{INT}) + \varepsilon_2$$

Model 3

The following model tests the relationship between use of FinTech (FT) by SEs and the percentage of SEs using Credit Line (CL).

$$CL = \alpha_3 + \beta_i (\text{OUTR}) + \beta_i (\text{INBR}) + \beta_i (\text{ADV}) + \beta_i (\text{PORT}) + \beta_i (\text{DBOARD}) + \beta_i (\text{DOC}) + \beta_i (\text{SCORE}) + \beta_i (\text{DISB}) + \beta_i (\text{CUS}) + \beta_i (\text{REPAY}) + \beta_j (\text{ASYM}) + \beta_j (\text{CW}) + \beta_j (\text{SEC}) + \beta_j (\text{INT}) + \varepsilon_3$$

Model 4

The following model tests the relationship between use of FinTech (FT) by SEs and the percentage of SEs not applying for credit lines because of possible rejection (CL_REJC).

$$CL_REJC = \alpha_4 + \beta_i (\text{OUTR}) + \beta_i (\text{INBR}) + \beta_i (\text{ADV}) + \beta_i (\text{PORT}) + \beta_i (\text{DBOARD}) + \beta_i (\text{DOC}) + \beta_i (\text{SCORE}) + \beta_i (\text{DISB}) + \beta_i (\text{CUS}) + \beta_i (\text{REPAY}) + \beta_j (\text{ASYM}) + \beta_j (\text{CW}) + \beta_j (\text{SEC}) + \beta_j (\text{INT}) + \varepsilon_4$$

Model 5

The following model tests the relationship between use of FinTech by SEs and the percentage of SEs 'feeling that there are no financing obstacles (OBST).

$$OBST = \alpha_5 + \beta_i (\text{OUTR}) + \beta_i (\text{INBR}) + \beta_i (\text{ADV}) + \beta_i (\text{PORT}) + \beta_i (\text{DBOARD}) + \beta_i (\text{DOC}) + \beta_i (\text{SCORE}) + \beta_i (\text{DISB}) + \beta_i (\text{CUS}) + \beta_i (\text{REPAY}) + \beta_j (\text{ASYM}) + \beta_j (\text{CW}) + \beta_j (\text{SEC}) + \beta_j (\text{INT}) + \varepsilon_5$$

Again, here the five indicators (of the ESAF index) of the parameter SME Access to Finance or that of SEs for this research (please refer to Section 2.1) represent the five different dependent variables for this research. The intercepts in the equations are α_{1-5} which refers to the value of the respective dependent variable when all the independent variables got zero. Then β_i are the coefficients of the independent variables to be estimated where $i=1-50$, and β_j are the coefficients of the control variables to be estimated and $j=1-20$. Here, in all cases, associated individual coefficients are indicating their slopes or the unit change in the respective dependent variable for one unit change in that individual independent variable. ε_{1-5} are the error terms, that represent the proportion of variations in the dependent variables that cannot be explained by the given set of independent variables. For all the rest abbreviations please refer to the variables Table (ref. Section 3.2 Table 12).

Multiple linear regression is used to analyze the data since it is in line with the theoretical framework that the different dependent variables are the additive result of key important factors from using FinTech (FT) by SEs. For the multiple regression models, Ordinary least square (OLS) is utilized to analyze the data. Since there are five different measures of five dependent variables, five separate linear regression models are developed and evaluated using the same set of independent variables.

3.3 Qualitative Research – In-depth Interview of Bankers

A qualitative research is done to answer Research Question 3 that is to attain specific research objective 3 which was to explore the determinants of motivations of the debt finance providers (primarily the commercial banks) to provide finance to small enterprises through collaboration with FinTech.

3.3.1 Data Collection

Primary data is collected through semi-structured, in-depth interviews with bankers. The interview method of qualitative research is considered apt to collect qualitative data as the research was concerned to know whether the bankers have their consent to work with FinTech companies in facilitating bank finance to the SEs. In order to facilitate the use of FinTech by SEs, it was also aimed to learn, if the bankers had given their consent, what factors of motivation or conditions they admired most for this. The research discovered that interviewing directly the policy executors of the banks was the most consistent way to obtain information. *Côté & Turgeon (2005)* also state, "*Qualitative interviews afford researchers opportunities to explore, in an in-depth manner, matters that are unique to the experiences of the interviewees, allowing insights into how different phenomena of interest are experienced and perceived.*"

Although interviews are considered one of the more effective ways to explore the perceptions of respondents, this method also has its limitations. *Seidman (1998)* asks a very important question that unearths one of the weaknesses of interviewing; "*whose meaning is it that an interview brings forth and that a researcher reports?*" While, on the one hand, *Roulston et al. (2003)* opine that *there are challenges that confront inexperienced interviewers in interviewing with their own actions and subjectivities, constructing and*

delivering questions, and handling sensitive topics, on the other hand, Taylor & Bogdan (1984) viewed interviews as "subject to the same fabrications... and although people's verbal accounts may lend insight... there can be a discrepancy between what they say and what they actually do".

Despite these, considering the relationship between participants and researchers and the emphasis on the exploration of human phenomena, interviews have traditionally been a data-collection method of qualitative research (Halcomb & Davidson, 2006). Therefore, given the observations, the researcher worked diligently to ensure the validity and reliability of the interview data.

As it is previously stated, the research conducted in-depth interviews with various executives who are currently working on desks that are relevant to the internal credit policy executions at various banks (please consult Table 14 for further references). Polkinghorne (1989) recommended interviewing 5 to 25 individuals who experienced the phenomenon. In this research work, 15 bankers from 15 sample PCBs (Private Commercial Banks) out of a population of the country's 60 PCBs directly shared their views on the determinants of motivation to work with FinTech companies. The number of samples was decided based on whether the categories of information had become saturated—which is considered to be reached when no new ideas are emerging—and whether the issue had been elaborated in all of its complexity. In this regard, '*code saturation*', indicating the researcher has "heard it all," instead of merely '*meaning saturation*', indicating only "understand it all," was adopted. (Hennink et al., 2017). Again, to ensure good representation, banks from all four generations of the banking industry in Bangladesh were deliberately included in the final list. This way, purposive sampling was applied, as it refers to a form of non-probability sampling technique in which samples are selected "on purpose." This is also called "judgmental sampling," as this sampling method relies on the researcher's judgment to provide the best information to achieve its objectives. Purposive sampling is common both in qualitative and mixed methods research as it makes the most of limited resources (Nikolopoulou, 2022). Contacts were made through the researcher's personal associations and contacts with the central bank. While working on the regulation part of the study, serving specific objective 1 of the study, the researcher had to work in direct contact with the central bank in August 2021. To facilitate further research, the bank arranged for the

researcher's official endorsement to the sample PCBs in order to extend all types of cooperation required to collect interview and other relevant data for the researchwork.

However, the interviews were taken in two phases. Initially, a pilot study was conducted where a total of five interviews were conducted with the bankers. The objective of the research was to test whether the questions in the interview protocol could result in responses of pertinence to the research objectives. The pilot study was carried out between August and September of 2021. The insights were used to modify the scope of the initial interview guide. However, this does not affect the integration of the empirical results. Lastly, from September to November, 2021, a total of 15 PCB interviews were completed.

Table 14 shows the details of all the interviewees from the sample banks with their codes used in this research.

Given the qualitative and exploratory nature of the present research, a series of face-to-face *semi-structured interview* questions (Appendix B), with a few focal points, was used to understand whether and why the banks will work with FinTech in deliberating bank finance for the SEs. In semi-structured interviews, indeed, *"the researcher has a list of questions or fairly specific topics to be covered, often referred to as an interview guide, but the interviewee has a great number of ways to reply"* (Bryman, 2004). Hence, in order to acquire an understanding of the participants' perspectives while keeping the context of the previously specified research questions, semi-structured interviews are employed as *"structured are too rigid in particular sets of given questions and lack flexibility, which leaves little room for unanticipated discoveries"* (Breakwell et. al., 1995). On the other hand, in unstructured interviews, the respondent may add all the issues he feels are important or may convey irrelevant information to the researcher. Apart from these, the researcher may not relate all the necessary issues and a personal bias could remain.

However, interviews lasted between 20 minutes and 1 hour. A total of 7 interviews took place at the interviewees' places of business. All interviews were recorded, except two. Where the interviews were not recorded, it was noted with the consent of the interviewees. In the remaining 6 cases, online Zoom meetings were arranged and recorded. All these recorded interviews were carefully copied and later transcribed, translated, and reviewed according to the records.

Table14 : List of Interviewees-Bankers

PurposiveSampling	Type of Organization	Interviewee Position	Code
1st Generation Banks	1. Private Commercial Bank (PCB 1)	Deputy Managing Director (DMD)	DMD1
	2. PCB2	EVP & Head of Investment Administration	EVP1
	3. PCB3	EVP & Head of Credit Risk Management Division (SME)	EVP2
	4. PCB4	Head of Small Business, SME Banking Division	SMEH1
	5. Foreign Commercial Bank (FCB 1)	Business Planning Manager	MNG1
2nd Generation Banks	6. PCB5	Deputy Managing Director (DMD)	DMD2
	7. PCB6	Chief SME Business Officer, SME & e-Business	SMEH2
	8. PCB7	SAVP, Senior Manager, Credit Risk Management Division (CRMD)	MNG2
3rd Generation Banks	9. PCB8	Deputy Managing Director (DMD) & Head of SME Banking, SME banking Division	DMD3
	10. PCB9	Additional Managing Director (AMD)	AMD
	11. PCB10	SEVP & Head of Credit Risk Management (CRM)	CRMH1
	12. PCB11	EVP & Head of Investment Risk Management	EVP3
4th Generation Banks	13. PCB12	Deputy Managing Director (DMD)	DMD4
	14. PCB13	EVP & Head of Credit Risk Management Division(CRMD)	EVP4
	15. PCB14	SVP & Head of Credit Risk Management Division (CRMD)	CRMH2

3.3.2 Data Analysis

The translated transcripts were reread several times to obtain and relate the insights in a consistent and all-inclusive way. These were analyzed following the procedures of data reduction and data display before drawing a conclusion (Miles & Huberman, 1994), where data reduction in the first reading includes the process of selecting, focusing, and simplifying the data from the transcripts, and data display involves organizing and assembling the excerpts from the transcripts to support the analysis and verification.

3.3.3 Analytical Themes

All the transcripts were then put into NVivo version 12 for a systematic analysis. In NVivo, a coding system was developed. The best effort was to ensure proper coding so that the emerging 'themes' (described in details in Section 6.2) might answer the specific objective 3. Vaismoradi et al. (2013) describe how themes can better describe the empirical results. Here, the 'thematic analysis' refers to an independent qualitative descriptive approach for identifying, analyzing, and reporting patterns within data (Braun & Clarke, 2006: 79). It involves the identification of common challenges that extend across an entire interview or set of interviews (DeSantis & Noel Ugarriza, 2000). Lastly, generating a conclusion (Miles et al., 2013) from the themes was pursued. The goal of identifying analytical themes was to create a thick narrative that was theoretically informed (Quattrone, 2006). For the research work, the themes best describe the empirical results and enable it to attain the research objectives, as the codes provide a complete understanding of the process. Given the findings from the interviews with bankers, some recurring themes (Hawkins, 2017) emerged that can be grouped into the following categories shown in Table 15. For example, different interviewee bankers were discussing on the Regulatory Framework from BB, for a legal basis and regulatory guidelines, the way BB will allow FT companies to collaborate, or acceptance by the regulatory authority, all of which could be grouped under the recurring theme "The Regulatory Framework."

Table 15: The Theme Codes from the Interviews of Bankers

Theme Code	Narratives
Regulatory Framework	Regulatory Framework from BB
	Legal basis and regulatory guidelines
	The way BB will allow FT companies to work in collaboration
	Acceptance to the regulatory authority
Authentication of FT companies	Ability to form a proper FT company
	NOC that ensures FT companies' authentication
	Formation of FT through the country's company law
Customer base or coverage	Possessing a large client base by FT
	Increasing banking inclusion through FT
	Reaching the last-mile customers
	The benefit to the end-users
	Collaboration with more customer-focused companies
Customer Acquisition	Proper acquisition of customers before financing
	Central storage of identical data
	On-boarding of customers maintaining relevant rules
	Opening of business accounts having demographic and other alternative data.
Data Reliability	Underdeveloped Infrastructures
	Insufficient sources and volume of data points
	Adequacy, authenticity, and reliability of data
	Non-manipulative data
Time and cost-effectiveness	Banks' interest in the economy of cost
	Time and cost-effectiveness in processing a loan
	Automation of loan processing
	Economies of scale by FT companies
	Online operation without establishing physical branches and avoiding labor-intensive manual work.
Loan Recovery	SME loans as 'supervisory credit'
	Lack of specific measures for recovery
	Settlement of loan default by banks and FT.

Thus, the analytical themes can be generated by analyzing the interview data. These major findings are presented and discussed in detail in chapter 6 under the research findings.

3.4 Qualitative Research- In-depth Interview of Regulators and Experts

Another qualitative research is conducted to answer Research Question 4, which is designed to achieve specific research objective 4, and understand regulators' and experts' perspectives on challenges and opportunities.

3.4.1 Data Collection

All the methodologies of data collection adopted in the interview of the bankers to attain specific research objective 3 were applied when interviewing the experts to attain specific research objective 4. For instance, primary data was collected in another semi-structured in-depth interview questionnaire with a different interview guide (**Appendix C**). The selection of respondents was based on Babbie et al.'s (2011) concept of 'current involvement.' This research part thus arranged in-depth interviews with the regulators and other (academic and practitioner) experts of the respective industry of bank finance. Here also, the sample size was 15 in total, with equal numbers of respondents from regulators, academics, and practitioners. The number of samples was fixed at the point when data saturation occurred. Contacts were made through the researcher's personal associations and on a snowball basis. A pilot study on 2 regulators' interviews, followed by the interviews of the full panel, took place from September to November 2021. Table 16 shows the information for all of the interviewee experts, along with their respective codes.

Table 16: List of Interviewees – Experts

Respondent Groups		Organization Type	Interviewees' Position	Code
A. Regulatory Body	1.	The Central Bank	Deputy Governor	CBDG
	2.	The Central Bank	General Manager, BRPD (Banking Regulation and Policy Department)	CBBRPD
	3.	The Central Bank	General Manager (Financial Inclusion Department)	CBFIDH
	4.	The Central Bank	General Manager (SME & Special Programs Department)	CBSMEH
	5.	The Central Bank	Deputy General Manager, RFFO (Regulatory FinTech Facilitation Office)	CBRFFO
B. Academic Experts, Government Foundation, Development Agency, Forum	6.	Banking Institute	Director-General	DGBIBM
	7.	Banking Institute	Associate Professor	PBIBM
	8.	SME Foundation	General Manager	GMSMEF
	9.	The World Bank	Senior Financial Economist	WBBD
	10.	Bangladesh FinTech Forum	Executive	FBFF
C. Experts in Practice	Bankers (with Expertise in bank FinTech collaboration for debt financing)			
	11.	PCB B	Deputy Managing Director (DMD) & Head of SME Banking	DMD3
	12.	PCB C	Head of Small Business, SME Banking Division	SMEH1
	FinTech Companies (with Expertise in Bank FinTech collaboration for debt)			
	13.	FinTech Company 1	The Chief External and Corporate Affairs Officer	FTC1
14.	FinTech Company 2	Advisor	FTC2	
15.	FinTech Company 3	Co-founder & CEO	FTC3	

As stated, given the qualitative and exploratory nature of this research, a series of face-to-face, semi-structured interview questions with a few focal points was used to interview the experts. The interviews ranged in length from 30 minutes to one and a half hours. A total of 10 interviews took place at the interviewees’ office. 1 interview was taken through written mail, and the other 4 were taken by arranging online Zoom meetings. All 15 interviews were duly recorded. All these recorded interviews were then transcribed, translated, and reviewed.

3.4.2. Data Analysis

In the data analysis part, too, the data analysis tool NVivo version 12 was used. Subsequently, the statements were coded, and, on the basis of that, another thematic analysis was developed based on the regulators' and other financial experts’ views. All the empirical themes analyzed from the experts’ interview data are categorized in the following Table 17.

3.4.3 Analytical Themes

The research constructed the following themes to describe the prospects and challenges of using FinTech, creating another set of thick narratives to be theoretically informed (Quattrone, 2006). Based on the findings of interviews with regulators and other experts, it enables the achievement of specific research objective 4. Table 17 below showed the categories in a way that the regulators and experts were conferring on, like an alternative to collateral, credit scoring at the back end, seamless customer offerings, or collateral-free business loans, all of which could be categorized under the term ‘collateral-free real-time loan’.

Table 17: The Theme Codes from the Interviews of the Experts on the Prospects and Challenges in Leveraging FT to enhance the Access to Finance for SEs

A. The Analytical Themes of the Prospects	
Theme Code	Narratives
Collateral Free Real-Time Loan	Alternative to collateral
	Credit scoring at the back end
	Seamless customer offerings
	Collateral-free business loans

Financial Inclusion	Last-mile prospective borrowers
	By attending SEs highest number of workers can be served
	Serving more to the vulnerable sector
	Extending credit supply against the present loan market
	Millions of enterprises are being sourced from a single FT
	Making unbanked businesses inclusive or banked
	Inclusion is a major factor to be prospective
	Not adopting FT, banks will lose a good customer base
Comfort to Banks	The competitive advantage of FT over the banks
	Cutting-edge features of FT
	Reducing hassle for banks
	Proper credit assessment based on tech-based data in addition to the conventional data
	High-profit margin at a lower cost
	Gathering and processing clients' data
	Use of artificial intelligence (AI), machine learning (ML), Blockchain (DLT), language processing, and application programming interfaces(API) by FT
	Providing convenient customized offerings on fewer inputs
Support Banks' Sustaining	FT offerings for services provided earlier by the banks
	FT apprehensions of the market through splendid capital, enough experience, a big customer base, vast customer data, and the ability to analyze this data.
	Managing cost against the given loan pricing by BB
Present Regulatory Base	BB's assertiveness and initiatives on FT regulations
	The well-equipped and sensibly concerned regulatory body
	Availability of BB's regulatory measures as needed
	Regulatory sandbox
	Learnings from the sandbox or the BB, RFFO experiences
FinTech Ecosystem	Nano credit
	The increasingly comprehensive trend of DFS
	Rapidly evolving FT market
	PSO and PRS attainment in FinTech or digital payments
	Bank-FT collaboration cases in Bangladesh
	App-based services initiated by FinTech
	Already established automated loan scoring and processing arrangements by FT
	The increasing trend of financial literacy in the country

B. The Analytical Themes of the Challenges	
Theme Code	Narratives
Adequacy and Authenticity of Data	Required quantity of the quality data
	FT companies' ability to feed enough data
	Proper acquisition of the clients
	The inevitability of adequate data
Loan Pricing	FT charges in addition to the bank charges
	Dividends between banks and the FT firms
Loan Recovery	The role of FT to recover the defaulted funds
	FT firms' proposals on recovery settlements
Inadequate Legal Support	Changes in the court from a legal standpoint
	Digital documents acceptance
	End-to-end digital solution
Transition Period	Gaining and holding public confidence
	The transition period in adopting any tech-based services
	Recent internet penetration in banking
	Having non-beatable FT to defaulter companies
	The end-users as the ultimate beneficiary
Mainstreaming in the Industry	Regarding all the banks' participation
	Numbers of SME-friendly banks

All these themes derived from the coding are described in details in chapter 7 under the research findings.

CHAPTER 4

ENABLING BANGLADESH’S FINTECH ECOSYSTEM

4.0 Introduction

This chapter presents the findings on the current status of relevant regulatory initiatives for FinTech in Bangladesh. While working on its broad objective to explore the prospects of leveraging FinTech to enhance access to finance for small enterprises and recommend required policy measures, this study found it vital to find out first, the current status of relevant regulatory measures for FinTech in Bangladesh based on what one can think of the adoption of FinTech credit in Bangladesh. For this purpose, secondary data (on international policy frameworks, experiences, guidelines, and the review of BD regulatory guidelines) is collected and consolidated in this chapter.

Using the conceptual framework of the “FinTech Tree” representing an overall FinTech Environment anywhere, developed (January 2020) by the Financial Stability Institute (FSI) of the Bank for International Settlement (BIS) and drawing on the work of others on FinTech regulations, this chapter is devoted to finding out, whether the financial service industry in Bangladesh is ready to adopt the digital transformation needed to have a bank-centric FinTech model- focusing on lending services to the unreached segment of debt financing right now. What policy measures relevant to FinTech facilitation have been taken up to the present time and what are to be adopted further are ascertained and described here.

The chapter is arranged with the following sections: Section 4.1 states the regulations for FinTech. Section 4.2 reviewed global regulatory initiatives taken, 4.3 represents a comprehensive theoretical framework for enabling the FinTech ecosystem, then section 4.4 explained enabling factors for Bangladesh FinTech ecosystem and how Bangladesh has responded up to the present time in accordance with the theoretical framework, and this section is followed by a discussion of summary in section 4.5.

4.1 Regulations for FinTech

Undeniably, technological innovations through FinTech are growingly transforming the way financial services are provided. Advances in technology such as computing power, Machine Learning (ML), Blockchain, and Artificial Intelligence (AI) – coupled with easier mobile access and increased internet speed and bandwidth – are giving rise to these new applications in almost all sectors of the financial services industry.

Thus, this transformation opens opportunities but comes with potential risks. These may include data privacy, cyber security, ML and AI application risks, and extensive third-party dependency and concentration, which can lead to bias, ethics, and fairness issues. As noted in the IMF Bali FinTech Agenda, 2018, a blueprint for successfully harnessing FinTech opportunities, 2018: *"FinTech can support potential growth and poverty reduction by strengthening financial development, inclusion, and efficiency – but at the same time, may pose risks to consumers and investors and, broadly, to financial stability and integrity"*

In general, *"financial regulation aims to address market failures and prevent potential risks by addressing the vulnerabilities and imperfections in the financial system"* (Kawai & Prasad,2011). This objective is the same for traditional financial services and FinTech as well. In addition, policy interventions for FinTech have to aim to mitigate the potential risks FinTech entails itself. Furthermore, *"an innovative environment calls for an adequate innovative policy framework"* (Fagerberg,2015). So, the enactment of regulations for FinTech has to resolve all the following issues at the same point in time.

1. *Security Turmoil.* while attempting to encompass a new financial environment there at the same time, policy actions need to be consistent with the preservation of financial stability in the form of market and financial integrity, perfect competition, and consumer rights protection—a complex equation for the regulators.

2. *Market Sedition.* while technology leads to more decentralization in the financial sector. It could present difficulties for financial regulatory and supervisory frameworks (FSB,2019), or where FinTech is characterized by a fast-evolving ecosystem with exponential growth, the traditional legislative process, on the other, is generally reactive,slow, and linear. So, the regulator should embrace a proactive, flexible approach, as finding a balance is a must.

3. *Market Failure*. The speed of innovation makes it difficult for regulators, facing resource constraints compounded by a lack of in-house technology experts and developed markets, to respond promptly.

4. *Evolving Risks*. Financial authorities may face further challenges as technology evolves, making the earlier one invalid. Understanding novel business models and their ever-evolving risks necessitated continuous efforts from authorities.

5. *Vulnerability*. Lastly, the regulations in the new setup might be prudent enough to sustain.

4.2 Global Regulatory Initiatives

At the international level, the regulatory community and different authorities are working to address emerging risks and develop a firm FinTech ecosystem. The global Standard-Setting Bodies (SSBs) have released several documents in recent years to provide insight into FinTech developments. It is found that various financial authorities have taken various ways to respond to FinTech developments. *“For one, regulators may put in place FinTech-specific licensing regimes that require entities to go through an authorization process before they can offer their services. Alternatively, or complementarily, they may issue requirements that are FinTech-specific, modify existing ones, or even prohibit certain activities. Some authorities explain how the existing regulatory framework is applied to FinTech business models and clarify their supervisory expectations”* (Ehrentraud & Garcia, 2020). For instance, the comparative analyses between two radically different regulatory processes that are captured by the FinTech leading regions are-

- i. conservative EU regulatory approach and
- ii. innovative policies implemented by the UK.

In March 2017, the European Commission under the *European Union (EU)* published an action plan with the purpose of strengthening the EU market with an integrated digital financial system. As the emergence of FinTech has been addressed since then, this initiative follows a consultation. The Commission launched the Financial Technology Task Force (FTTF) that *“involves all relevant services working on financial regulation, technology, data, and competition to ensure a multi-disciplinary approach that FinTech developments*

ask for" (Gomber et al., 2018). However, the literature shows that the Commission's regulatory work was only reactive and conventional in its legislative process.

In contrast to EU, in 2013, the UK government traced a reform that divided its financial regulatory and prudential systems into two divisions. On the one hand, the Prudential Regulatory Authority (PRA), being a part of the Bank of England, was assigned the responsibility of supervising large banks. On the other hand, the Financial Conduct Authority (FCA) became the conduct regulator of 59,000 financial services firms and the financial market as well in the UK and the prudential regulator of more than 18,000 of those firms (FCA, n.d. & Dow Jones Professional, n.d.).

After the global crisis of 2008 in particular, the FCA focused on the potential of FinTech companies and actively supported the sector, introducing creative ways of regulation for innovative start-ups. The authorities brought an interactive approach through an *'Innovation Hub'* launched in 2014. The Hub was intended to enable new businesses—regulated or non-regulated—to introduce innovative financial products and services into the market with fewer regulatory costs or burdens (Yang, 2017). The flexible approach arranged for close relationships, direct consulting, and assistance from regulators to FinTech startup companies, allowing them to reduce regulatory risk and foster the most creative response to FinTech requirements while ensuring a balance between financial stability and beneficial innovation. Following the literature, UK legislation offers encouraging incentives for FinTech startups and is regarded as a global leader in financial technologies.

4.3 Enabling the FinTech Ecosystem through Regulations

This research study examines a conceptual framework of the **FinTech Tree** developed by the FSI (The Financial Stability Institute) of BIS (Banks for International Settlement, Basel, Switzerland) in 2020 (BIS, 2020; Ehrentraud et al., 2020) for the development of the overall FinTech ecosystem anywhere.

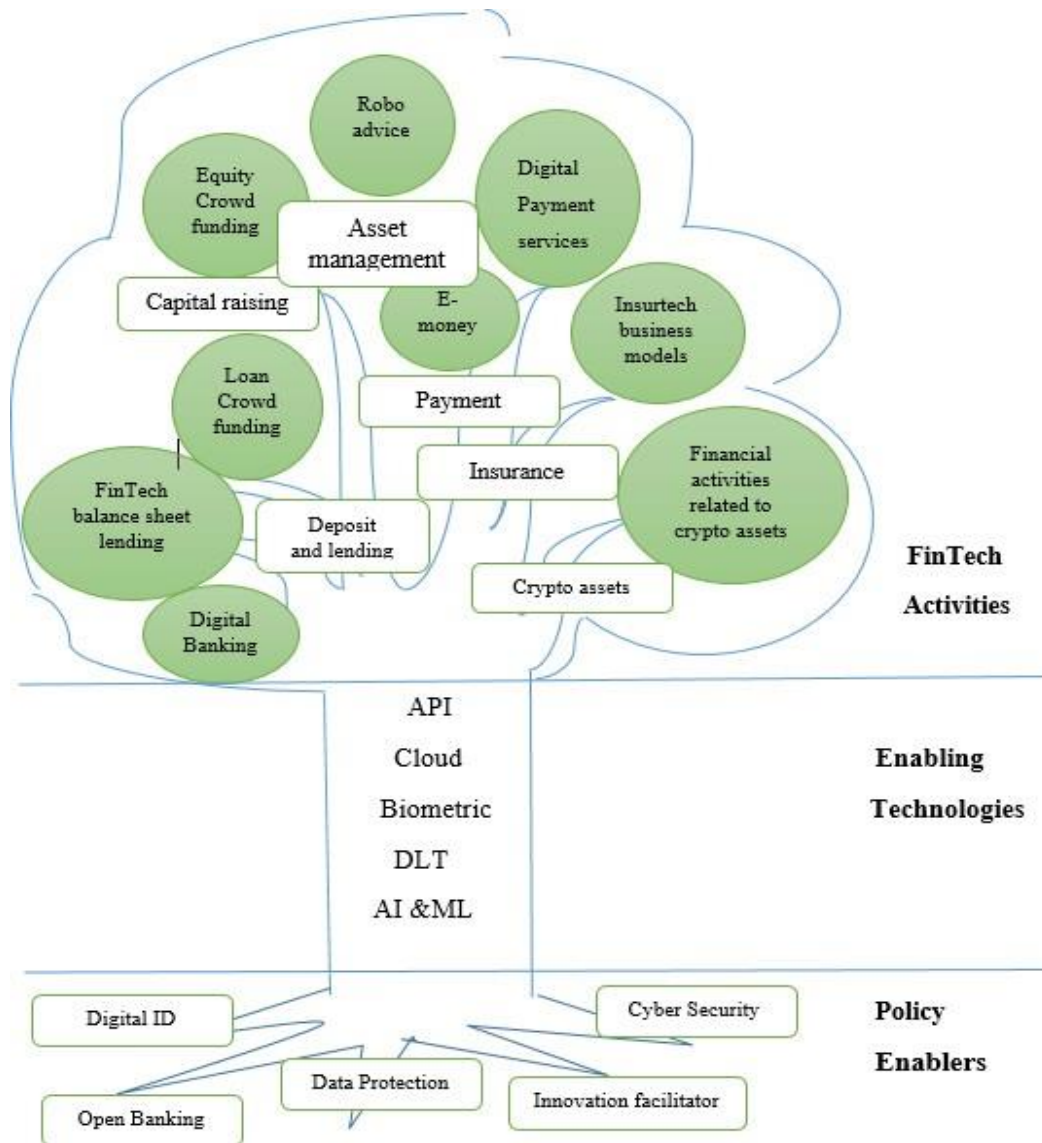


Figure 8: FinTech Tree. Source: BIS,2020

FinTech Tree is mentioned as a taxonomy of the FinTech environment in the study. Given this research study’s focus on the regulation of FinTech, the researcher found this conceptual framework most comprehensive and relevant among the contemporary literature bases because:

Firstly, the FinTech Tree structures the FinTech environment in terms of three components: **Policy enablers**: the roots of the environment; **Enabling technologies**: the trunk; and **FinTech activities**. Policy enablers refer to public policy measures and initiatives that support the development of FinTech activities and the use of enabling technologies.

Enabling technologies are those that make innovation possible in the provision of financial services and, as such, form the backbone of FinTech activities. FinTech activities, or technologically enabled provision of financial services, can take various forms and encompass different sectors of the financial industry.

However, FinTech activities are discussed in the earlier section 2.4. Throughout this chapter, BIS's notion of this FinTech Tree's Policy Enablers and also the regulations for Enabling Technologies are viewed in the context of Bangladesh. This is because, according to this research study, ensuring the execution of proper regulations on the tree's root and trunk is the first to have the application of that regulation in FinTech activities. Thus, trees can flourish or FinTech activities (including lending) can be in full bloom.

Secondly, the standards are set by the global standard-setting body, BIS, which is unquestionably the most reliable body from a global perspective, being a supreme bank regulations execution authority and is known as 'the bank of the central banks'.

Thirdly, this BIS paper provided a cross-country overview of the responses that financial authorities of FinTech adopting countries have pursued regarding FinTech applications.

On the above-mentioned merit grounds, this research used the given categories as the **measuring tool** to assess the prevailing FinTech environment in any place (primarily in Bangladesh).

4.4 Enabling Bangladesh's FinTech Ecosystem:

This section tries to find out and elaborate the way Bangladesh has responded to date in compare to the given regulatory framework by BIS.

4.4.1 Enabling Technologies: the trunk

The FinTech Tree revealed that, currently, multiple technologies are enabling innovation in the global financial sector. These include, but are not limited to, Application Programming Interfaces (API), Artificial Intelligence (AI) and Machine Learning (ML), Biometric-based identification and authentication (biometrics), Cloud Computing (CC), and Distributed Ledger Technology (DLT) or Blockchain. These technologies have a large number of use cases. For instances,

- APIs have been used mainly to share customers' payments and account information between the account holding bank or other non-bank financial institutions and another non-bank firm in a regulated and secured way.
- CC enables the storage; management and processing of large volumes of data under a scalable, flexible, and efficient IT scheme.
- DLT is being appreciably applied to reduce costs, raise enormous efficiency, lessen the repetitive information input and eliminate the need for intermediation.
- Biometric data are increasingly being deployed for customer authentication.
- AI and ML applications have been used mostly in credit scoring and high-frequency trading alongside many other predominant areas (BIS,2020).

A report on a 'cross-country overview of fintech adoption in 31 countries,' developed from a FIS survey in 2019 and used in a BIS study in 2020, showed the application and market adoption of the above enabling technologies in the countries surveyed. In this connection, the report presented Table 18 below. Here, the jurisdiction that is still working on initiatives to be taken in the context of a particular technology is referred to as the 'work in progress' (W) of adopting that one.

Table 18 above shows, that a total of 14 jurisdictions from the surveyed 31, have adjusted their existing regulations, while 5 formulated general principles and 3 keep in consideration the regulation formation on API. Rest columns show in the same way regarding adoption of FinTech Regulations in that countries.

The categories of these enabling technologies about FinTech applications is used in this research study as the *tools to measure* the prevailing adoption of the technologies to foster enabling environment for FinTech, here in Bangladesh.

Table 19: Bangladesh Policy responses to enabling technologies

	API	Cloud Computing	Biometrics	DLT	ML and AI
BD				W	W

Source: Prepared by the author

API (Application Programming Interface, a data-sharing application)

Usually, current regulatory responses to APIs are part of open banking initiatives. In recent years, regulatory authorities from several countries have focused their attention on APIs since they provide a means of interaction and an opportunity of sharing data between banks and third parties with the customer’s consent, which is a must for open banking frameworks (for more details on open banking please refer to section 4.4.2 of this chapter)

However, several jurisdictions have asked their banks to create mechanisms to permit third parties access to customer data with customers’ consent. Such is the case in the EU, where regulations mandate account information sharing among the account information service providers, payment service providers, and payment initiation service providers on interfaces (BIS,2019). Similarly, in Mexico the FinTech Law, 2020 also requires that the credit bureaus, traditional financial institutions, clearing houses, and FinTech institutions develop APIs for connectivity in between. In Singapore, MAS (Monetary Authority of Singapore) together with the Association of Banks in Singapore, has published an API Playbook which presents concrete guidelines for API design and usage for the stakeholders who are intending to use

the APIs, including the consumers, providers, FinTech and the developer community. Likewise, the HKMA (Hong Kong Monetary Authority) is in the process of implementing an API framework in Hong Kong that aims to enable the development and the adoption as well of the APIs by the banking sector (Ehrentraud et al., 2020).

Impressively, Bangladesh has also stepped forward toward API applications in several national projects. Bangladesh Bank and ICT Division jointly have launched the IDTP (the Interoperable Digital Transaction Platform to ensure integrated digital payment services ensuring National ICT Policy 2018 implications) in January 2022 with an application of API (The Financial Express, Dec 2019). Before that, a World Bank-supported pilot project was conducted in 50 locations across 33 districts, linking 16 banks, 2 MFS operators, and an NBF using API to the database of the country's Election Commission Office (AFI, 2020). Thus, though Bangladesh doesn't have any regulatory mandate or guidelines yet on the API allegation, its practical implications in national projects are appreciably found to be applied.

Cloud computing (CC)

Regulatory frameworks for CC have several common requirements and expectations. *"Authorities generally focus on: (i) the adequacy of information security, data confidentiality, and availability; (ii) the strength of IT and cyber security capabilities at cloud service providers; (iii) the effectiveness of recovery and resumption capabilities; and (iv) the adequacy of audit rights of the supervisory authorities"* (Ehrentraud et al., 2020). Almost all of the surveyed jurisdictions shown in Table 18 have either modified or clarified their regulatory expectations regarding the use of CC by financial institutions (BIS,2020). But, to the best of this research study's knowledge, no policy measure initiated on CC, in particular, is found from the perspective of Bangladesh. Thus, this study finds a huge area for development and further research on the policy implications of CC here in Bangladesh.

Biometric data

Biometric data facilitates non-face-to-face, remote customer identification and secured authentication by financial institutions. In countries where remote authentication is allowed, the financial authorities have either initiated new policies or modified their existing regulatory

frameworks to support the use of biometric data, mostly for onboarding or account opening purposes. In jurisdictions where the infrastructural set up for collection, use, and storage of biometric data has been established, they are mostly accustomed to their policies relevant to data privacy, cyber security, and money laundering risks.

Such is the case with EU member countries where different regulations and directives like PSD2 (Payment Services Directives 2), GDPR (The General Data Protection Regulation), and AMLD (Anti Money Laundering Directive) mandate payment service providers to ensure strong security requirements on consumers' biometric authentication. Biometric data is increasingly being used for customer authentication with a higher rate irrespective of developed and developing (even in India-Aadhaar program, Pakistan) jurisdictions.

In the Bangladesh case, the paper-based NID has already been replaced by biometric and microchip-embedded Smart ID cards since 2016. Besides, all mobile SIM (173.36 million mobile subscribers) are biometrically registered and matched with the NID biometric information. Based on such procedural rules, having projects but no regulation yet, the application of Biometrics can be remarked to be in consideration and have the respective grey color code.

Distributed Ledger Technology (DLT) / Blockchain

Despite DLT prevailing at an early stage of its adoption, several jurisdictions have already included specific DLT provisions in their regulatory frameworks. *"The notion of a distributed ledger was first introduced in French law allowing the use of DLT. The Swiss Federal Council passed a new Federal Act on the Amendment of Federal Laws in the light of the developments regarding DLT. In Russia, a DLT regulatory framework applicable to all economic sectors is currently under discussion"* (Ehrentraud et al., 2020).

In Bangladesh also, a **National Blockchain Strategy** has been published by the ICT (Information and Communication Technology) Division of GoB in March, 2020 to establish Blockchain technology in any sector or industry in applicable cases.

Even though there are different ways Blockchain systems can be utilized (discussed earlier in Section 2.4.1), the application of this technology is mostly related to the creation of crypto assets (cryptocurrency, mostly Bitcoin through Ethereum, the world's first full-fledged smart-

contract platform). However, one major concern is that Ethereum and other public Blockchain-based smart-contract platforms are completely anonymous and untraceable to a legal entity, making them vulnerable to abuse by criminals. This is why Bangladesh, like a few other countries, has banned the use of Bitcoin or any other kind of crypto-currencies.

But, given all of this, the public Blockchain domain is regarded as one of the very few domains with strong disrupting capabilities, as it provides a foundational and secure (by its technological prudence) system, with a novel mechanism to store data and facilitate transactions in a most secure tech-based distributed fashion, and strong support for data integrity, authenticity, and provenance. The investment was a solid 23 billion USD from 2013 to 2018 and is expected to grow even faster in the future (Cortina & Schmukler, 2018). Furthermore, there are many other applications of a Blockchain system that do not require any crypto-currency to function.

Considering all this, the executors of the National Blockchain Strategy 2020 found that, like many other countries, Bangladesh must take advantage of this foundational technology. To them, Blockchain technology can disrupt a wide range of potential Blockchain ‘application domains’ in Bangladesh. These application domains (a total of 12 in number given in the strategy) cover a plethora of use cases (36 in total). Towards this goal, they proposed a subset (use-cases) of these domains and prioritized these. They are perceived to be forming a necessary base for Bangladesh in view of achieving the vision of having a "Blockchain-enabled Bangladesh" following the National Blockchain Strategy: Bangladesh of March 2020. The authorities also figured out a tentative roadmap of short and mid-term goals for Blockchain applications here in Bangladesh based on the value of use cases.

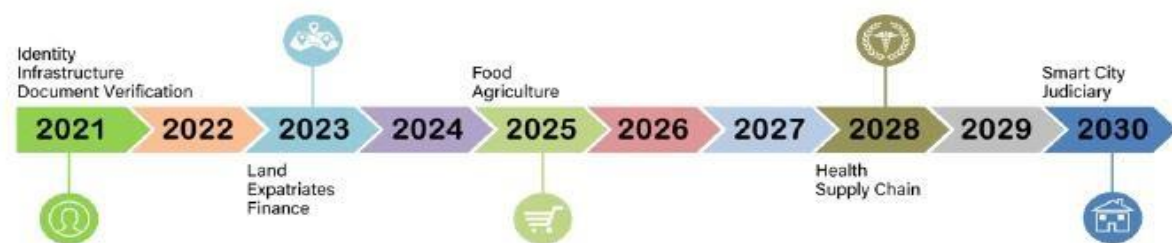


Figure 9: A Tentative Roadmap of Application Domains of Blockchain in Bangladesh

Source: National Blockchain Strategy: Bangladesh, March 2020

Some potential Application Domains (from a list of 12) and their subset of use cases (from a list of 36) for Blockchain applications (that do not require any type of cryptocurrency initiation) in bank lending-related financial services are as follows:

Table20: Some Bank Lending Relevant Application Domains with Use- cases

Application Domain	Use- cases
Identity Application Domain	e-KYC
Finance Application Domain	Payment
Banking/ Insurance Application Domain	Digital Asset management
	Trade Finance
	P2P Lending
	Credit Rating
Judiciary Application Domain	Securing Digital Evidence

Source: National Blockchain Strategy: Bangladesh, March 2020.

From the above document analysis, it can easily be implied that bank lending relevant use-cases (like trade finance, credit rating) and application domain (like finance, judiciary) can be established at any time required to be adopted as the map itself is a tentative roadmap only.

So, Bangladesh has formulated a National Blockchain Strategy that paves the way to formulate general principles and thus found the respective color code (reference Table 19) with notification of work in progress (W). Now, the application of a Blockchain-based system in the banking and finance domain is merely a subject of policy execution.

Machine learning (ML) and Artificial Intelligence (AI)

In the jurisdictions surveyed, listed in table 18, a few authorities have published exploratory reports, while others are drafting consultation papers on ML and/or AI implications there (BIS,2020). Again, some jurisdictions have issued general principles to encourage the responsible and ethical use of AI by financial institutions. Like Singapore, issued principles to promote FEAT-fairness, ethics, accountability, and transparency in the use of AI (Monetary Authority of Singapore, 2018); the Netherlands issued general principles on SAFEST-soundness, accountability, fairness, ethics, skills, and transparency for the same (Netherlands Bank, 2019); and Hong Kong also issued high-level principles on the use of AI by banks (Hong Kong Monetary Authority, 2018).

In Bangladesh, a draft version (version 3) of the **National Strategy for Artificial Intelligence of Bangladesh 2019-2024** has been placed with the Government through a joint initiative of the ICT Division, Cabinet Division, A2I, and UNDP. Thus, regulation status under ML and AI in Bangladesh may have same status of DLT.

4.4.2 Policy Enablers: The roots

The policy enablers serve as the roots of the FinTech Tree, which provides the basic initiations of the adoption of regulations for a FinTech environment anywhere. Government authorities or regulators enact and implement public policies on services like digital identity systems, which give citizens access to digital services; data protection; assigns rights and responsibilities to have access to and share consumer data; cyber security; makes it easier to mitigate cyber risk and open banking edges, which allow banks to share customer information (BIS,2020).

The cross-country summary of FinTech adopting 31 countries, provided by the BIS study, 2020, also showed the adoption and application of the policy enablers there, through Table 21 below. Some jurisdictions follow a *prescriptive approach (P)* and some a *facilitative approach (F)* in terms of issuing guidance. Furthermore, some jurisdictions have set up initiatives that are dedicated to facilitating FinTech innovators, in particular, in their financial systems. This sort of initiative includes the adoption of ‘innovation hubs’ (IH), ‘regulatory sandboxes’ (RS), and ‘innovation accelerators’ (A)—all of which can be mutually inclusive. They are described later in this chapter.

Table 21: Public Policies that Enable the Provision of Digital Services

	Digital ID(eID)		Data Protection	Cyber security		Open banking	Innovation facilitator
	Framework for eID systems' use in financial services	National eID System	National framework	Financial sector framework	National Strategy	Type of approach	Type of facilitator
United Arab Emirates	✓		✓	✓	✓		
Argentina	✓	✓	✓	✓			IH
Australia	✓	✓	✓	✓	✓	P	IH,RS
Austria	✓	✓	✓	✓	✓	P	IH
Belgium	✓	✓	✓	✓	✓	P	IH
Brazil	✓		✓	✓	✓	P*	IH,RS*,A
Canada	✓		✓	✓	✓		IH,RS,A
China	✓		✓	✓	✓	P	RS
Chile			✓	*	*		
Canada	✓	✓	✓	✓	✓		RS
Colombia			✓	✓			IH,RS
Denmark			✓	✓	✓	P	IH
Spain	✓		✓	✓	✓	P	IH
France	✓	✓	✓	✓	✓	P	IH,A
United Kingdom	✓		✓	✓	✓	p	IH,A
Hong Kong	✓	✓	✓	✓	✓	P	IH,RS,A
Italy		✓	✓	✓	✓	P	IH
Japan	✓		✓	✓	✓	P, F	IH,RS
Luxemburg	✓	✓	✓	✓	✓	P	IH
Mexico	✓		✓	✓	✓	P	RS
Netherland	✓	✓	✓	✓	✓	P	IH,RS
Peru	✓		✓	*	*		
Philippines			✓	✓	✓		RS
Poland	✓		✓	✓	✓	P	IH
Russia	✓		✓	✓	✓		RS
Saudi Arabia	✓		✓	✓	✓		IH*,RS,A
Sweden	✓	✓	✓	✓	✓	P	IH
Singapore	✓	✓	✓	✓	✓	F	IH,RS, A
Turkey	✓		✓	✓	✓	P	
United States	✓ s			✓ s	✓		IHs, RS
South Africa	✓		✓	✓	✓		

P=prescriptive, F=facilitative, IH= innovation hub, RS= Regulatory Sandbox, A=Accelerator
 *=in progress, s=state level

Source: Policy Responses to FinTech: A Cross-country Overview, BIS,2020 based on FSI survey, 2019

The categories of the policy enablers, as well as the required regulations for their FinTech applications, are shown in Table 22 of this research as the **tools to measure** the adoption of the regulations to foster an enabling environment for FinTech here in Bangladesh. The status of Bangladesh in terms of enablers is claimed to have been established on the basis of initiatives taken to date, some of which are mentioned here.

Table 22: Bangladesh’s Responses to Adapting Regulations for Policy Enablers

	Digital ID(eID)		Data Protection	Cyber Security		Open Banking	Innovation Facilitator
	Framework for eID systems’ use in financial services	National eID System	National framework	Financial sector framework	National Strategy	Type of approach	Type of facilitator
BD	✓	✓	✓		✓	P	IH, RS
Some Basis	i. BB Guideline on E-KYC, January, 2020 developed by BFIU, BB	i. National Identity Registration Act, 2010 ii. Smart National Identity Cards from October 2016 iii. Ongoing Integrated Service Delivery Platform (ISDP) project of ICT Division	i. Digital Security Act, 2018		i. Digital Security Act, 2018	i. IDTP, January, 2022 (Sharing Fund Transfer) ii. Pilot projects on bank-FT collaboration for debt finance (like BRAC, The City bank initiatives)	i. BB, RFFO Dec, 2019

Source: Prepared by the author

The findings mentioned in the above Table are described below.

Digital ID systems

Digital IDs are significant policy enablers as they enable governments and businesses to deliver digital services that increase financial inclusion by securing remote identification, authentication, and support for customers' due diligence via a digital channel. It gives people access to online and mobile digital services. From Table 21 on the cross-country overview, the regulations from one or both of the government and financial regulatory bodies of a country are found to be indorsed.

In Bangladesh, establishing an efficient means to conduct customer due diligence and proper documentation has long been a hurdle to financial inclusion. Recognizing this, the **Bangladesh Financial Intelligence Unit (BFIU) of Bangladesh Bank** released **e-KYC guidelines in January 2020** directing that all institutions regulated by Bangladesh Bank—from banks to mobile and digital financial services, payments providers, and FinTech firms—will have to comply with e-KYC norms (Asia,2020) along with the country's Anti-Money Laundering Act (AML) of 2012 and Combating the Financing of Terrorism (CFT) Act of 2009, by December 2020.

By dint of these e-KYC norms, customers can now open accounts by completing a digital form and submitting a national identity card using biometrics, facial and optical character recognition technologies. Nevertheless, it simplifies e-KYC requirements and shortens the customer onboarding time from an estimated three to five days to just five minutes, ensuring remote account opening and cash transactions with verification.

Before that, the National eID system, GoB enacted the **National Identity Registration Act, 2010** and introduced **Smart National Identity Cards with built-in chips from October 2016** covering all its 100 million adult people. Besides that, through ICT Division, The GoB is currently implementing an **Integrated Service Delivery Platform (ISDP)** through which citizens' data will be collected once, using a single set of credentials over the course of their lifetime, and shared across all service-providing organizations and information systems via an identity hub or gateway that enables authentication across various platforms. (The Financial Express, Sep 23, 2021). Thus, Bangladesh has formulated regulations on Digital ID.

Data protection & Cyber security frameworks

Given the increasing importance that data brings to the digital economy in terms of obtaining detailed insights into people's economic, social, and political profiles, the right to privacy of personal data has gained more attention for many years. On the other hand, another global challenge is concerned with cyber risks. This cyber threats can be internal or external. Internal threats and vulnerabilities are related to data breaches made by misguided independent employees or contractors, while external threats might involve cyber hackers and criminals trying to pull sensitive information. Given its importance and the increasing digitalization in economies worldwide, public authorities in most jurisdictions have issued data protection and cyber security regulations. From Table 21 as well, we find that almost all surveyed jurisdictions have issued data protection and cyber security laws.

Article 43 (B) of the Constitution of *Bangladesh* safeguards citizens' privacy in correspondence and communication, but such protection would not usually extend to the breach of privacy. Then came the ICT Act, 2006, which provides the legal basis for digital signatures, electronic records, and controllers of certifying authorities. Then GoB enacted the *Digital Security Act of 2018*. On data protection, *Section 26* of the act defines "*collecting, selling, providing, and using identity information (including name, address, e-TIN number, digital signature, credit or debit card number, voice print, retina or iris image, security question, etc.) without one's explicit consent as a crime and is punishable by a maximum of five years' imprisonment, or a penalty of Taka five lakh maximum, or both*". For cyber security, *Section 27* defines "*one committing cyber-terrorism will be punished with imprisonment not exceeding 14 years or for life (on repetition) or with a fine not exceeding Tk.1 crore or Tk.5 crore (on repetition), or with both*". Following experts, the Digital Security Act, 2018, is a powerful and persuasive piece of law in Bangladesh that has had an immense impact on Bangladesh's digital economy, especially in the telecommunication, e-commerce, banking, and FinTech industries (The Daily Star, April 8, 2019). So, Bangladesh has regulations on Data Protection and Cyber Security.

Open banking initiatives

Several jurisdictions have adopted, or are in the process of adopting open banking initiatives. They cover the requirements that apply for accessing and sharing customer information from banks with third-party firms (say FinTech) to provide innovative services for customers.

Table 21 shows that open banking initiatives varied among surveyed jurisdictions, as the regulatory approaches to open banking can be classified into two approaches. *“A prescriptive approach (P) mandates banks to share customer permitted data with registered third parties, and a facilitative approach (F) issues guidance to encourage API adoption as an enabler of digital financial services” (BCBS,2019).*

Regarding Open Banking till date Bangladesh has taken the following initiatives, which provide evidence of the impression that Bangladesh has a ‘Prescriptive’ approach towards open banking. For instances, in January 2022, Bangladesh Bank and the ICT Division jointly enacted the Interoperable Digital Transaction Platform (IDTP), a new system for transferring funds between MFS, between MFS and banks, and between MFS and other Payment Service Providers (PSP) using API. Besides that, a few open banking-related pilot projects (where banks are working in collaboration with FinTech, sharing internal data) like Nano Loan of the City Bank & bKash, products of Dhaka Bank, on-line SME credit of BRAC Bank & ShopUp; API is being used.

Innovation facilitators

The three main types of innovation facilitators are **innovation hubs, regulatory sandboxes, and accelerators**. They can be mutually inclusive.

An innovation office is the dedicated point of contact placed by the regulators to engage with, and provide regulatory clarification to DFS (Digital Financial Service) providers that seek to offer innovative products and services. It arranges regulator–innovators' assignation and mutual learning toward policy development. In the cross-country review, though the name varies among the 21 jurisdictions that responded that they have an innovation hub, the objectives are found to be similar. They are:

- i. to provide guidance and support on regulatory requirements to the applying companies
- ii. to facilitate regulator–innovator engagement and mutual learning for policy development.

In some jurisdictions, innovation hubs serve as a prior step to formulating a **regulatory sandbox**. According to a report by CGAP, *"A regulatory sandbox is a framework set up by a financial sector regulator to allow small-scale, live testing of innovations by private firms in a controlled environment (operating under a special exemption, allowance, or other limited, time-bound exception) under the regulator's supervision."* (Jenik & Lauer, 2017). This intends to recognize the regulatory barriers faced by businesses while testing new ideas and then see how and to what extent these barriers might be lowered. (Regulatory Sandbox, 2015). Global interest in sandboxes is rising to have its applications in over 50 countries (World Bank, 2020) in both developed and developing ones. The Monetary Authority of Singapore also launched the same initiative, while the European Banking Federation recommended the creation of a Europe-wide FinTech sandbox. The strategy has also been contemplated by U.S. regulators (Wall Street Journal, 2016). Malaysia, Singapore, Indonesia, Thailand, Kuwait, Hong Kong, the United Kingdom, Australia, and Canada have all introduced regulatory sandboxes (Next Billion, n.d.).

Accelerators refer to a partnership or funding support between the central banks and FinTech providers to develop specific use cases. For example, in France, the ACPR (an independent administrative body of France) has set up an "entrepreneurship" program, relying on funding support from the innovation accelerator by the Bank of France, and has developed dedicated supervisory technological tools (SupTech) for FinTech (BIS,2020).

Bangladesh Bank, the central bank of Bangladesh, introduced a 'Regulatory FinTech Facilitation Office (RFFO)' under its Payment Systems Wing of the Financial Inclusion Department (FID) in December 2019. In brief, the support involves RFFO discussing, fine-tuning, and assisting a FinTech provider in implementing a product innovation and adjusting regulatory requirements, after which a pilot test is allowed to be run for three months in the real market, after which RFFO re-aligns its regulation and supervision in response to the changed market conditions (if any). With the experience of a successful pilot test, a no-objection certificate (NOC) is issued or a license is granted. Thus, the office pursues its support with that of both an innovation hub and a regulatory sandbox in the name of RFFO, as the name of innovation facilitators varies country-wise (Parenti, 2020)

The services of RFFO are not limited only to new entrants to the market. Incumbents such as banks and other regulated entities that are interested in collaborating with FinTech service providers to improve their operational ability and customer experience can also interact with RFFO. Industry experts believe that Bangladesh could generate a concrete impact by encouraging mutually beneficial collaboration among cross-industry partners, including banks, mobile financial service providers, and FinTech. A regulatory sandbox can enable the country to achieve a sustainable ecosystem.

4.5 Chapter Summary

FinTech solutions and innovations in digital financial services (DFS) are gaining traction in Bangladesh, expanding financial access and inclusion. But as this also poses fraud and market abuse-related risks to financial stability, therefore, regulatory regimes are needed to strike a balance between stimulating innovation, safeguarding consumers, and addressing the possibility of unintended consequences of technological disruption.

The findings emerging from the research work as regards Bangladesh reveal that with a growing DFS market and a progressive central bank, Bangladesh is on track with the rest of the FinTech-led countries to many extents.

To achieve the *specific objective 1* of the research study, which is to find out the current status of relevant regulatory guidelines for FinTech in Bangladesh-

1. Documents were analyzed on pioneering countries' (EU, UK) regulatory practices.
2. The FSI, BIS Survey (2019) on 31 jurisdictions worldwide, currently adjusting their policy framework, was reviewed.
3. Bangladesh's relevant regulatory status was compared with the set international criteria by BIS.
4. Lastly, in-depth interviews were taken from the country's regulatory body, which is incorporated in later chapters.

From there, the research found-

1. Appreciably, a significant number of relevant legal (in terms of national acts) and regulatory initiatives have already been taken that are coherent with the criteria set by BIS to facilitate a FinTech environment.
2. In accord with the criteria, the use of five 'enabling technologies' is already in practice here in Bangladesh to some extent by means of the application of biometrics, DLT, ML & AI, and API which are evident from different program applications cited in this chapter. More applications of these enabling technologies in financial services are found to be mandatory.
3. Five 'policy enablers' to ensure a FinTech Environment: Digital ID, Data Protection, Cyber Security, and Innovation Facilitation are worked in, through recent initiatives like – Bangladesh Bank Guidelines on E-KY C, 2020; National Identity Registration Act, 2010; Smart National Identity Card 2016; Ongoing ISDP, Digital Security Act, 2018; IDTP, 2022; Bangladesh Bank FinTech Facilitation Office (RFFO) from 2019.

CHAPTER 5.

QUANTITATIVE ASSESSMENT OF THE EXTENT TO WHICH THE USE OF FINTECH WILL INCREASE THE ACCESS TO FINANCE FOR SEs IN BANGLADESH

5.0 Introduction

This chapter presents the empirical results of the quantitative aspect of the research study. The objective of this part is to assess the extent to which the use of FinTech by SEs enhances access to finance for those small enterprises in Bangladesh. Prior to this, in the literature, FinTech was found to be a disruptive phenomenon in the financial services industry that has the ability, among others, to enhance access to finance for SEs. Based on that, the primary research question was whether it is applicable in the context of Bangladesh also. And if it is, to what extent can it improve access to finance for SEs here? To find the answer, the researcher conducted an empirical survey on the SEs pool. That is, it collected the demand-side (of debt finance) view on the prospect of using FinTech here in Bangladesh. Based on the discussion of five different dependent variables and the same set of independent variables identified in the methodology, the issues in question are tested in this chapter using specified models. Then the empirical results are presented and discussed. In discussing the results, this chapter also explains the rationale for finding the use of FinTech as prospective from the demand side of debt finance for the SEs in Bangladesh.

Section 5.1 explains the descriptive statistics and the correlation. Section 5.2 reports the multiple linear regression results. Section 5.3 shows a summary of the tested hypotheses. Section 5.4 analyze in details the findings from the models, and Section 5.5 summarizes the chapter.

5.1 Descriptive Statistics and the Correlation

At first, to see whether the collected data were normally distributed, it reviewed the histogram of the observations for the dependent variables. Data are found normally distributed except for few cases which are justified by the questions' nature (Soriano, 2017). For instance, the distribution for the data input in a question like, if you are given a collateral-free loan in a few minutes, would you like to have a bank account and have an access to a referred online- based

platform or a mobile App? - are not found with normal distribution for its question nature and response. However, most importantly, all the scales or questions are found to have internal consistency or **data reliability**. Please refer to the Table below.

Table 23: Data Reliability

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.779	.818	43

Table 23 depicts that all the scales have internal consistency with a Cronbach's alpha value of 0.82, where an alpha value near zero refers to complete inconsistency and a value of 1 refers to perfect consistency (Mohsen & Reg, 2011) Here, the alpha value measures the internal consistency of all the data or shows how closely related a set of scales, items, data, or questions are as a group, and when the average inter-item correlation increases, Cronbach's alpha value increases as well (holding the number of items constant).

Table 24 reports the means, standard deviations, and minimum and maximum of all variables used in the different models.

Table 24: Descriptive Statistics

Descriptive Statistics					
	N	Min	Max	Mean	Std. Dev
BL	311	4.00	12.00	7.0418	2.23495
BL_REJC	311	3.00	13.00	7.1961	2.69350
CL	311	4.00	12.00	7.0418	2.23495
CL_REJC	311	3.00	13.00	7.1961	2.69350
OBST	311	0.00	19.00	.5949	3.27008
OUTR	311	4.00	14.00	9.5723	1.98553
INBR	311	0.00	4.00	.1190	.65893
ADV	311	2.00	4.00	3.7910	.42280
DBOARD	311	1.00	2.00	1.9839	.12598
DOC	311	1.00	2.00	1.8521	.35558
SCORE	311	0	3	.10	.530
PORT	311	2.00	6.00	3.0643	.56430
DISB	311	1.00	2.00	1.6463	.47889
CUS	311	1.00	5.00	2.0579	.57068
REPAY	311	1.00	2.00	1.8199	.38486
ASYM	311	0	2	.40	.710
CW	311	2.00	4.00	3.3055	.81909
SEC	311	0.00	2.00	1.4373	.75888
INT	311	0	5	1.83	.714
Valid N (list wise)	311				

Table 24 shows the variability in the data collected from different SEs, both banked and unbanked. For instance, the composite score or points under the dependent variable of the percentage of SEs using bank loans (BL) varies from a minimum of 4.00 to a maximum of 12.00 points. This can be read as the composite score from the relevant set of questions being a minimum of 4 points in measuring the variable of the percentage of SEs using bank loans (BL). That is, a respondent put a minimum score of 4 points on a scale of 13 points while answering the composite set of questions asked to him regarding using BL by the SEs. (Please refer to question 30-33 in Appendix A-2). Similarly, BL_REJC scored a minimum point of 3.00, and OBST scored a minimum of 0.00. The average given score of BL is 7.08, whereas that of OBST is 0.59. This is because a higher score is set for favorable or more frequent use of BL by SEs or for a lessened feeling of having financial obstacles.

The responses ranges from 0-2,0-4 and 0-5 point scale (Ref. Appendix A2) following the Likert-type scale (Joshi et al., 2015). Here the difference between the Likert-type scale and a full-blown Likert scale is that the Likert-type scale uses a five-point (or seven-point, or whatever a researcher prefers) to answer on a question, where the Likert scale is a 5- or 7-point scale to quantify the subjective preferential thinking or cognition in a validated and reliable manner (Likert,1932; Joshi et al., 2015).

Table 25 displays the correlation matrix under Pearson correlation (Mamun, 2002) of all the variables used in different regression models.

Table 25: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
BL (1)	1.00														
CL (2)	1.000	1.00													
BL_REJC (3)	0.567	0.567	1.00												
CL_REJC (4)	0.567	0.567	1.000	1.00											
OBST (5)	0.221	0.221	0.116	0.116	1.00										
OUTR (6)	0.250	0.250	0.385	0.385	0.131	1.00									
INBR (7)	0.227	0.227	0.118	0.118	0.994	0.13	1.00								
ADV (8)	0.013	0.013	-0.038	-0.038	-0.425	0.055	0.408	1.00							
PORT (9)	0.279	0.279	0.159	0.159	0.135	0.2	0.134	-0.048	1.00						
DBOARD (10)	-0.032	-0.032	-0.019	-0.019	0.023	0.179	0.023	-0.063	0.012	1.00					
DOC (11)	0.032	0.032	-0.007	-0.007	-0.024	0.189	-0.21	-0.035	0.298	0.307	1.00				
SCORE (12)	0.217	0.217	0.115	0.115	1.000	0.131	0.992	-0.428	0.135	0.023	-0.027	1.00			
DISB (13)	0.178	0.178	0.084	0.084	0.916	0.204	0.909	-0.403	0.171	0.14	0.001	0.917	1.00		
CUS (14)	0.175	0.175	0.070	0.070	0.941	0.184	0.934	-0.404	0.111	0.148	-0.005	0.941	0.914	1	
REPAY (15)	0.069	0.069	-0.044	-0.044	0.085	0.13	0.085	-0.054	0.038	0.14	0.064	0.085	0.121	0.194	1

Note: Bold numbers = statistically significant at less than 0.05

The findings from the Table 25 are *Firstly*, the numbers of independent variables - the composite score from the scales measured under the independent variables of Inbound Referral (INBR), Automated Underwriting (SCORE), Disbursement Management (DISB), and the Customer Management (CUS) have a strong positive correlation with the composite score from the scales measured under the dependent variable – the percentage of SEs Feeling there is no Financial Obstacle to have finance (OBST) at above 0.9 (correlation coefficient is near 1 meaning a perfect correlation between variables); therefore, as expected, these independent variables should have a significant effect in the regression model. But, these same sets of IVs show a lower correlation with other DVs, suggesting it is highly likely that the regression models for DVs may vary with a different set of IVs.

Secondly, the correlation of Outbound Referral (OUTR) with both the DV of the percentage of SEs Not Applying for Bank Loan or Credit Line because of Possible Rejection (BL_REJ and CL_REJ) is .385. This suggests that being far less than the acceptable correlation of 0.5, this variable can help explain little changes in these dependent variables.

Thirdly, the strong correlations (near to 1) among some independent variables, like that between composite scores from the scales measured under the independent variables of Inbound Referral (INBR) and Automated Underwriting (SCORE) (correlation .992) and between Disbursement Management (DISB) and Customer Management (CUS) (correlation .914) is a matter of concern and subject to a check of multicollinearity test.

Lastly, there are nearly moderate (around 0.5) negative correlations between the composite score from the scales measured under the independent variables of Automated Loan Advice (ADV) and the percentage of SEs Feeling there is no financial obstacle (OBST) (correlation - 0.425); between Automated Loan Advice (ADV) and Automated Underwriting (IV_Aut_Underwriting) (correlation-.423); and Disbursement management (DISB) (correlation-.403); and Customer Management (CUS) (correlation-.404), which would suggest that these variables may move against each other in the regression models meaning one unit increase in a variable cause the given unit of decrease in another. In the same way, a positive correlation among variables refers to a move in the same direction meaning one-unit increase in a variable cause the given unit of increase in another.

When running the regression models, this research tested for two key effects which could distort the results: (1) Multicollinearity and (2) Heteroscedasticity.

Multicollinearity reduces the precision or accuracy of the estimated coefficients, which weakens the statistical power of a regression model. This is because, the estimated coefficients or slope of the DV concerning an individual IV gives the estimate of a unit change in the DV for one unit change in that particular IV, holding all other IVs constant, and multicollinearity or internal correlation among independent variables rescinds that core property. This multicollinearity can be measured by the Variance Inflation Factors (VIF). This estimate shows, how much the variance of a regression coefficient is inflated or exaggerated due to multicollinearity (if any) in the model. The VIF for each independent variable in the regression models of this research ranged from a minimum of 1.15 to a maximum of 12.63 (refer to Appendix D), which is far lower than the conventional threshold of 20 (Kutner et al., 2004; Soriano, 2017). In conformity with the above analysis, there is no multicollinearity problem in the data; that is, the IVs are not internally correlated. Hence, no multicollinearity problem is present in any model.

Having **heteroscedasticity** refers to some data points having more variability or dispersion than most of the data. In regression, all data points are supposed to have almost similar dispersion from a standard line or have data consistency. To test the presence of heteroscedasticity, this research work ran the Breusch-Pagan-Godfrey Test (Breusch & Pagan, 1979) as it found some other similar tests like, the Harvey-Godfrey Test, time-consuming. According to Breusch and Pagan (1979), data do not have unequal variability across predictor variables. As it found a P-value > 0.05 (with a P value of .192 in all the cases from models 1-4), it failed to reject the null hypothesis of the test that the data has homoscedasticity. Thus, following the test and scatter plots (Appendices E series), as well, no heteroscedasticity problem was found from models 1 to 4. But model 5, only with the dependent variable of the percentage of SEs Feeling there is no financial obstacle (OBST), had a P value in its Analysis of Variance (ANOVA) Table less than 0.05 (with a value of .000), evidencing the data's heteroscedasticity. This research found it justified on grounds of the variations in respondent samples' nature (SEs before and after using FinTech) and the variation in their responses (with high dispersion from zero to the maximum value of a scale).

5.2 Regression Results

As stated earlier, Multiple Linear Regression is used to analyze the data, since it is in line with the theoretical framework that the different dependent variables for this research are the result of key important factors from using FinTech (FT) by SEs. Ordinary Least Square (OLS) is utilized for the multivariate regression models.

Here, Model 1 tests the effects of the use of FinTech by SEs on the percentage of SEs using bank loan (BL), Model 2 on the percentage of SEs not applying for bank loan because of possible rejection (BL_REJC), Model 3 on the percentage of SEs using credit line (CL), Model 4 on the percentage of SEs not applying for credit line because of possible rejection (CL_REJC) and Model 5 on the percentage of SEs feeling there are no financial obstacles (OBST) to have bank finance, comprising all the subset of the independent variable.

In the following pages, a detailed explanation reviewing the effects of the sub-categories of the independent variable on the dependent variables is provided. Please refer to Tables 26 and Table 27 for individual models' summary with their 'standard multiple linear regression analysis'.

Table 26: Model 1 Summary- Regression coefficient for the prediction of percentage of SEs using Bank loan(BL).

Variables	B (Coeff.)	95%CI	β(Standardized Coeff.)	t	p(Sig)
(Constant)	2.534	[-3.573,8.640]		0.817	0.415
OUTR	0.417	[0.238,0.595]	0.370	4.600	0.000
INBR	2.052	[-0.793,4.896]	0.605	1.420	0.157
ADV	0.465	[-0.148,1.079]	0.088	1.493	0.136
DBOARD	0.640	[-1.479,2.760]	0.036	0.594	0.553
DOC	-0.420	[-1.137,0.298]	-0.067	-1.151	0.250
CUS	-1.054	[-2.503,0.394]	-0.269	-1.432	0.153
REPAY	0.228	[-0.418,0.873]	0.039	0.694	0.488
SCORE	0.029	[-3.861, 3.918]	0.007	0.014	0.988
PORT	-0.514	[-1.904,0.877]	-0.130	-0.727	0.468
DISB	1.057	[0.532,1.582]	0.226	3.960	0.000
ASYM	-0.434	[-0.897,0.028]	-0.138	-1.847	0.066
CW	0.231	[-0.160,0.623]	0.085	1.163	0.246
SEC	-0.771	[-1.212,-0.329]	-0.262	-3.433	0.001
INT	0.064	[-0.344,0.472]	0.020	0.309	0.758

Adjusted R-square=0.177(N=311, Sig .000). CI=confidence interval for B

Table 26 specifies, with 95 percent confidence, the relationship of the dependent variable to each independent variable. For instance, holding all other things constant, a 1-unit increase in inbound referral will result in a 60.5-unit enhancement in the percentage of SEs' using bank loans (BL) (showed in the β column). While the effect of outbound referral (OUTR) is high, the effect of application dashboard (DBOARD) is not that impactful, causing a 3.6-unit increase. On the other hand, a 1-unit increase in portfolio management (PORT) may even decrease the percentage of SEs using bank loans (BL) by 13.0 units. Consequently, it is evident that there is a significant relationship between the DV and the sets of IVs. The adjusted R square.177 in model 1 summary table refers to the fact that the use of FinTech can explain 17.7 percent of variations in the percentage of SEs using bank loans (BL). Therefore, the use of FinTech by SEs has a significant impact on the percentage of SEs using bank loan (BL).

Table 27: Model 2 Summary-Regression coefficient for the prediction of percentage of SEs not applying for loan because of possible Rejections (BL_REJC)

Variables	B(Coeff.)	95%CI	β (Standardized Coeff.)	T	p(Sig)
Const	5.102	[-1.797,12.002]		1.455	0.147
OUTR	0.618	[0.416,0.819]	0.455	6.030	0.000
INBR	1.086	[-2.128,4.300]	0.266	0.665	0.507
ADV	-0.089	[-0.782,0.604]	-0.014	-0.253	0.800
DBOARD	0.886	[-1.509,3.282]	0.041	0.728	0.467
DOC	-0.982	[-1.793,-0.171]	-0.130	-2.383	0.018
CUS	-1.532	[-3.169,0.105]	-0.325	-1.842	0.066
REPAY	-0.289	[-1.018,0.440]	-0.041	-0.780	0.436
SCORE	0.328	[-4.067,4.723]	0.064	0.147	0.883
PORT	0.125	[-1.445,1.696]	0.026	0.157	0.875
DISB	0.887	[0.293,1.480]	0.158	2.941	0.004
ASYM	0.328	[-0.195,0.851]	0.086	1.232	0.219
CW	-0.117	[-0.559,0.326]	-0.036	-0.520	0.604
SEC	-1.034	[-1.533,-0.535]	-0.291	-4.076	0.000
INT	-0.001	[-0.462,0.460]	0.000	-0.005	0.996

Adjusted R-square=0.276(N=311, Sig .000). CI=confidence interval for B

Table 27 shows with a 95 percent confidence the adjusted R square of.276 in Model 2 Summary. Therefore, the set of IVs can explain 27.6 percent of the variations in the DV of the percentage of SEs Not Applying for Bank Loans (BL_REJC). Thus, in this Model 2 also, it becomes apparent that there is a significant relationship between the respective DV and the sets of IVs. This Table enables the researcher to form Model 2.

The Tables that generate the remaining three models—Models 3, 4, and 5 in the same way—are shown in Appendices F (1), F (2), and F (3). This way, **Table 28** below refers to a summary of the results from all five regressions that were generated from the OLS test analysis shown above.

Table 28: Multiple Regression Summary from OLS

Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
	Standardized Coefficients (Beta)	P value	Beta	P value	Beta	P value	Beta	P value	Beta	P value
OUTR	.370	.000	.455	.000	.370	.000	.455	.000	.001	.611
INBR	.605	.157	.266	.507	.605	.157	.266	.507	.141	.000
ADV	.088	.136	-.014	.800	.088	.136	-.014	.800	.000	.989
DBOARD	.036	.553	.041	.467	.036	.553	.041	.467	-.001	.651
DOC	-.067	.250	-.130	.018	-.067	.250	-.130	.018	.002	.077
CUS	-.269	.153	-.325	.066	-.269	.153	-.325	.066	.001	.845
REPAY	.039	.488	-.041	.436	.039	.488	-.041	.436	.000	.788
SCORE	.007	.988	.064	.883	.007	.988	.064	.883	.859	.000
PORT	-.130	.468	.026	.875	-.130	.468	.026	.875	.000	.971
DISB	.226	.000	.158	.004	.226	.000	.158	.004	-.001	.463
ASYM	-.138	.066	.086	.219	-.138	.066	.086	.219	.000	.873
CW	.085	.246	-.036	.604	.085	.246	-.036	.604	.002	.201
SEC	-.262	.001	-.291	.000	-.262	.001	-.291	.000	.000	.915
INT	.020	.758	.000	.996	.020	.758	.000	.996	.001	.402
R-squared**	.177		.276		.177		.276		.100	
ANOVA sig	.000		.000		.000		.000		.000	
N	311		311		311		311		311	
p<.05										

**The IVs can significantly explain the percentage of respective R-squared amount of variations in the respective DV with a P value of .000 in all the models.

1. In Table 28, **the standardized beta coefficients** show the slope of the respective response/criterion/dependent variable (DV) in respect of the individual predictor/explanatory/independent variable (IV), where the slope refers to the unit change in the DV because of one unit change in the independent variable.
2. While the coefficients describe the mathematical relationship between each IV and the DV, the P values (**level of significance, Sig.**) for the coefficients indicate whether these relationships are statistically significant or not. Here, the given P value for consideration is $p < 0.05$, or the confidence interval is 95 percent. Accordingly, those values are taken to have statistically significant relations that have a significance value (sig.) of 0.05, less than 0.05, or very close to that. The IVs can significantly explain percentage of respective R-squared value of variations in the respective DV with a P-value .000 in all the models.
3. In the Table, as a whole, all **the bold figures** in a line under a model are showing *three things*: the relationship between the individual IV and the DV by the beta coefficient, the direction of that relationship by the sign (positive or negative); and the statistical significance of that relationship. For instance, the figures under Model 1 in the second and fourth columns, the third row indicate that a one-unit increase in the IV of Outbound Referral will increase (in the positive direction) the DV in the model, the percentage of SEs using bank loan (BL) by .37 units, and the relationship is statistically significant as the sig. level is less than 0.05 (Sig .000).
4. Most importantly, to test the ‘goodness of fit’ (Mamun,2002) of the models, the coefficient of variation/determination (**adjusted R²**) is calculated to determine how closely a regression model *as a whole fits* or explains the relationship between the set of all the IVs and DVs. Here the adjusted R² of all the models is found above the value of .10 with a significance level of .000 in each. That is, from **the summary** of the Multiple Regression Models it is revealed that the set of IVs using FinTech by SEs can explain a good proportion of the respective DVs or using FinTech by SES can significantly change the five indicators of the access to finance for SEs.

5.3 Hypotheses Testing Summary

The Hypothesis testing summary table (Table 29) sums up the same OLS results but in terms of all the hypotheses proposed in the quantitative work of the research. It also depicts whether there is an impact of an IV on the DV, but is based on its statistical significance only.

Table 29: Hypothesis Testing Summary for All Models based on Statistical Significance

Hypothesis	DV	Independent Variables										Control Variables			
		Referral		SaaS											
		(OUTR)	(INBR)	(ADV)	(PORT)	(DBOARD)	(DOC)	(SCORE)	(DISB)	(CUS)	(REPAY)	(ASYM)	(CW)	(SEC)	(INT)
Hypo 1	(BL)	Yes	No	No	No	No	No	No	Yes	No	No	Yes	No	Yes	No
Hypo 2	(BL_REJC)	Yes	No	No	No	No	Yes	No	Yes	Yes	No	No	No	Yes	No
Hypo 3	(CL)	Yes	No	No	No	No	No	No	Yes	No	No	Yes	No	Yes	No
Hypo 4	(CL_REJC)	Yes	No	No	No	No	Yes	No	Yes	Yes	No	No	No	Yes	No
Hypo 5	(OBST)	No	Yes	No	No	No	Yes	Yes	No	No	No	No	No	No	No

Notes:

Hypothesis 1: There is a significant relationship between the use of FinTech by SEs (FT) and the percentage of SEs using bank loan

Hypothesis 2: There is a significant relationship between the use of FinTech by SEs (FT) and the percentage of SEs not applying for a loan because of possible rejection

Hypothesis 3: There is a significant relationship between the use of FinTech by SEs (FT) and the percentage of SEs using Credit Line

Hypothesis 4: There is a significant relationship between the use of FinTech by SEs (FT) and the percentage of SEs not applying for a credit line for possible rejection

Hypothesis 5: There is a significant relationship between the use of FinTech by SEs (FT) and the percentage of SEs ‘feeling that there is no financing obstacles’

Table 29 found each the IV that have impact, but was not considered unless the impact is not statistically significant. Here, **Yes** means the individual IV tested for the corresponding regression model is statistically significant and provides support for the hypothesis. **No** means the individual IV tested for the corresponding regression model is not statistically significant and does not provide support for the hypothesis.

For instance, the survey reveals that Automated Underwriting (SCORE) that is credit scoring by the FinTech companies may not be found to have a significant impact on the percentage of SEs Not Applying for Bank Loan (BL_REJC). But it is found to have a positive significant impact on the percentage of SEs Feeling there is no Financial Obstacle (OBST) to have bank finance, as it facilitates real-time loans at few clicks to the online borrowers using the FinTech Platform. At the same time, SEs other than online borrowers are thinking that collateral-free real-time loans can be processed based on this automated credit scoring and it will enhance the prospects to have bank finance using FinTech. Hence, from the summary of the Hypotheses testing, it is evident that six predictors or independent variables from the studied ten and two control variables from the studied four - are found to have a statistically significant impact either on one or more models.

From the Table above, all the results are shown against each of the proposed hypotheses, which can facilitate many other relevant decisions, like helping a FinTech startup decide which FinTech products have the best prospects to start with in terms of the Bangladesh debt financemarket and which products are not.

5.4 Findings from the Models

Hypothesis 1 tested the impact of using FinTech by SEs on the percentage of SEs using a bank loan. The regression **model 1** shows that the use of FinTech by SEs has statistical significance in the enhancement of SEs using bank loans ($\beta = .177$, $p = .000$), thus supporting hypothesis 1. The results indicate that more use of FinTech by SEs will enhance the number of SEs using bank loans, as 17.7 percent of the variations or enhancement of the percentage of SEs using bank loans can be explained by the sets of IVs listed under using FinTech by SEs.

In Table 28, the model shows that Outbound Referral (OUTR) and Disbursement Management (DISB) have a direct positive impact on the model with ($\beta = 0.370$, $p = 0.000$) and ($\beta = 0.226$, $p = 0.000$), respectively. This might be possible as, in the survey, most of the existing and potential bank account holders were found to agree to be referred to the bank- authorized FinTech platform following the outbound referral manner, to have a collateral-free,real-time loan. This is consistent with the findings of Morales (2020) and Gorham & Dorrance(2017), who found that referrals allow banks to fill gaps in their service offerings, such as the needs of specific customer segments (i.e. “unbanked,” "underbanked"), and provide a broader offering to reach new customers.

On the other hand, from the study by Gartner (2021) and others, it is found, that when banks opt for a SaaS approach, without investing in dedicated infrastructure or technology, they can readily offer online end-to-end digital lending solutions under their own brand and thereby reduce cost per loan, increase loan volume. SaaS remains the largest market segment for public cloud services. But these survey results report some contradictions. Except for Loan Disbursement Management (DISB), some of the subsets of using FinTech underthe SaaS model are not found to have significant impacts on the enhancement of the number of SEs using bank loans (BL). Loan Advice (ADV), Loan Portfolio Management (PORT), and Repayment (REPAY) were all rendered ineffective.

But, again, the impact of collateral-free, real-time loan disbursement management(DISB) by FinTech on the enhancement of the number of SEs using bank loans was obvious. Manyika et al. (2016) also demonstrate that new digital products can serve as one of the building blocks for the potential economic impacts of digital financial inclusion when they truly solve the customers’ problems. FinTech is providing these sorts of digital products that carry the ability to solve, in the true sense, customers’ problems that are initiatedin the traditional form of lending. Loan Disbursement Management (DISB) by FinTech streamlines these processes, allowing small businesses to apply for a loan and receive payment almost instantly.

Hypothesis 2 proposes that there is a significant relationship between use of FinTech by SEs and the percentage of SEs not applying for loans because of possible rejection. Using Regression **Model 2**, it reports a statistically significant association between use of FinTech by SEs and the percentage of SEs not applying for bank loans because of possible rejection

(BL_REJC) with ($\beta = .276$, $p = .000$), providing strong support for hypothesis 2. The result means that the use of FinTech by SEs must have a strong impact on the response variable as a large percentile of variations (27.3 percent) of the percentage of SEs not applying for loans because of possible rejection can be explained by the sets of independent variables listed under using FinTech by SEs.

Here, the results are slightly different. For instance, Document Tracking (DOC) and Customer Management (CUS) have a direct negative impact on the model with ($\beta = -0.130$, $p < 0.01$) and ($\beta = -0.325$, $p < 0.1$), respectively. While the overall *Model 2* provides strong support for the hypothesis with an overall coefficient of multiple determination of 27.6 percent. The individual coefficient of Customer Management (CUS) is marginally significant, with a p-value (of 0.066) very close to 0.05. In this regard, this is also to clarify that, as the indicator of the ESAF index - the percentage of SEs not applying for loans because of possible rejection (BL_REJC) is negatively correlated with its parameter SME Access to Finance, hence the negative coefficients of Document Tracking (DOC) and Customer Management (CUS) in the current study will have a positive impact on the parameter of access to finance of the ESAF Index.

However, from the survey, it is found that Document Tracking (DOC) and Customer Management (CUS) can significantly reduce the percentage of SEs not applying for loans because of possible rejection. This result can be interpreted in reference to the theoretical argument of Principal-agent problems that occur when one entity (the agent) is able to make decisions or take actions that impact, another entity (the principal) (Eisenhardt, 1989).

The problem typically arises in many cases, including asymmetric information, such that the principal cannot directly ensure that the agent is always acting in their (the principal's) best interest, or the principal may be concerned enough about the possibility of being exploited by the agent that they choose not to enter into the transaction or system at all (Bebchuk et al., 2004). In the small business industry, like in any other real economy, the exclusion of some borrowers with profitable projects from financial markets happens because of difficulties in documentation formalities and acquiring information. Whereas some other businesses exclude themselves because of their perception that their credit application will not succeed because of a lack of collateral, required information for documentation, and other formalities. But at the same time, enforcing contracts is a rational response by economic agents. These types of

imperfections can limit lending to firms, including those with profitable investment opportunities. Studies by Abraham, 2017; Darvas, 2013; Beck & Demirgüç-Kunt, 2006 also show that asymmetric information and agency problems and small businesses' opacity, including lack of collateral and required documents, restrict access to credit by small businesses, which often have limited credit history and lack the expertise needed to generate sophisticated financial statements. Again, low profitability per client reveals proper customer management, avoiding their true needs. In such cases, viable automation of previously labor-intensive, cumbersome paper processing tasks can be replaced by tech-based alternative data input, which again is being replaced by the machine learning and optical character recognition technologies used by FinTech firms. These are making low-cost small-ticket loans more viable to enterprises (Dev et al., 2016).

Hypothesis 3 proposed, there is a significant relationship between the use of FinTech by SEs (FT) and the percentage of SEs using credit lines (Indicator 1 of sub-ind2 in the index). During testing the hypothesis and drawing the **Model 3** based on the tested relationship, the researcher had a different experience. In theory and in practice, the definitions of bank loans and credit lines differ (please consult Section 3.2.2 for more information). The ESAF Index might also differ in the same attitude of enterprises regarding using bank loans and/or credit lines. Accordingly, the index set different sub-indicators for these two (bank loans and credit lines). Taking the Index as a measurement tool to measure the parameters of SEs' access to finance, this study was bound to use the measuring tools as they are.

Not so surprisingly, but interestingly, this research found all the respondents were indifferent regarding the types of finance (bank loans or credit lines). This was reasonable because, while FinTech as a term is new to the majority of respondents, the way FinTech can arrange fund was the subject to more concern not that of loan types. As a result, all the respondents reacted by stating that "all the given answers will be applicable for both—a bank loan and a credit line."

As a matter of the above facts, Model 3 generates the same results (or relationship pattern of IVs with a new DV) with the same set of data input for a different variable of the percentage of SEs using the credit line.

This is the case in **Model 4** also, on the same justification ground. No single respondent thinks, their responses would be changed according to finance types. Therefore, all the data input remains the same for the relationship between the use of FinTech by SEs (FT) and the percentage of SEs not applying for credit lines because of possible rejection (Indicator 2), as it was in the case of the percentage of SEs not applying for a bank loan because of possible rejection.

Model 5 presents the results of the test on whether there is a significant relationship between the use of FinTech by SEs and the percentage of SEs 'feeling that there are no financial obstacles.' Model 5 reports a statistically significant association between these two, with ($\beta = 1.00, p < 0.01$) providing strong support for the proposition in hypothesis 5. It implies that, the impact of using FinTech by the SEs is very high in the percentage of SEs feeling that there are no financing obstacles to having bank finance. This happened as all the online borrowers of bank finance through FinTech platforms opined to their optimum level that they didn't feel any financial obstacle to being there to have bank finance. Indeed, they had the collateral-free, small ticket, real-time loan instantly in a few minutes with a few clicks for the first time. But before that, they had to do all their business transactions online through the platform, make on-time product deliveries and payments, give consent for access to alternative data, and comply with other requirements.

However, among the subsets of the IVs, all the inbound referrals (INBR), document tracking (DOC), and underwriting (SCORE) are found to have a statistically significant positive impact on Model 5. This might be possible as, in the survey, all the online borrowers of bank finance through the FinTech platform were found to be referred by the platform to the lending partner bank for their loan proposal following inbound referral. It has a direct and significant positive impact ($\beta = 0.141, p = 0.000$) on the DV. It indicates, holding all other things constant, a 1-unit increase in in-bound referral will result in a 14.4-unit enhancement in the percentage of SEs' feeling that there are no financing obstacles'. While the effect of inbound referral (INBR) is high, the effect of document tracking (DOC) is not that impactful. Although the coefficient is positive, it is statistically significant with a p-value near 0.05 and supports the hypothesis slightly with ($\beta = 0.002, p < 0.01$).

But, almost all the variations (85.9 percent) of the DV are explained by the statistically very significant impact of automated underwriting, which is credit scoring (SCORE) with ($\beta = 0.859$, $p = 0.000$). Prior research studies (Costa et al., 2015; OECD, 2017a; Cornelli et al., 2019) also found that the FinTech credit scoring technique based on machine learning and non-traditional data is better able to predict losses and defaults than traditional models of credit scoring, and FinTech is taking on an ever more important role in lending decisions, providing many unbanked, underbanked, and SEs with no assets to be pledged as collateral for the first time. Morgan Stanley (2021) also observed in the most relevant way that credit risks underwritten by alternative lender platforms have expanded over time beyond the unsecured consumer to include small businesses. All the respondents of online borrowers of bank finance through FinTech firms in the empirical survey of this research have had the credit scoring services of the firm. They found this one as one of the most prominent reasons for the loan to be granted by the bank, assuring an enhancement in access to debt finance.

Again, with the given data set of Table 28, lastly the research finds, the use of FinTech by SEs as prospective from the demand side of debt finance for SEs in Bangladesh based on following rationale.

According to Gujarati, Porter, and Gunasekar (2012), a model's explanatory and predictive ability is deemed to be good if its R-squared value is high (between .60 and .80). According to this general concept, the explanatory factors in the model are frequently good predictors of the dependent variable, which offers the scientist a degree of confidence (Hill, Griffiths, & Lim, 2018). On the other hand, because of the "imperfect nature of social science" (Ozili, 2023) and the fact that a model's goodness of fit (as measured by the tool R squared) is a descriptive measure rather than a test statistic, social scientists believe that empirical modeling in the social sciences serves a different purpose than that of empirical modeling in pure science.

In this regard, a study by Ozili (2023) examined the acceptable R-squared in empirical modelling in social science research with particular focus on whether a low R-squared is acceptable assuming the R-squared is the only decision rule being considered. The study found that strong predictive power or a high R-squared value are required for models in pure science. This is due to the fact that scientists working in the pure sciences study molecules, materials, objects, or atoms whose characteristics are well-understood, whose behavior is predictable,

and who do not change over time. The social sciences, in contrast, study human behavior and relationships that are dynamic and subject to change over time as a result of variables such as group dynamics, emotions, and individual self-interest. As a result, it will be challenging for one model to encompass all the variables that predict human behavior at a certain time. Even if it is feasible to incorporate into the model all the explanatory factors that explain human behavior, some of the included explanatory variables might have a weak or non-linear relationship with the dependent variable thereby weakening the R-squared goodness-of-fit of the model. Cornell and Berger (1987) study also pointed out that the R-squared value is affected by several factors, some of which are associated more closely with the data collection scheme or the experimental design than with how close the regression equation actually fits the observations.

In this backdrop, the paper by Ozili (2023) argued that *“a regression model in social science research should not be discarded solely because it has a low R squared value. Rather a low R-squared of at least 10 percent is acceptable in social science empirical modelling provided that at least some of the explanatory variables are statistically significant and a model with a R-squared that is between 10 and 50 percent can be unacceptable only when all the explanatory variables in the model are statistically insignificant”*.

Following the Table 28, four subsets of using FinTech under the SaaS model—loan advice (ADV), application dash board (DBOARD), loan portfolio management (PORT), and repayment (REPAY) —were not found to have significant impacts on any of the dependent variables. This is probably because the respondents did not consider these as able to solve their true problem (Manyika et al., 2016) of lack of access to finance. Like in response to an item in the survey questions to measure the trend of ADV among SEs, 'Does automated loan advice can better help you decide and apply for a loan? the data set didn't establish a significant positive association with that of the percentage of SEs using bank loans (BL) or on the DV of the opposite direction, that is, the percentage of SEs not applying for bank loans for possible rejections (BL_REJC) or with any other DVs. Aside from that, as stated in Section 4.4, robust national database-enabled e-KYC platforms are increasingly being used in countries such as China, Thailand, India(Aadhaar) to biometrically identify and authenticate the unbanked population, small customer acquisition, and due diligence (Nicastro, 2016). These successes have prompted different emerging countries (including Bangladesh) to explore digital identity

systems (Mir et al., 2021). Now in Bangladesh, also by dint of e-KYC, customers can open accounts from an estimated three to five days earlier to just five minutes, ensuring remote account opening. Consequently, in the question of Loan Application Dash Board or On-Boarding (DBOARD) in respect of using more bank loans, in particular, respondents are found indifferent. The above scenarios in the present social context of Bangladesh are reasonable because, while FinTech itself as a term is new to the majority of respondents and most of the respondents are being deprived of having a large SE finance gap, there loan application dash board (DBOARD), loan advice(ADV), portfolio management (PORT), or repayment (REPAY) terms could not be of that concern to the enterprises.

But eventually, the survey is the case where the set of IVs has explanatory or predictive power far above the acceptable values of 10 percent in social science with a significance level of .000 in each of the models. That is, the set of IVs using FinTech by SEs can explain a good proportion of the variance in the respective DVs. That means an increase in the use of FinTech (a set of IVs) can significantly increase the relevant indicators of access to finance for SEs (DVs). Furthermore, as shown in the tables, six predictors or IVs (OUTR, INBR, DOC, SCORE, DISB, and CUS) from the studied ten are found to have a statistically significant impact on one or more models. The facts imply that the use of FinTech by SEs is prospective from the demand side (SEs) of debt finance for SEs in Bangladesh.

5.5 Chapter Summary

With the findings of this chapter, this research thus interprets the relationship between the use of FinTech by SEs and the indicators of the SEs' access to finance and thus serves the *specific objective 2* of the research. In this regard, the ESAF Index provided an all-set alternative lens to measure the access to finance parameter set for SMEs along with the application of any tool. In this research work, the tool was used for measuring this access by SEs only in terms of relevant indicators. The results found that *six predictors, or independent variables from the studied ten, have a statistically significant impact on one or more models*. That indicates, from a market point of view, using FinTech by SEs can significantly enhance the relevant indicators of access to finance for SEs. It implies the use of FinTech by SEs is *prospective from the demand side* (SEs) of debt finance for SEs in Bangladesh.

CHAPTER 6

DETERMINANTS OF MOTIVATIONS TO THE DEBT FINANCE PROVIDERS

6.0 Introduction

In chapter 5, based on some structured hypotheses, empirical models are developed that evaluate the significance of using FinTech along with other control variables in increasing access to finance for SEs. This quantitative approach is complemented in this chapter with a qualitative research, which involves interviews with the bankers of the country mainly to explore the determinants of the motivations of the debt finance providers to provide finance to small enterprises through collaboration with FinTech firms. In other words, while chapter 5 (serving the specific objective 2 of the research) tries to estimate the prospect of using FinTech by the SEs, that is, the *demand side* of bank finance, chapter six (serving the specific objective 3 of the research) elicits the views of the *supply side* on whether the banks will at all agree to work in a setup of FinTech collaboration for bank finance. And if it is, what will motivate them to conduct such activities?

Section 6.1 examines whether all generations of bankers agree to work with FinTech in collaboration to manage debt finance for SEs, and Section 6.2 finds out the determinants of motivation to work in this setup by the bankers. In this regard, as stated in the methodology chapter, the research method was used with the approach of contextualizing the findings only, the qualitative research had a direct approach in raising questions and after coding in the data analysis tool of NVivo version 12 simply put the findings in context showed in Section 6.2.1. to Section 6.2.7.

6.1 Bankers' Consensus on Collaboration for Debt Finance to SEs

The research conducted an interview with bankers, directly asking them if they would be interested in bank-FinTech collaboration for debt finance to SEs. Hence, the banks had the option of agreeing or not agreeing to bank-FinTech collaboration, particularly in managing debt finance (though they are collaborating in managing payment; BRAC-bKash and DBBL-Rocket are two examples). Before that, reviewing the literature with reference to Section 2.6.4

of the study, banks are found to view FinTech companies as enablers or competitors, and to choose FinTech platforms as partners or not (Economist Intelligence Unit, 2015). Accenture also categorized FinTech companies as competitive or collaborative in nature, both with BFIs and NBFIs (Accenture, 2016). Apart from this, as discussed in earlier chapters, there are a number of initiatives (time-to-time regulations by SMESPD on SME finance), incentives (like 0.25 percent provisioning requirements against SME loans as opposed to 1 to 2 percent for other sectors' loans; fund arrangements from development agencies including JICA, IFC, and ADB in the form of refinancing); and instructions (like banks are instructed to set the SME target to at least 25 percent of net outstanding of all loans by 2024 to be compliant to BB instruction following SMESPD Master Circular No. 2 dated Sep 5, 2019; Bangladesh Economic Review, 2021 from the central bank). Despite these, banks were still lacking (having a 40 percent finance gap) for more SME financing. Despite such measures, only a few banks, like BRAC, One Bank, The City, UCBL, and others, are found to be SME (and thus SE) friendly as from the business portfolio of most banks rarely has an adequate SME base.

In view of the above, for this study, the industry was primarily not supposed to be agreeable to SE financing in collaboration with FT for debt finance as a whole. In this connection, the research found primarily 2 cases (as of the date of the interview, August 2021) of bank-FT collaboration in managing debt finance. One was the 'BRAC Bank-ShopUP project' for small enterprises, to a limited extent to date, which was a pilot project only. 'The City Bank-bKash Nano Credit Project', on the other hand, was designed for personal loans and has just received a NOC from BB for its commercial launch in October 2021.

But, while interviewing the bankers, this research surprisingly found that the internal policy executors of all 15 banks are not only well informed about the issue, but most of them are positive about the bank-FinTech collaboration in managing debts for small businesses. Therefore, the researcher went for further document analysis of current banking business affairs and news updates and it was found that this concern of banks here in Bangladesh got built up as an outcome of initiatives by Bangladesh Bank, other banking institutes like BIBM, and development agencies like the World Bank, IFA, and OECD in this jurisdiction in the form of training workshops, courses, paper publications, round table conferences, and others. The elaboration of these findings is described in the literature in section 2.7.5. In addition to these document analysis, in following interviews, the researcher asked the bankers directly whether

they would agree to finance small businesses in collaboration with FinTech firms. The bankers positively responded, saying:

"We welcome technology from our side, no matter whether it is in-house technology or third-party outsourcing, and those who are concerned about more cost-cutting can certainly take third-party FinTech help in lending. Our bank finds it prospective " (MNG2).

These kinds of responses didn't vary that much with respect to banks' generations. A total of 14 banks out of the 15 sample banks from all four generations of banks (established during the first four decades of independence) responded positively to bank-FinTech collaboration for financing small business loans. That was the most prominent finding toward the consensus of the bankers, which reflected a good prospect of using FinTech by the debt service providers as well. Another instance can also be cited here.

"For those like us who are new fourth-generation banks and whose country-wide branch network or full expansion is not there yet, I think these FinTech companies have a huge opportunity there, and our bank, in particular, is proceeding on this track" (EVP4).

To the researcher, this positive assertion and mere expectations of the bankers may be better validated with the reflection of the facts and understandings of the bankers who have experience in financing debt in collaboration with FinTech. The researcher asked a banker at BRAC Bank whether, from their experience, they found it prospective to have this sort of collaboration between banks and FinTech firms in financing small business loans from the perspective of the Bangladesh banking industry as a whole. The respondent replied:

"...bank-FinTech collaboration, even in debt finance besides payments, is now an appreciated business model in many parts of the world. We find its potential from Bangladesh's perspective also... A bank does not have the expertise to create an app; it's not a software company. It's a financial expert, which a FinTech is not. In one hand, it can be a win-win partnership; and must add value to the customers" (DMD3).

This finding can be assumed to corroborate the study of Tah (2016), where the author stated that it is an incredibly difficult procedure for banks to innovate on their own. Regarding this, the optimal course of action would thus be to quickly achieve innovation through

collaboration. Many other studies are also in support of this view, as according to Zalan & Toufaily (2017), regarding technological expertise, speed, and customizability, FinTech offers several advantages over banks. The study by Accenture (2016) also identified "collaborative FinTech companies" that consider existing financial institutions as potential customers. Therefore, companies always try to support, cooperate, and provide solutions by serving the interests of their partner financial institutions in the market.

Thus the statements of the respondents of this research also added more insights and explanations on the banks' attitude toward having FinTech firms as their lending partners for the SEs and make absolute sense of making a theoretical argument on the good prospect of bank FinTech collaboration for debt finance. Most importantly, the demonstration came up with a finding of consensus among most of the bankers (of 14 out of 15 respondent bankers) on doing lending business with SE in collaboration with FinTech. The banks further clarified their views on the present status in terms of the acceptance and adoption of the collaborative business arrangements between banks and FinTech. For instance, one respondent commented:

" We are to observe which way the world market is going. In the last decade, the market has been moving toward bank-FinTech collaboration all over the world. Now, in Bangladesh as well, FinTech firms are getting ready. Two new start-up companies are Dana FinTech and Sheba. XYZ. Currently, they are already placing projects with the banks to manage small business finance. It is the beginning of a new era in Bangladesh and is a good start (AMD)".

Other banks, which were not found in contradiction to the above statements, also added their views in the same direction. For instance, another respondent banker clarified the country's present standing:

"I think bank FinTech collaboration for debt finance will come for sure in the near future. In the background, in terms of building awareness, the development agencies and other banking experts in Bangladesh have been working for the last couple of years. It is taking time to be practiced on a broad base. Hence we are passing nothing but the needed transition period " (DMD1).

Here again, comes the question of whether this upcoming collaborative model will really prosper and sustain in the mainstream financial services industry of the country, as stated, and justify the purpose of the study.

However, interestingly, the City Bank alone was not found to be that affirmative in the matter of business loan processing under this model. It was found to be the only exception among all the 15 responding banks. According to the respondent interviewee from the bank, the Central Bank-approved Nano Credit is dealing with a personal loan based on an eID and the last six months' top-up or transaction history under this collaborative business model. But if it is about processing a business loan, a radical infrastructural base is needed to be made ready first. This should include infrastructure support such as data authentication ensured by a data pulling facility from a national-level central server; the development of a business cluster-based appropriate matrix for credit scoring; a change in the country's legal base to accept virtual data as official documents; and others. However, each of these issues is brought forward in the latter part of this study in detail in document consultation, discussion with the experts, and also in constructing recommendations with credible solutions in possible cases.

Thus, this section strongly argues that there is a consensus among the banks to work with FinTech in collaboration for SE financing, except for a negligible few. This has profound implications for the bank's financial suppliers as well as for developing countries like Bangladesh. The following sections present an analysis of further findings from the interviewee bankers and support the arguments on what determinants the banks will be motivated to provide finance to SEs through collaboration with FinTech.

6.2 The Determinants of Motivations of the Bankers

The studies by Romanova et al. (2016), Zalan & Toufaily (2017), Buchak et al. (2018), Puschmann (2017), Tah (2016), and Cortet et al. (2016) referred to in section 2.6.3 of this study on the competitive advantage of FinTech over banks, section 2.6.4 on the rationales of the banks' move towards collaboration with banks, and the study of the cutting edge features of FinTech with reference to section 2.5.2 well justify the issues that in general, banks consider when collaborating with FinTech firms in payment, wealth management, and debt. This chapter is devoted to finding the determinants of banks' considerations in this regard applicable in Bangladesh's financial industry context. Whether the determinants are the same or on what grounds are different is a concern of this section. However, the prime issues that the bankers are found concerned with are as follows:

6.2.1 Regulatory Framework

To work in a completely new set of innovative systems, a strong regulatory base by the central regulatory authority of the banking sector is explored as the most important prerequisite and requires support to work securely with FinTech companies. One of the responding bankers responded in this manner:

" Before all these, regulatory frameworks from Bangladesh Bank should be there" (MNG1).

Some other bankers also responded, *" More important are the legal basis and the regulatory framework" (SMEH1).*

Thus, most of the sample banks do not seem content with a proactive approach to start working with FinTech before having clear guidelines from the central authority. Another interviewee mentioned:

"We welcome technology from our side, no matter whether it is in-house technology or third-party outsourcing. In the case of outsourcing, we will have to see how Bangladesh Bank will allow a third-party organization to work in collaboration with the banks and what regulatory frameworks do come into play (MNG2).

Some other banks, which were found to be comparatively more confident in beginning with the arrangement, were also determined to begin with a clear regulatory framework built at the outset, as such a banker was saying:

"Bankers rely on third-party data for property valuation from survey firms, for financials from audit firms, for credit ratings from credit rating agencies like CRAB and CRISL, and for lawyers' reports to another third party because bankers remain involved in bank-related expertise issues. Likewise, if FinTech firms are found reliable and acceptable to regulatory authorities, a banker should have no difficulty working with them"(CRMH2).

While the above banks were talking about the inevitability of a regulatory framework with required policy support from the central regulatory authority in general, some others specified the necessity of the regulatory framework needing to clearly define the responsibilities of all the stakeholders—banks, FinTech, and the settlement issue in case of breach of contract. In this regard, the researcher reviewed the study based on findings from document analysis on Bangladesh regulation and found that a provision is there to approve the NOC to the FinTech

companies and to have other relevant support from the RFFO office and BRPD department of BB, but no such provision, on delegation of responsibilities with clearly defined jurisdiction of all the stakeholders is there through any regulatory framework.

6.2.2 Authentication of FinTech Companies

The bankers were apprehensive about some other issues, like the authenticity of the FinTech companies. In the context of a developing country, the upholding of business ethics by the stakeholders in any system has always been a concern. Studies depict, as opposed to the developed, business ethics are much more divested in developing countries' business cultures (Rossouw, 1994; Eleigido, 2004). Rossouw, G. J., (1994) explained, "business ethics is fighting an uphill battle in becoming part of the business culture in developing countries". Here the authenticity or legitimacy of a company is clubbed under "law-abiding," or being bound by laws, one of the core principles of business ethics (Josephson M., 2015). In this connection, a respondent bankers responded in the following way:

"Being a proper FinTech is an ability. Bank will not accept anyone as a FinTech " (DMD3).

Other banks were no exception. They also expressed FinTech companies' authentication as one of the motivational determinants to work with them for debt financing.

"We have done very well in digital payments; only in the area of financing we are a little confused. If there are validated NOCs ensuring FinTech companies' authentication, then only banking will go for this sort of collaboration" (MNG2).

Here also, during the interview, the researcher reviewed and shared with the respondent the Bangladesh Bank provision to grant a license to start a business as a FinTech company and to approve a NOC (No Objection Certificate) on a successful test run of the business in a real market and the fulfillment of all the other official requirements by the RFFO office with support from the BRPD department of Bangladesh Bank. Hence, some banks were informed of the issue by the researcher, while others were found to already have the idea. One respondent banker from one of the prominent first-generation banks stated,

"In this business model, we are not that concerned about FinTech's authenticity issue. Because it cannot simply be an online Evaly⁸. The company must be registered under the company laws of the country and come up with a product having Bangladesh Bank approval" (EVPI).

6.2.3 Customer Base or Coverage

The banking business community kept the business profit motive at the forefront of the motivational factors in any drive, including collaboration with FinTech. It can easily be argued that, in a win-win partnership setup, the debt finance providers were to ensure an addition to the earnings in the bank's book of accounts. More customer coverage could be one of the leading dynamics for making more profit in the banking business. While interviewing a banker from the City Bank, a bank derived experience in collaboration with FinTech, of their motive to collaborate, the interviewee retorted:

" City Bank is giving small personal loans in collaboration with bKash. This is simply because BKash has a very large client base and a very big database " (SMEH1).

Unquestionably, more customer coverage is one of the banks' top concerns. In the earlier studies, access to SME finance and greater financial inclusion of the relevant customers were found to be profoundly constrained by a number of inevitable factors. Therefore, despite the central bank's initiatives, it was not always possible to serve such marginal clients, leaving many of the prospective customers unbanked or underbanked. Therefore, while working in collaboration with a trusted third party, banks might have this to consider. Naturally, reactions came up in this way:

"More customer coverage is a huge motivation. The market is competitive but banks can't reach every corner in a cost-effective way. Banks would like to increase banking inclusion and reach out to last-mile untouched customers through FinTech " (EVP4).

But, probably the most profound and rational judgment was articulated by the following banker who gained work experience in collaboration with FinTech in debt management, while he was asked regarding what the bank considers choosing a FinTech to work with.

“If the end-user customers do not benefit, there will be no benefit regardless of whom we partner with. If customers do benefit from using it, they will catch on, and the market will automatically be gained. Clearly, if someone can bring a more customer-focused and relevant service with good customer coverage, I will go for that one” (DMD3).

This finding is akin to the Wonglimpiyarat (2017) study. The author gathered data on the flow of FinTech innovation in the financial markets and, in her study, recognized motives for bank and FinTech partnerships. She stated that FinTech firms enter into collaboration to extend their service reach to new customer segments under a trusted logo, whereas banks can benefit from collaboration by extending the scope of their services and ensuring better services for new customers.

6.2.4 Customer Acquisition

Though a question regarding proper customer acquisition through FinTech came up as a concern of a few bankers, in subsequent discussions with most of the other bankers, the issue was resolved to many extents. The whole conversation is found needed to be brought in the discussion of determinants for collaboration by the bankers with FinTech. While some bankers brought up the issue of customer acquisition in the following way:

" I would rather say for customer acquisition first; later comes financing " (SMEH1).

There, some other bankers specified the compulsion, saying:

"To date, for customer acquisition, we have eKYC system based on national ID only. But we still don't have an authentic data source for the trade license yet. No central authenticated storage is there which is at the same time accessible by all, like that in digital NID" (MNG2).

Again, some banks were showing the resolutions that could take place, as the banker stated:

“Maintaining anti-money laundering relevant and other rules, onboarding is done in the banks using eKYC. If FinTech firms follow the same rules, then banks can be assured on authentication grounds. Further, in addition to the demographic data, FinTech firms will incorporate alternative data that can't be manipulated by human activities" (EVPI)

This is at the core of automated customer acquisition by FinTech companies. Earlier literature is also found in its defense. As Romanova et al. (2016) showed, FinTech has harnessed

technologies such as artificial intelligence, machine learning, Blockchain, and natural language processing to offer highly automated and secured services. By digitizing and automating loan applications online, FinTech firms have generated an "incremental change" (Puschmann, 2017) by increasing efficiency and security and decreasing handling time. In response to the researchers' query, bankers responded that business accounts should be opened having copies of demographic papers and data including the eID of owners, trade licenses, memorandum, and articles of associations in applicable cases from the SMEs. FinTech can use alternative data from ATMs, POS, mobile devices, and the internet, among other sources, in addition to conventional data to have a paperless but secure onboarding process.

6.2.5 Data Reliability

The bankers were also fretful about the reliability of the data collected through FinTech. They raised questions about how much and what sort of data would be sufficient to consider a project loanable. That is, they were concerned to review what the parameters would be in terms of data quantity and quality and how the parameter could be reached. The respondents stated the following:

"Our regulatory body also wants FinTech to come forward. The challenge is that the infrastructure, including the estimation of required data points, is not yet developed and there are not enough sources of those data point. To date, data reliability has been a matter of apprehension" (AMD).

Other bankers were outlining the likely issues they would face:

"The acceptability of the provided data by FinTech is to ensure... While the regulatory body is auditing a bank, it might not raise any questions in terms of the adequacy, authenticity, or reliability of the data provided by the bank using FinTech" (CRMH2).

But this research found that this observation of the bankers was raised from a state of hypothecation or is a generalized idea. This is because the banks, on the other hand, working in direct collaboration with FinTech, both at home and abroad, are not found to have that concern. The experienced banks spoke out in a different way.

"When customers conduct transactions in a FinTech-led app-based bank or nonbank account, that record will be kept. Based on that data, a non-manipulative, authentic data scorecard

can easily be produced using Blockchain or other secured measures, and we can go for lending” (DMD3).

Indeed, FinTech works with non-manipulative transactions and other alternative data in addition to conventional demographic data. Furthermore, it arranges low-risk, small-ticket loans in proportion to its transactions and business size. In many other ways FinTech itself, for its in-built cutting-edge features, is designed to collect required data to well manage low-risk small ticket loans. The elaboration of these features is discussed earlier in chapter 2.5.2 of this study. Despite all such activities, the issue of data reliability was forwarded to the experts for their further directions, discussed in chapter 7, and reflected in policy recommendations, discussed in chapter 8.

6.2.6 Time and Cost Effectiveness

From the literature reviewed, this study found that for potential borrowers, the time and cost-effectiveness of the lending services are critical in determining whether to take out a particular loan. These were of prime concern to the debt finance providers as well. Banks in this developing country were not exempt from these findings. This can be corroborated by the following statements from different bankers of different generations:

" If FinTech can ensure the cost and time effectiveness of processing a loan, it would be the most effective motivational factor for any bank to join " (EVP4).

Other banker also added:

" All banks, more or less, will be interested in the cost and time effectiveness of processing small-scale loans" (DMD1).

Another instance may be cited:

" The debt processing costs and time provided by the FinTech companies must be economical, lucrative, and agreeable to the bankers" (CRMH2).

While some banks merely cited the cost-effectiveness of loan processing and approval as a strong basis or determinant for working in collaboration with FinTech, other bankers stated in detail.

"... Here, data need not be processed each day. A program is given, and the process is automated. In traditional lending mechanisms, so much data has to be managed manually, and the documentation costs, and other fixed and overhead costs per rendered service reach high levels. FinTech do these using machine learning, Blockchain at clicks" (AMD).

Besides technological advancement and innovative applications of the new business model by the FinTech firms, other financial factors were brought into the discussion by the bankers.

"... As a company, FinTech will provide solutions to different banks. If a bank does business with 200 business clients, say, through a FinTech, the FinTech will do business with twenty different banks. In economies of scale also, the cost will be much less " (EVP4).

This is consistent with the findings of Zalan & Toufaily (2017), who showed that recent technology enables FinTech to provide more cost-efficient services than banks do, because it computerizes labor-intensive tasks and operates completely online without establishing physical branches. This is comparable to many other FinTech studies evidencing its cost-cutting ability. In a paper published by BIS, Dudley (2017) showed how the operating cost of a FinTech like **Lending Club** is less than 2 percent of its outstanding loans, compared to that of large US lender companies at 6 percent. Goldfarb and Tucker (2019) described all the search costs, replication, tracking, and verification costs being reduced using digital technologies.

However, another competitive advantage FinTech ensures, is its ability to provide faster loan origination in comparison to conventional banks. Nicastro (2016) showed, a loan approval that might take 15–30 days in a traditional lending mechanism requires a few minutes in FinTech. Prakash (2016) showed how **On Deck Capital** and **Kabbage**, two world-renowned FinTech process and approve financing for small businesses in few minutes.

6.2.7 Loan Recovery

Despite FinTech Lending bringing convenience, quickness, and efficiency in lending services, the risks such as delayed payment and debtors' default can take place. As long as it is not due to system failure, the FinTech firm as an administrator of the lending services, is not supposed to deal with that risks. Hence, it belongs to the creditors. Again, without any specific collateral, the risk becomes much higher (Lerong Lu: 2018, 320). The lending administrator has risk disclaimer mentioning that any possible credit risk and loss in lending services belongs to the

creditors. By investing other people's deposits in the lending business and being bound to oblige international (like the BASEL Accord⁹ and others) and national banking rules, in this research bankers are found to be more vigilant indeed in their work in collaboration with third-party FinTech companies. In consequence, assurance of loan recovery, especially in the context of a developing country like Bangladesh, was found to be a resistant determinant of banks' motivation to work with. An interviewee banker responded like this:

" SME loans are called supervisory credit. A lack of supervision may cause default as the loans do not have enough collateral security and document support in most cases. Recovery is a big issue to be addressed and FinTech is not an expert in managing defaults " (CRMH2).

Where credit risk is one of the four major risks (according to the BASEL Accord) for any bank, any innovative setup or business model will naturally run into the issue. Indisputably, the study was interested in getting an idea of how banks with experience working with FinTech manage debt for enterprises. When asked in this collaboration how loan recovery was ensured, BRAC Bank replied:

" To date, we have done real business only with shop up. In their model, they didn't cover this, and we went for the traditional collection process on the bank's part. Although the proposed model by Dana FinTech offers to cover this part from their end, let's see what Dana FinTech comes up with " (DMD3).

It implies that, though from the banker's perspective, loan recovery is a prime issue in any emerging state like Bangladesh, it has yet to be addressed through specific policy measures. The finding is further put forward for discussion about policy recommendations in the upcoming chapters.

6.3 Chapter Summary

Thus, to explore the determinants of motivations of the debt finance providers to provide finance to small enterprises through collaboration with FinTech, that is, to serve the specific objective 4 of the study, it arranged in-depth interviews mostly with the internal policy executors of respective banks, 15 sample PCBs out of the country's total 60 PCBs of all generation banks, to directly obtain their views on the determinants of their motivations in this regard. Hence –

1. Following the conduct of other social studies, the researcher intended to claim bank FinTech collaboration as ‘prospective’ from the supply side (primarily the banks) of bank finance for SEs if at least 10 percent of respondent banks agree to work with FinTech in managing debt finance for SEs. After conducting interviews with 15 commercial banks, it was firmly established that all 15 banks were aware of and concerned about the issue, and a total of 14 banks (except one of the first-generation banks) agreed to work in collaboration with FT in managing bank finance for small business loans initially. These findings exceeded the expected set of at least ten percent of banks' consent and agreement about working in collaboration with FinTech. Therefore, it was found prospective also from the supply side of bank finance. To the study as a whole, this is one of the main findings.
2. The top seven determinants of motivation having the most weighted scores in NVivo version 12 were regulatory framework, authentication of FinTech companies, customer base or coverage, customer acquisition, data reliability, time and cost-effectiveness, and loan recovery. Among them, the top concern of the bankers working with FinTech was a supportive ‘regulatory framework.’
3. Another interesting finding was the matches (customer base, cost, and time effectiveness) and mismatches (added authentication through the rest five determinants; that is, regulatory framework, authentication of FinTech companies, customer acquisition, data reliability, and loan recovery) between the world studies on the banks’ motivation and what is in the respondent banks' responses in this study. Hence, banks in Bangladesh added more authentication issues to the common motives of bankers to work with FinTech firms for debt finance.

CHAPTER 7

PROSPECTS AND CHALLENGES

7.0 Introduction

This chapter showcases the findings of another qualitative research, conducted by interviewing financial experts in the relevant field. The objective of this section is to assess regulators' and other experts' opinions on the challenges and opportunities of bank-FinTech collaboration in managing debt finance for SEs. This chapter complemented both the earlier two research areas, where the quantitative research assessed the prospect of using FinTech by the SEs, or the demand side of bank finance, and the qualitative research explored the prospect of using FinTech primarily by the bankers, or the supply side of that bank finance. The qualitative research findings in this chapter serve specific objective 4 of the study, assessing views from completely different opinion polls of the regulators and other financial experts in the relevant field. The prime area of interest was how different phenomena of interest experienced and perceived the same issue (Côté & Turgeon, 2005) of debt financing solutions by bank-FinTech collaboration for SEs. The questions were whether the insights from this different poll match those of the demand and supply sides of debt finance, whether they also find the proposed bank-centric FinTech model promising, and if it is, what their main concerns in terms of prospects and challenges are. This chapter tried to provide these answers.

Section 7.1 examines whether the regulators and experts find this kind of collaboration prospective and, if yes, on what grounds they think likewise. Section 7.2 places the challenges according to the regulators and other experts from the academic and practical grounds in this regard.

7.1 The Prospects

According to the experts, the bank-FinTech business model in managing SEs debt finance will be prospective in Bangladesh based on the theme codes developed by the experts (Ref. Table 17) because it:

7.1.1 Arranges Collateral Free Real-Time Loan

When the experts were asked about their considerations for bank-FinTech collaboration for small loan finance, the following respondent answered:

"Collateral is the massive challenge for SME finance, and FinTech proposes alternatives to that collateral" (DGBIBM).

In this regard, the researcher interviewed a respondent from bKash, Bangladesh's largest MFS and most experienced FinTech, who worked in the Nano loan project under the bank-FinTech collaboration with the City Bank. He replied:

"There is no collateral issue in a nano loan, as these are very small-scale loans. People will apply digitally, and at the back end, credit scoring will be processed based on their last six months' top-up or transaction pattern as recorded at their bKash account, and the well-scored clients will be disbursed loans right at that moment in real-time" (FT1).

The respondent Deputy Governor of the Central Bank also added:

"Regarding the bank-FinTech collaboration, I would say this remains no longer in its piloting stage. Now it is a reality... They are for the needy segment that can't offer collateral for the loan and can get a small ticket loan while sitting at home. All they will have to do is have an eID and a mobile top-up history, which is completely a FinTech issue" (CBDG).

When asked about the business loan, the above respondent replied:

"Any person, including a business person, may get a loan through this program." (CBDG)

In question of business loan bKash also replied by saying:

"If we really want to address small-scale business people, having its technological readiness after launching the Nano loan project..., bKash can think forward" (FT1).

The researcher was also interviewing a brand new FinTech (since 2020) in the Bangladesh financial market that has come up with an online-based new business model to work with banks to facilitate personal and business loans. When the CEO was asked about their business model, he replied, saying:

"SMEs are not getting loans from the banks. Few customers are getting loans on average at 30/40 days. All these are our concerns... Hence, if a bank wants to give a seamless customer offering, that pushes the need for a digital lending platform. Here we are managing collateral-free business loans at a few clicks" (FT3).

From the above-mentioned responses, it can be inferred that the prospect of bank-FinTech collaboration to manage small business loans is not far behind its regulatory and other infrastructural support but is subject to a little more exploration. Rather, the experts are defining this as a core ground for FinTech in managing debt and being prospective in any market—both developed and emerging. And despite all the challenges rendered toward bank-FinTech collaboration in managing debt finance for SEs, FinTech firms' offerings of the collateral-free real-time loan alone would make it sustainable with omnipotence.

7.1.2 Ensures Financial Inclusion

In an emerging country like Bangladesh, extended financial inclusion is a true motivation to work with any sort of innovation. *Amidi, Massara, & Mialou (2014)* broadly define financial inclusion as *"an economic state where individuals and firms are not denied access to basic financial services based on motivations other than efficiency criteria,"* whereby Kempson, Whyley, Caskey, & Collard (2000) earlier identified the lack of access to financial services as one of the core elements of social exclusion. The financial experts of Bangladesh are more concerned about greater financial inclusion since it has been widely studied and documented that re-designing the financial markets to ensure greater financial inclusion for the financially excluded groups is one of the major issues towards attaining the SDGs (Sustainable Development Goals) in the country. In this research part also, the respondent experts appeared to be apprehending the financial inclusion motive of the proposition of using FinTech in a bank- FinTech collaboration set up for bank finance to the SEs. Like, the following respondents viewed the issue in a way:

“In conformity with the proposition banks will act as lending partners and FinTech as their technical partners as a trusted third party, like outsourcing. As banks are unable to include the last mile of prospective borrower enterprise due to high administrative costs and other factors, I found the business model in the proposition as prospective” (PBIBM).

In his further discussion, the expert in bank management also added:

“According to BBS, 8.07 percent own small, and 0.73 percent own medium businesses out of the total registered number of businesses in Bangladesh. Again, in employment (regular, casual, seasonal) generation SE is far ahead of large enterprises even. Thereupon, in terms of inclusion and poverty reduction, a larger number of people can be served by attending SEs” (PBIBM).

Other experts also found the model prospective from a financial inclusion point of view.

“In our financial market, credit supply is much lower than the size of the total loan market. Their FinTech applications can unquestionably extend financial inclusion” (FBFF).

Instances may include the reach of **ShopUp** in debt financing. The vision of the company is 'value addition through aggregation' There are over five million entrepreneurs who are currently sourcing from ShopUp. In general, previously, these entrepreneurs were used to sourcing on their own from suppliers. The following statement by the respondent regulator, the central bank, can also be presented as another instance indicating how the more unbanked people can be brought under banking services through FinTech applications.

“In the discussion of making it all-inclusive, it is found that, compared to the banked people, we have many times more mobile operators. In contrast, a large number of people did not have a bank account but did have a mobile phone. Hence, we seized the opportunity to incorporate financial services through these mobile-operated accounts. We started with MFS, where one could transfer funds, make payments, and have other financial services and thus be brought into the banking channels” (CBRFFO).

The respondent regulator also added, *“We have many times more mobile operators. A large number of people didn't have a bank account but a mobile. Therefore, we took the opportunity to incorporate financial services through these mobile-operated accounts. We started MFS, wherefrom one could transfer funds, make payments, and have other financial services and thus be brought into the banking channels” (CBRFFO).*

The contents above are self-explanatory. That shows how the experts viewed FinTech's involvement with the country's banking system as one of the most prominent means to achieve the large financial inclusion sentiment. This indicates a major factor in the prospects of bank-FinTech collaboration here in Bangladesh.

7.1.3 Gives Comfort to Banks

According to the experts, leveraging FinTech with the purpose of managing debt finance in banks for SEs has a bundle of prospects for one more reason. That is, it can be designed with the deliberate aim of bringing comfort to the banks through the initiation of higher technology. A respondent expert depicts:

"Banks have their own judgments. SEs are comparatively more vulnerable sector, their sock absorption capacity is less, costs are high; less collateral, don't have structured financial data, are heterogeneous in nature, and entry-exit barriers are low...Clearly, there should be some alternative channels that will deliberately reduce such hassles for banks" (PBIBM).

While discussing, other experts are also found to join the fray as well.

"If FinTech can give enough confidence with the proper credit assessment based on tech-based data in addition to conventional data sources, it will make our banking life much easier. At a lower cost, a high-profit margin may occur" (CBSMEH).

The findings of the research work revealed a wide range of other opinions in the same direction. Indeed, noexperts hold a contrary opinion. Instead, it has already been broadly studied and documented in the literature (described in this study in Sections 2.5.2, 2.5.3 and 2.6.3). Therefore, this research work finds the respondent experts' views in line with the study of Romanova et al. (2016). In their study, they showed that by using technologies like artificial intelligence, machine learning, Blockchain, language processing, and application programming interfaces, FinTech offers highly automated services like gathering and processing clients' data with the strong involvement of connectivity. Buchak et al. (2018) showed that providing convenience and personalizing offerings, even requiring less input, is another reason for FinTech disruption. Zalan & Toufaily (2017) also exposed earlier how this use of recent technology enables FinTech to provide the most cost-efficient services. Indeed, banks and FinTech firms can complement each other's strengths by working collaboratively, according to Dunkley (2016),

Icar (2016) fetched evidence of more and more bank-fintech collaboration cases. This way, as FinTech has the ability to bring comfort to banks, it might have the prospect of dwelling in the same financial market as the banks. It can confidently be inferred from the literature brought to bear and from this interview as well.

7.1.4 Supports Banks' Sustaining

Partnering with FinTech in the loan business is becoming increasingly important, not only for bankers' comfort but also for their survival.

"...Rather, I would add, if we want to bring more unbanked people under bank finance, there is no substitute for the bank-FinTech collaboration. Otherwise, banks themselves will lose a big customer base... Foreign companies like Alipay, Ant Financial are getting interested in coming and doing business in the Bangladesh market. Clearly, if banks do not grab this market, they will simply lose it" (GMSMEF).

Although many of the experts interviewed did not bring up the debate above, there was no scope left to overlook the issue from bankers and the experts point of view. This observation is found in parallel to the study of Gomber et al. (2018) (see chapter 2.6.3), where the authors showed how **GAFAA** (Google, Apple, Facebook, Amazon, and Alibaba) like TechFin or BigTechs, started to offer targeted financial services provided earlier by the contemporary banks and captured the market in developed societies through their splendid capital, enough experience, an unlimited customer base, vast customer data, and the ability to analyze this data.

Here in Bangladesh, this is the case with **ShopUp**. Although BRAC Bank started offering instant lending at a near-zero administrative cost to the small business client base of ShopUp, all of their debt financing is not managed by the banks alone. They are also working with other lending partners like NBFIs, development agencies, and FDIs, along with banks. Its funding to start-ups amounts was \$113 million only in 2021 up to September according to data from LightCastle Partners, among which \$109 million came from foreign sources. For instance, it received Series A funding from Flourish Ventures, Sequoia Capital India, and VEON Ventures; the largest Series B funding from Peter Thiel (the co-founder of PayPal), Valar Ventures of the USA, and Prosus Ventures; a Series B extension from Tiger Global, and many others. Coupled with all of the rounds, ShopUp has raised more than \$200 million in

2022 up to July, the highest investment any Bangladeshi startup has ever received (The Daily Star, September 7, 2021; The Financial Express, June 29, 2022; The Financial Express, July 2, 2022). Thus, FDIs have already undertaken a major chunk of fund investment, far more than banks.

Sustainability is being questioned for another factor also, as the following respondents added:

"Before these days, banks' spreads (profit margins) ranged from 5 to 6 percent, but now the loan interest rate is fixed for all businesses, hence how can you have a spread in the high-cost, low-margin lending to small businesses? If a 5 lac Tk loan supervision involves one officer and a Taka 5 crore loan involves the same, why will banks go for these not viable projects" (DMD2)?

The representative from the SME Foundation of Bangladesh further added to this:

"Now, at a flat 9percent rate, banks must operate at least at a margin of 2 to 3 percent. In large loan processing, a 2 to 3 percent spread is acceptable, but in small loans, even a higher rate is not that profitable... Given this, if banks can't lower operating costs through tech-based or other solutions, they can be unable to sustain even" (GMSMEF).

It indicates that the alignment of banks with FinTech firms to make their loan business more successful is becoming a necessity rather than merely being prospective. This discussion further leads to the research work in the given perspective on how FinTech companies' involvement can have the ability to cut the lending cost at a required level and is put in the recommendation sections of the policy implications.

7.1.5. Adaptable to the Present Regulatory Base

In this regard, the researcher reviewed and forwarded to the regulators the findings from the bankers' perspective on the requirements of a regulatory framework regarding necessary settlements in a bank-FinTech collaboration for managing debt finance. Overall, theregulators responded positively to this query.

"Yes, the regulatory framework is needed, and Bangladesh Bank is resolute "(CBBRPD).

Before that, the researcher was interviewing one of the respondents from the RFFO office of Bangladesh Bank. The respondent shared:

"Now, when a new concept related to FinTech comes, RFFO sees it on a primary basis, in needed and feasible cases, sends it for trial and error under a pilot run, gives a NOC for commercial launching on successful pilot run, and RFFO has the provision to give recommendations to BRPD for policy execution where needed " (CBRFFO).

This is the whole process currently in practice at Bangladesh Bank. According to this executive of the central bank, this is to understand that all countries go for these innovative issues in a customized way, in line with their own regulatory base or environment and different forms of customer need, and thus give a country-specific model (like the UK went in a more conservative way in terms of regulation enactment than the USA). Regarding the BD FinTech market as well, the market is dynamic and evolves fast. The regulators are to continuously respond to the needs of the time and adjust to market demand and end users' actual needs. Thereupon, future market prediction is tough. To them, giving a single 'static regulatory framework' for a particular single model may become invalid, especially for the market's evolution in terms of FinTech-related issues. The above executive was discussing further:

"...even then, if someone can come up with such a big idea covering that much business, market, and public interest that we feel a new policy can make this large business work smoothly, then we are ready to change or bring any sort of fixed policy issue into collaboration with BRPD." (CBRFFO)

While forwarded to the BRPD dept. of Bangladesh Bank, they continued the issue, adding:

"In relevant cases, on the basis of RFFO office findings and recommendations, BRPD is all set to take the necessary steps, basically, on the basis of 'learning by doing' from the RFFO or Sandbox" (CBBRPD).

According to this respondent, worldwide, the process comes across this way. Without learning in depth from Sandbox experience, facing problems, particular solutions and related regulations can't come up. In the given problems, the regulators use to learn who is to bear what responsibility, or, in another case, perhaps a single regulation from the authorities will suffice to achieve the desired result. In these cases, BB can apply rational solutions on an individual basis. Again, to him, until the present time, the authorities are not given enough

change over time as the RFFO office has been opened at the end of 2019. BRPD and RFFO have only been working together or interacting for less than a year. Lastly, where necessary, the Bangladesh Bank is ready to take the initiative on necessary regulations or policy execution on a rational basis. The above respondent added further:

"When the banking sector reform started in 1989, many new initiatives of the Bangladesh Bank contributed to it. Today we are passing through another transition period only for the FinTech revolution, for which we are getting ready, learning from doing, and certainly will put our utmost effort into making the system smooth through policy execution" (CBBRPD).

Correspondingly, the regulators' viewpoint on the prevailing regulatory landscape can be summed up with the comment by the respondent Deputy Governor of the Central Bank:

"If it gets necessary on rational grounds, on the basis of findings, Bangladesh Bank will definitely take initiatives through regulations or policy execution " (CBDG).

The above finding is pertinent to the statement of the FCA (Financial Conduct Authority of Banks for International Settlement, BIS) on Regulatory Sandbox applications that a Sandbox intends to arrange regulator-innovators' meetings, distinguish the regulatory barriers faced by the businesses while testing new ideas, and then see how and to what extent the barriers can be lowered and thus facilitate mutual learning by doing toward policy development (Regulatory Sandbox, 2015).

7.1.6 Resilient to the Present FinTech Ecosystem

Unquestionably, one of the most prominent factors for FinTech to be prospective in arranging debt finance for SEs with banks is the prevailing ecosystem relevant to it. To this study, it is high time to start with the proposed business model where a bank (lending partner) will collaborate with a FinTech (technical partner) initiating alternative data sources, Artificial Intelligence (AI), Machine Learning (ML), Blockchain (DLT), Application Programming Interface (API) like technologies in managing collateral free real-time debt finance at clicks for SEs. This is because, for this study, meanwhile a FinTech-friendly eco-system has been established here in Bangladesh. The study of Bangladesh's current financial context, as discussed with elaboration in Section 2.7, and its current relevant regulatory set-up, as described in Chapter 4, supports the findings. In addition to these, this section adds the

concurrence of financial experts. In their following statements, they clarified and added more aspects to these findings:

"The permission for Nano loan to be turned on was given from my desk. We put it to the test and found it possible. We gave the condition that the lending rate couldn't be increased for the end users because of FinTech charge additions. Thus the bank could offer a loan at the desired rate managing to process within five minutes with a few clicks. Now it's no longer a fallacy. It is happening" (CBDG).

Thus, the regulatory bodies themselves are found well equipped and sensibly concerned about the application of FinTech in lending besides its payment applications in banking. Another respondent from the regulatory authority added, saying that

"We are having a demand transform from 'access to payment' to 'access to finance'. Our MFI and agent banking guidelines are being practiced in their second version. DFS is on an increasingly comprehensive trend. And we firmly believe that should be the trend. In terms of FinTech, too, the market is rapidly evolving" (CBRFFO).

While regulators were reassuring about the prevalence of a friendly environment here in Bangladesh for the firms dedicated to FinTech credit in alliance with banks, other experts also found it evident. A few banks and FinTech companies involved in collaboration for debt finance in pilot projects are morally and, to a large extent, technically ready to continue working on the trend they experienced. While interviewing such a bank, the following views regarding the FinTechs' further implications were shared:

" bank-FinTech collaboration is now an appreciated model in many parts of the world. Expertise in developing different app-based services has also been developed here in Bangladesh. "From our part, we worked with ShopUp, recently signed Sheba XYZ, and are in discussion with Dana FinTech, whose I-farmer products we chose most" (DMD3).

On other hand, experienced FinTech firms are also found to work further.

"For launching the Nano Credit project, the bank is already integrated with us; the groundwork, including the bank's and our technological readiness and sharing technological advancement in between like API-all, is done. After this, if we really want to address small-scale business people, with this technological readiness, BKash can think forward" (FT1).

But perhaps the most clarified explanation regarding the prospective success of FinTech credit was depicted by the following respondent experts:

"The prospects of the proposition are ample. Firstly, because financial literacy has been on a sharply increasing trend following the initiatives from related ministries and the Bangladesh Bank since the last decade, and Secondly, for different DFS and MFS applications, we are well ahead in digital payment. Clearly, it's a ready market to have financing through the same channels" (DGBIBM).

The respondent Deputy Governor to the Central Bank added-

"Since we have successfully tested pilot projects, proficiency has grown in this field, and using that experience, the central bank is interested in working further on bank-FinTech collaboration initiatives" (CBDG).

This study started with a broad research question regarding the future prospects of a bank-centric FinTech model with a lending aspect here in Bangladesh for SEs. Besides other empirical findings, the regulators and industry experts were found to cite the above-mentioned interesting and encouraging findings and observations. This demonstrates that leveraging FinTech to enhance access to finance for SEs is a prospective phenomenon in the Bangladesh context from the regulators and experts point of view as well.

7.2 Major Challenges

The experts were also asked about challenges they felt needed to be addressed further, despite the prospects of the proposed bank-FinTech collaboration for managing debt finance for SEs. They focused on the following issues in this regard:

7.2.1 Lack of Adequacy and Authenticity of Data

Though the alternative data sources are said to be added to the conventional financial data of the banks to assess a client's creditworthiness, some experts raise questions about the attainment of data in its required quantity and essential quality, i.e., with righteous adequacy and authenticity, respectively. Indeed, machine learning (ML) and artificial intelligence (AI) use nothing but algorithms where big data is fed. These are fed to have a calculated outcome through given programming, thus producing scored or weighted information on the basis of what one can be judgmental to consider a business loanable. Regarding this, an expert stated:

"...but to see whether they will be able to feed enough data into their systems." (DGBIBM)

Where the above respondent pointed to the inevitability of adequate data collection, the following respondents were talking about the authenticity or reliability of the fed data.

"If FinTech can't do the customer acquisition and credit scoring properly, proper financing under FinTech is a long way off. Covering different variables in lending with different parameters is difficult. Again, the parameters programmed will need continuous change as the industry's features change over time" (SMEH1).

Another banker, experiencing the BRAC bank-ShopUP project of debt finance to SEs using FinTech, shared the work perspective of dealing with collected data in the following way:

"In my experience working with FinTech companies, they are too technology-focused but not customer-focused or concerned with bank compliance issues. On the other hand, banks are more compliance-focused or risk-averse but do not have that much technical know-how or don't know what technology will truly serve the customer" (DMD3).

Eventually, the research found that data was a prime concern of the bankers as well (ref. Section 6.2.5). In upcoming chapters, this study is deliberately devoted to finding out and recommending required policy measures based on a careful examination of the default issue with the help of Fintech Credit's cutting-edge features in managing loan defaults.

7.2.2 Challenges in Loan Pricing

The increased service charges for the added services by the FinTech firms were obviously a concern to the stakeholders. No exception was made there either. Some experts raised the issue as a challenge to the end users to grab the alternative lending model.

"The first challenge for me is the loan pricing. It's apparent to be high in this business model as FinTech charges will be added in addition to the bank charges. Again, the total dividend charge between banks and FinTech firms is another issue" (DGBIBM).

But, within the interview session itself, the study found an appreciable resolution that is being instructed by the regulatory authority and, accordingly, being practiced right now.

"Since FinTech is working as an intermediary in the middle, they have an issue with loan pricing that is supposed to be higher when a charge is added. However, in the City Bank case, I stipulated that the rate could not be raised at the end level" (CBDG).

In support of this, this study went further in finding ways to reduce the cost, as the theoretical study on FinTech benefits supported the feasibility of cost and price minimization (please refer to Point 4 of Section 2.5.2). Later, the outcomes are added to the policy recommendations in the study (reference section 8.1.3).

7.2.3 Challenges in Loan Recovery

It could easily be inferred that the delegation of loan recovery responsibility would be met with great apprehension. Between banks and FinTech what would be the settlement way in recovery and loan default cases, were also major concerns to the stakeholders including experts. Section 6.2.7 also described loan recovery arrangements as a resistant determinant of bankers' motivation to work with FinTech in debt finance.

Following Usanti et al. (2020), the responsibilities of the debtors may not suddenly disappear under the legal context of the agreement and the collateral, thus any risk of loss or default exclusively belongs to the creditor banks (in the case where the FinTech lending firm is administering a bank). On the other hand, the Conduct of Business Sourcebook by FCA (COBS, n.d.) has prescribed specific recovery procedures to deal with a default of FinTech lending agreements (in case of a FinTech lending firm is administering P2P lending). But, undeniably, with no specific collateral as assurance, the position of creditor banks (in this case, represented by an administrator FinTech firm) will be very risky. It is definitely prejudicial for the creditor, as they do not exactly know the debtor's relevant details and credit worthiness. Some interviewed experts also stated the recovery as subject to resolutions.

"FinTech will have to come up with a clear determination of what their role will be to recover the defaulted funds." (CBFIDH)

It indicates that being persuaded from both the bankers' and the experts' points of view the unsolved question regarding which authority will take the loan recovery responsibility to what extent was subject to specific policy recommendations.

7.2.4 Inadequate Legal Support:

In case the debtor is considered to default on credit payment, the creditor may take legal action based on the applied law by suing the defaulting debtor in a public court. In connection with this, Bangladesh's legal system is not digitally application-friendly yet. This through a huge challenge.

"... more important are the legal basis and the regulatory framework. We need a change in the courts of our country from a legal standpoint. Bankers ask customers to sign a check, with which the bank will file a lawsuit in money loan court in the event of default. For this, banks have to deal with hard copies even in the digital case. Yet no court in Bangladesh accepts virtual signs, statements, or anything." (SMEH1)

While contextualizing the findings, the statements of the interviewees in this qualitative research conducted both with the bankers (to attain specific objective 3) and with the regulators and experts (to attain specific objective 4) are indeed self-explanatory. No such theoretical base or work in literature from Bangladesh's perspective had the scope to be brought forward as the implication of digital lending by the banks through FinTech is in its initial stage in the country. The issue of accepting virtual or digital documents as legal documents and executing laws thereby is found to be both required and viable. The above respondent also found adding:

"One solution could be that all the digital documents have to be archived centrally. There is actually no work going on in this place. To leverage FinTech, one must now provide an end-to-end solution. Technical and manual processes cannot go side by side" (SMEH1).

7.2.5 Present Transition Period

According to the experts and some bankers as well, Bangladesh is passing through a transition period regarding technical upliftment and its adoptions. The last one or two decades have seen a blend of traditional and, on the other hand, new tech-based and innovative institutes; business models; recent penetration of the internet (since 2013) and mobile services in banking; implantation of the fiber optic just before that; inhabitants ranging from adults of the non-digital era and, on the other hand, numbers of tech-savvy millennials; the existence of non-beatable FinTech like **bKash and Grameen Phone**; and on other hand company like **Evaly**

that got involved in scams. All these happenings make people not always ready to adopt any technology at any moment. Thus gaining and holding public confidence is a big issue to be addressed. For this, the adoption of any technology, along with new innovations, requires sometime. To the experts the security and comfort must come first for any service to be well received by the people. Respondents reacted in the following way:

"The end-user should be the ultimate beneficiary." (DMD3).

Thus, in order to gain enough public confidence through the mainstreaming of the business model with full security and comfort, the implications of FinTech applications in the lending aspects of the country's financial services industry might need some time.

7.2.6 Challenges in Mainstreaming the Proposition in the Industry

Another challenge was found in the discussion with the expert, as in the question of collaborating with FinTech for small enterprise loan financing, all the banks' participation does not appear to be guaranteed. According to a respondent:

"From the business portfolio, it is apparent that, except for some third- or fourth-generation banks like BRAC, One Bank, and Bank Asia, most banks, especially traditional first- or second-generation banks, are not SME-friendly (GMSMEF)."

The prospect of leveraging FinTech from the supply side of debt finance to the SEs may thus call into question its mainstreaming in the banking industry as a whole in the near future.

7.5 Chapter Summary

The objective of this chapter is to understand whether, besides the demand and supply sides of the debt finance discussed in the earlier chapters' references, the regulators and relevant other financial experts of the country also find the bank-centric FinTech model for managing debt to the SEs a prospective proposition in the country's context. For that, the research work arranged expert interviews with a good pool of regulators, academics, and practitioners (both banks and FinTech companies with experience working in collaboration in managing debt). Regulators (the Central Bank), specialized academic institutions (BIBM), a government foundation (the SME Foundation), a development agency (the World Bank), a forum (the Bangladesh FinTech Forum), and practitioners (the City Bank-bKash, BRAC Bank-ShopUp, Dana FinTech) were reached. The objective was attained at a time when,

1. The experts found it prospective in the context of the country. To them, the proposition will ensure collateral-free real-time loans, financial inclusion, comfort for banks, support for banks' sustainability, and is in line with the country's present regulatory base and FinTech ecosystem.
2. The interviewees also came up with the challenges to be addressed. To them, these were the authenticity and adequacy of data, the loan pricing and recovery, the prevalence of the present transition period in Bangladesh, and the challenge of its mainstreaming.

Along with the earlier findings on the country's present regulatory base to enable a FinTech environment and enact bank lending through FinTech, the ability to enhance access to finance by the use of FinTech in the Bangladesh context, the market review, and the bankers' or supply-side view of adopting FinTech as a technical partner to the lending business, this chapter added that the experts and regulators also found the propositions brought by the study prospective for the country. They also suggested challenge areas in its execution, all of which, along with others, are addressed in the next recommendation session (Ref. Section 8.1) of the study on policy requirements.

CHAPTER 8

POLICY IMPLICATIONS AND CONCLUDING REMARKS

8.0 Introduction

This section narrates the second major part of the broad research objective, which puts forward recommendations for required policy measures for leveraging FinTech to enhance access to finance for SEs here in Bangladesh. To accomplish it, specific objective 5 of the study is set to have the measures required to provide an enabling environment for FinTech collaboration and further move toward a bank-centric FinTech model. Based on the overall study, including the literature review, current FinTech regulations in Bangladesh, findings from the questionnaire survey, in-depth interviews of bankers, regulators, relevant academics and practitioners; these policy measures are recommended and depicted in Section 8.1, with a particular focus on the regulatory and legal areas. Indeed, it restates the empirical findings in order to provide a comprehensive inference and conclusion from the study, and the implications brought by the study and future research aspects that can be pursued further.

8.1 Required Policy Measures

8.1.1 Policy Guidelines for FinTech Companies

There are clear guidelines for FinTech companies' formulation. Through interviewing the regulatory authorities and consulting the documents, this study found that, in general parlance, global FinTech companies are registered and licensed. For instance, as of September 30, 2019, all 127 FinTech lending companies in Indonesia, according to OJK, the Financial Services Authority of Indonesia, were registered and licensed under the country's Financial Service Authority Regulation No. 77/POJK.01/2016 (POJK 77/2016). They are the incorporated companies that have been registered before implementing their activities and, in addition, have a service license from the Financial Service Authority (Usanti et al., 2020). In case of Bangladesh also, one of the respondent regulators confirmed that:

"Rather than simply being an online platform, FinTech firms are to emerge through the country's company law. Then, based on a successful test run and other bank requirements, a

NOC or license is to obtain from Bangladesh Bank to launch a new financial product or service or to work with a new business model” (CBDG).

Therefore, all the bankers’ undue concerns about the ‘authentication of FinTech companies’ (reference section 6.2.2) can be invalidated.

Regarding the regulatory framework, from the regulator experts’ interview (reference section 7.1.5) on the prospects of a bank-centric FinTech model in debt finance for SEs, the interview of the bankers on determinants of motivation to work in collaboration with FinTech firms (reference section 6.2.1), and the regulatory responses made to date in Bangladesh (reference section 4.4), it can certainly be argued that the bankers, with an approach of ‘let’s see what regulatory framework does come from Bangladesh bank’, would rather leave scope to be in trend. These observations drive recommendations 1 and 2, which are depicted in this chapter.

8.1.2 Regarding Data Adequacy and Authenticity

Both respondent groups in the two qualitative research expressed significant concern about data management issues. Here, basically, two sides of data management were focused on: data adequacy and then its authentication.

Firstly, in data adequacy, only experts are found to raise the questions. While exploring real-world practices, it is found that the world-renowned FinTech, **On Deck**, requires only the history of a 1-year business transaction with a given annual sales level or a business credit score of over 500 points to successfully obtain the loan (Prakash, 2016).

The implications of these features in terms of adequate data collection and overall loan processes by the FinTech firms here in Bangladesh were tried to be assessed from a few cases. **ShopUp**, a renowned FinTech firm in Bangladesh, is dealing with managing small business loans in collaboration with their ‘lending partner’ banks, nonbanks, and other local and foreign direct investors on the basis of scorecards made on transactions in accounts maintained with them online on conditions like both the buyer and seller account must be maintained with them and a given number of business deal and transaction history should be there. It recommends enterprises to the banks for loans after analyzing over 2,000 data points using a unique algorithm to determine their capital needs and repayment capability (ShopUp, 2019). **Dana FinTech**, another renowned FinTech firm, shows they are assessing an enterprise as loanable

using at least 6,000 data points that are manageable from Bangladesh's perspective using demographic, documentary, transactional, data from partners, device data, financials, and psychometric assessment (from the respective firm's websites).

Thus, from an in-depth search of FinTech cutting-edge features, relevant world practices, and practices followed in pilot projects (the City Bank-bKash and the BRAC Bank-ShopUp cases) of bank FinTech collaboration in debt management in Bangladesh and the above cases in the Bangladesh context, it can easily be contended that managing adequate data from conventional and innovative alternative sources to disburse small ticket loans through FinTech firms are now in practice both in the developed and developing countries including Bangladesh. Sharing the facts and figures in this regards, with the experts concerned won a great deal of appreciation from them. They said,

"That is really impressive. From my work experience and IT-related studies, I made an insightful observation that the talented younger generations have a lot of capabilities. But they have to testify to their skills or expertise before the approving authority or a committee of experts, where needed, prior to coming on the market" (DGBIBM).

Secondly, with regard to the questions of data authenticity issues both the bankers and the experts are found concerned. But interestingly, that apprehension was not part of the global literature. This was because availability, adequacy, and the authenticity of fed data didn't give birth to unapproachable grounds to work within a developed infrastructure setup, but rather is upsetting in an emerging country like ours. Indeed, the quality of data in any developing or even developed country's context can be called into question from a variety of socioeconomic, infrastructural, cultural, skill, or technical perspectives. But to another set of experts, on the other hand, FinTech means working with alternative data in addition to the long-used conventional data, and, based on conventional data alone, the SME loan default rate in Bangladesh is far less (only 2 percent from official statistics) than large loans (Shah, 2014). Accordingly, SME loan default is not found as one of the major SME finance constraints in the relevant literature in the Bangladesh context. Furthermore, the cutting-edge features of FinTech credit itself can validate its authentication in a way that the scoring is calculated on the basis of the alternative (transactional data like wallet transactions, bills, EMI payments, e-commerce shopping, card transactions, ATM, bar code and POS transactions, FinTech

platform transactions, and any other digital payments; demographic data like profile, family, lifestyle, profession, residence; phone device data such as phone usage, phone location, call frequency, call location; psychometric data; and financials such as income, expense, and credit) data (ITUFGDFS, 2016), in addition to the previously conventional (eID, trade license, picture verifications, bank account transactions) data for a small ticket loan (well proportionate to yearly transactions and even a bill amount in applicable cases such as in supply chain finance). This provides the basis for the data authentication in these FinTech credit models. Certainly, from all the studies, experience, and discussion above, this study did not find it to be a big policy issue, except for forming a committee if the policy executors find it necessary. However, the study found no provision for such a committee anywhere else.

8.1.3 Loan Pricing or the Cost of the Loan

Loan pricing is given significant weight in words by both bankers and experts, indicating their concern about the issue. Although the added service provided by the FinTech firms as intermediaries is supposed to add additional charges, this is not the case, as is evident from the earlier study. This can be elaborated through **Table 30** below.

Table 30: A Basis for Cost Analysis

(all figures in percent)

Bank's loan pricing	Apparent charges¹	Under Bank Fintech lending model actual charges can be
1. SMART rate ²	7.14	7.14
2. Bank's Margin ³	3.00	0
3. CSME additional fee ⁴	1.00	1.00
Sub-total	11.14	-
FinTech firm's loan pricing	Apparent charge	The actual charges can be
4. Fixed and Operating costs per loan ⁵ (the cost of acquisition, alternative data collection, scoring, tracking)	2 (1.5-2.5)	0.50 ⁷
5. Margin ⁶	2 (1.5-2.5)	1.5 ⁸
Grand Total	15.14	10.14
	(Bank-FinTech charge that is apparent)	(Total Bank-FinTech charge in the proposed business model)

Notes

¹. Adding the additional charges over bank charges for FinTech service. The charges are apparent from the point of interviewees concern, set for FinTech charge on the basis of bank charges.

². SMART rate declared from BB for the latest month of September, 2023 following BRPD circular no. 9, dated 19.06.2023 and Monetary Policy Statement July- December 2023 by BB

³. *ibid.*

⁴. *ibid.*

5. Average value of given range, where the range is determined on the basis of banks' fixed and operating cost per loan
6. In compare to banks' margin of 3.00 percent, FinTech are supposed to charge at least 2.00 percent.
7. Firstly. As FinTech neither collect data in a traditional way nor employ office and employees as banks do, but rather collect tech-based (data mining, machine learning, Blockchain) alternative and automated data at clicks, its fixed and operating cost is near zero (ref. point 4 of section 2.5.2). Secondly, For the 'economies of scale' (ref. section 6.2.6), the FinTech firms get specialized in processing these loans at clicks while dealing with thousands of bank accounts of numbers of banks. For instance, while interviewing the *ShopUp*, the FinTech that has experience in bank- FinTech collaboration in debt finance to the SEs, regarding their business model, they shared that:

"ShopUp work with a vision of 'value addition through aggregation.' Under this set up, there are over five million entrepreneurs... Even after ShopUp's commission, much lower prices are enjoyed by SEs while dealing with businesses through this e-commerce platform. This similar model is implemented in partnership with a good number of banks" (FT2).

8. The agreeable margin, based on interview held with Dana FinTech and ShopUp

Table 30 is self-explanatory. The findings from the Table confirm that, although the added service provided by the FinTech firms as intermediaries is supposed to add additional charges over the bank charges and appears to be 15.14 percent in total, this is not the case; rather, it can be a total of 10.14 percent on justified grounds. Further, the total bank FinTech charge (10.14 percent) becomes even less than the present charges of 11.14 percent (estimated) claimed by the bank alone. Thus, as the model is able to drastically reduce both the bank's and the FinTech firm's costs, it can charge clients **at the lowest possible rate ever**. In this regard, this study places recommendation 3 in the later part of the chapter.

8.1.4 Limit of a Momentary Balance and the Recovery of the Loan

The limit of a momentary balance is given by the regulatory authority to the personal loan, Nano credit, brought to the industry by the City Bank-bKash collaboration. As it is about dealing with a digital account and is designed for an unbanked person (in many cases) the same provision should be there in case FinTech arranges bank funds for SEs.

Figure 2 (ref. section 2.5.3) also showed the cutting-edge features themselves do replace the associated high risk of traditional lending with a ‘small ticket loan’ given for the short term. ShopUp, for example, provides a small business in supply chain finance with a specific proportion (say, 60–70 percent) of a specific bill amount. On payment of the bill by the buyer in his account maintained on the same platform, the funds are adjusted first to the ShopUp account and then to the account of the supplier.

This sort of customized loan meets the supplier’s immediate needs, as opposed to a non-customized loan through traditional lending. A loan may become non-customized when the bulk of the money is made available in a long-term loan (OD, CC, or time loan for 6 months to one, two, or three years) irrespective of the business’s need. These sorts of loans fall under the risk of loan diversification and default. This is substituted in FinTech credit through a small ticket loan disbursed on a single deal basis. In this setup, a short-term loan based on the business’s needs is arranged only on the adjustment of an earlier deal or loan. Moreover, there might have been some other internal arrangements by FinTech, such as an arrangement of equal monthly installments for the highest tenor of a three-month loan, message alerts, and others. Thus the model (with customized-small ticket-short term-single deal basis-and with other internal arrangements) itself is well designed to be adjusted or recovered. This way, fund diversification and loan default can easily be checked many more times than in traditional lending.

A few more points came up in the discussion of loan repayment in the interactions with the bankers and relevant industry experts.

i. The loan recovery issue is found to vary between FinTechs' arrangements and offerings. In one hand, **ShopUP** arranges for loan adjustment through account transactions but takes no liability for loan recovery in default cases. The credit risk lies completely with the banks. On the other hand, **Dana FinTech** is offering to take on the responsibility of recovering the loan.

*"Of course, Dana will collect repayments and **will take responsibility**. For example, when banks refinance MFIs, they act as lending partners. There, all the responsibilities of recovery lie only with MFI. Here also, FinTech will go for three ways in recovery—using a collection team, third party involvement, or going for legal action"(FT3).*

ii. Another option proposed by Dana FinTech was that, in banking practice, banks don't file cases or sue the customers up to 2/3 lac Taka loans in most cases because it is financially and economically not viable and lastly the loan is rescheduled or written off. Hence, financing up to this amount can take place digitally with paperless arrangements (no documentation formalities for filing suit) if banks decide not to sue clients up to this limit.

iii. While sharing the determinants of motivation to work in collaboration with FinTech in debt finance for SEs, a respondent banker was proposing that *"if the FinTech companies take the NPL risk and loan recovery is ensured at least to an extent, then we will agree to work with them. Even up to a certain level, like up to 3 percent NPL (first loss condition at total loan outstanding), we may be ready to consider, beyond that the company will remain bound to repay. Again, we can share commission income (income from bank charges) with them as recovery cost"* (DMD2).

iv. Another proposition was, *"If the FinTech company also maintains a balance in the bank, then the bank will not be too concerned about this issue of credibility or loan recovery. The loan will be small and of low-risk. Both banks and FinTechs will work with a spread. To have this spread, the company has to make an investment in the bank. It will act as security money, too"* (EVP4).

Finally, the above study indicates that, though loan recovery is a primary issue on bankers' part, especially in an emerging country like Bangladesh, it has not yet been addressed through any specific policy measure. Accordingly, this study would endorse recommendations 4–6 in regard to loan recovery.

8.1.5 End to End Paperless Automated Solution

This refers to the automation of the entire loan origination process, including new customer acquisition (or onboarding), loan processing, monitoring, follow-up, repayment, and even after-loan services. According to the experts:

"Bank FinTech collaboration will work in a sustainable way if it can provide an end-to-end solution to their client base" (AMD).

"The bank-FinTech collaboration will be able to work in a sustainable way only if it can serve its client base with an end-to-end solution. Manual and automated systems cannot go together" (DMD3).

However, the following discussion shows the automation of the entire loan origination process in three main phases.

- **Automation of customer acquisition:**

Digital IDs are significant policy enablers as they enable governments and businesses to deliver digital services that increase financial inclusion by securing remote identification, authentication, and support for customers' due diligence via a digital channel. It is now successfully being used to biometrically identify and authenticate the unbanked population in a cost-efficient manner to provide access to online and mobile digital financial services.

In Bangladesh also, by dint of e-KYC, followed by e-KYC guidelines, January 2020 of Bangladesh Bank (ref. section 4.4), customers can now open accounts using a digital form, eID, and biometrics, facial, and optical character recognition technologies. Unquestionably, it has shortened the customer onboarding time to just five minutes ensuring, in addition, the remote account opening and verified cash transactions.

Given this facility, now the interviewees were talking about '*a central search engine*' where the centrally processed and preserved credentials and also lending-related data can be accessed with the assurance of validity by the relevant financial body. But Bangladesh still has only some CIB-based information here, and not everyone has access to it. Hence, automation of customer acquisition in a broader sense (more than eID) with data accuracy and validation and its digital access is a necessity.

The findings emerging from the documentary studies in connection with the matter reveal that this obstacle is also being appreciably abolished in the near future. The ICT Division of the GoB is currently putting into practice an Integrated Service Delivery Platform (ISDP) through which citizens' data will be collected just once using a single set of credentials over the course of their lifetimes, and will then be shared across all service-providing organizations and information systems via an identity hub or gateway that will enable authentication across multiple platforms (The Financial Express, September 23, 2021). To this study, the platform ISDP can serve as a central search engine, as said by the experts.

- **Automation in the loan process:**

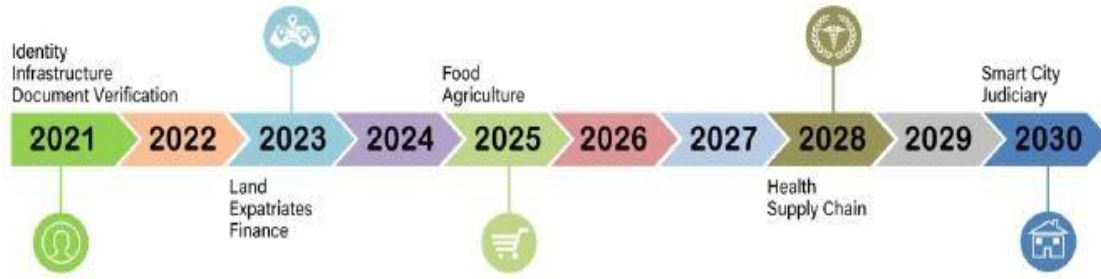
The lending products of **Nano Loan** (The City Bank-bKash), **eRin App** (Dhaka Bank-CASH Alliance FinTech of Bangladesh), **PrimeAgrim** (The Prime Bank-Swiss contact of Switzerland and a British tech firm, AGAM International), and **Digital Loan for Small Businesses** (by Dana FinTech) (The Business Standard, January 17, 2022) all have been processing digital small loans now a day in Bangladesh. The country's first-ever digital Nano loan, the City Bank-bKash collaboration, launched the collateral-free instant digital for bKash users after the successful completion of a one-year pilot project in December 2021 (New Age, Dec. 15, 2021). The smooth running of these lending processes is subject to detailed observation.

- **Automation in loan settlement:**

While interviewing, this was found to be the primary challenge the banks experienced in bank FinTech collaboration for debt finance (the City and BRAC Bank claimed to face more challenges in managing their digital loan services). They are not able to provide a complete end-to-end digital lending service because of a lack of automated loan settlement. They were sharing their experiences, saying:

"There remain more important things; that is our legal basis. When one doesn't repay a loan, we have to sign a check with which we can file a case. In digital cases, we also deal with the hard copies—the check and the documents—manually for security purposes. Yet no court in Bangladesh accepts virtual signs, statements, or anything. Hence, how can a person with complete digital validity benefit? We must provide an end-to-end solution. Technical and manual processes cannot be in a line " (SMEH1)

Therefore, towards ensuring an ‘end-to-end paperless automated solution’ in digital lending, one solution to the automation of loan settlement can be the digital documents are validated and archived centrally, allowing for easy access and acceptance of digital documents. In this regard, this study would refer once again to the tentative roadmap of the National Blockchain Strategy of Bangladesh (refer to Figure 9 and Table 20 for more details).



From the earlier Figure 9: A tentative roadmap of application domains of Blockchain in Bangladesh (National Blockchain Strategy: Bangladesh, March 2020) and,

from the earlier Table 20 Bank lending relevant application domain with use case is

Application Domain	Use- case
Judiciary Application Domain	Securing Digital Evidence

Source: National Blockchain Strategy: Bangladesh, March 2020.

The figure shows that 2030 is the tentative year when the use case of securing digital evidence under the Judiciary Application Domain can be Blockchain-based. This significantly indicates the governmental concern and awareness of the issue. Further, it can easily be argued that this digital finance relevant use case can also be established at an early time required to be adopted as the roadmap itself is a tentative example only. These interpretations drive recommendations 7–9 presented in this chapter.

8.1.6 Foreign Direct Investment (FDI)

From a conventional competitive point of view, FDI in local FinTech firms in the country is not appreciated. Rather, the investment interests of **AliPay** and **Ant Financial** are treated as detrimental to banks' expansion with FinTech (ref. section 7.1.4).

But there are findings from a different poll as well. Following that, as Bangladesh is not that advanced in advanced technology yet, government policy may encourage foreign tech companies to invest in the market. Local blockages should not be there. Regarding this, the respondent from BRAC bank was sharing the experience of bKash, the most prominent MFS and FinTech company in the country and a sister concern of the bank:

"We should know whether a particular app will be acceptable to the customer or not. A living example of this is bKash. When we first started bKash, it only transferred money. But this could not go that far. Then, when Alibaba⁹ got involved, they changed our mindset. They provided advisory services regarding operational, customer, profit-making, technical, and technological issues, and they invested in cutting-edge safety measures... Thus, a revolutionary change could come in bKash. Now the company has flawless records, is the lead MFS company, and is the only unicorn¹⁰ in Bangladesh" (DMD3).

Reviewing the views above, the study suggests recommendation 10.

8.1.7 Bangladesh Bank's Instruction to its Mainstreaming

From the experts' interview findings, the mainstreaming of bank-FinTech collaboration in the industry is found to be a challenge on its way to being accomplished. Whereas the motive of the study can be best explained in terms of an initiative to ensure access to finance, more financial inclusion for SEs, and thus to meet the ultimate SE finance gap.

The mainstreaming of the bank-FinTech collaboration model for managing debt for small businesses can be a prerequisite for this. In this connection, this study finds that providing Bangladesh Bank instructions is a good way to have them adopted by the banks. In this regard, recommendations 11 and 12 can be proposed.

⁹Alibaba-China's e-commerce and tech giant. ¹⁰ Unicorn-The term unicorn refers to a privately held startup company with a value of over \$1 billion.

8.1.8 Regarding Interoperability and API

According to financial experts, integrated system solutions, or interoperability, are required for the FinTech industry to grow at a much faster rate. For instance, in the payment system, users are able to transfer funds to all operators and banks free of charge (Islam, 2021). Again, in trade finance, a Blockchain network alone can establish interoperability throughout the systems—L/C contracts, orders, documentation, insurance, multimodal shipments, customs, and delivery—to improve accuracy, reduce end-to-end transaction time from 10–15 days to a few hours, and increase transparency.

However, as stated in section 4.4 under the open banking initiative, BB has initiated IDTP in January 2022. It will enable digital money transactions, e-commerce, m-commerce, bill payments, merchant payments, the exchange of remittances, machine-to-machine payments, and all other financial transactions, and between MFS and other Payment Service Providers (PSP). If a client holds several accounts with banks, PSPs, or MFS providers, they will not be required to register every account in the system. Only one account will need to be registered, and other accounts will be added automatically by the financial institutions by verifying the national identification cards of the clients (The Daily Star, November 22, 2021). However, right now (by June 2022), banks in Bangladesh are in the process of adopting IDTP (like inviting tenders for hardware and software support, and so on) based on Bangladesh Bank's instructions (ificbank, n.d.). Another instance of today's reach can be found in trade finance; the study discovered that Standard Chartered Bank executed the country's first Blockchain LC (ref. section 2.7.4) through **Contour**, a global bank network.

Another prominent application is application programming interfaces (API), a software intermediary that allows many platforms to share data. Open API-based integration with existing financial institutions allows FinTech to offer targeted financial products (such as digital lending in this case).

The previously mentioned IDTP platform is also designed with an API, the data-sharing tool. This can be seen as a replica of the Unified Payment Interface (UPI) formed by the National Payments Corporation of India (NPCI) in order to provide an instant real-time payment system for inter-bank peer-to-peer and person-to-merchant transactions. In a single month of August 2021, more than 3.5 billion transactions valued at over Rs. 639,000 crores were transacted under the UPI-based payment system (Islam, 2021). However, in this regard, Bangladesh is also expecting to reach its own edge. Recommendations 13 and 14 are suggestive here.

- ◆ Nevertheless, with the focus on the required policy measures in providing an enabling environment and further moving towards a bank-centric FinTech model for managing debt finance for the SEs, the study explored and brought forward the standpoints of all the stakeholders—SEs, bankers, regulators, and other financial experts—reviewed their current viewpoints, and presented the findings and recommendations on that. In light of all such matters, the study recommends:

1. It is rather the internal policy executors (primarily of the commercial banks) who are expected to be confident enough to collaborate with FinTech in various promising business models and come up in the market, where all regulatory support, regarding delegation of responsibilities, dispute settlement or any other issue, are evidenced to be in line with the regulatory authority part on eligible and needed grounds.

2. On the other hand, the regulatory body may consider observing, educating, and guiding all prospective stakeholders—bankers, FinTech companies, and relevant associations—to better assess risks and support FinTech-relevant operations via its platforms, such as the Digital Financial Service Lab (a joint initiative of Bangladesh Bank and a2i) or any other.

3. The regulatory authority may render a guideline in charging the SEs for managing debt finance by bank-FinTech collaboration, or it may impose a ‘set criteria’ to be filled up by the FinTech firms in applying for NOC from RFFO or to have the license and approval for its commercial launch from the central bank. The observations made in Table 30 above can be a ‘virtue-based approach’ to set cost on the set criteria.

4. There must be a limit for the highest momentary balance for a single small business loan (similar to the current single borrower limit ¹¹). The fixation of the highest momentary balance should not be left to the banks' and FinTechs' discretion or under their internal deal arrangements. And most importantly, there might be an online lending cap (like a percentile portion of a bank's capital) for all the banks.
5. The authorities may clearly delegate responsibilities to bankers and FinTech firms on the issue of recovery. Such a sensitive issue as loan repayment should not vary FinTech-wise at their discretion. A clear guideline, at least in terms of recovery, is needed.
6. The authorities may review the FinTech and the bankers' offerings on paperless lending, NPL risk sharing, or equity sharing issues as is mentioned in section 8.1.4
7. It is the financial regulatory body that is to push for the earlier implications of the use case of securing digital evidence under the Judiciary Application domain of the National Blockchain Strategy before 2030 on market demand and for further policy implications (if needed) from the national regulatory body.
8. For further advancement in the automation of customer acquisition, the ISDP platform should be constructed according to the needs of financial institutions where all the relevant institutions will be able to give input and have access to the preserved data- through data pull-push. The data content should include the client's financials, ID, lending-relevant information including CIB report, and other taxes, VAT, and payment updates that are more detailed than the present eID information. Again, the flexibility of the data platform should be incredibly strong, so that all the 62 banks of the country, NBFIS, FinTech, and other authorized financial institutions will have fast access to it.

¹¹ single borrowers limit- maximum payable amount to a single borrower at a time

9. Bangladesh Bank through its upcoming ISDP platform can also take the lead in other relevant Bangladesh Bank counterparts and other public-sector counterparts to operationalize the required infrastructural facilities. For instance, the platform can collaborate not only with eID issuing authorities but also with financial institutions, as stated in recommendation 8. Rather, it can collaborate with the Security Exchange Commission, the Bangladesh Telecommunication Regulatory Commission (BTRC), and the ICT-related regulators to better assess the risks and provide needed support for FinTech-friendly regulations (World Bank, 2019).

10. As the country will not be able to attain that much competency and maturity right now, the policy executors may encourage FDI investment to a limited extent (not to any global company), width (with a given maximum size of investment to refrain Bangladesh market penetration), and up to a certain span (say for next five or seven years) considering the initial stage of FinTech adoption.

11. There must be instructions for banks from Bangladesh Bank. Now, banks are found to invest more (10–30 percent) in capital markets for low-interest rates in loan businesses, being more dispersed from their main banking businesses. BB can instruct the banks to disburse through FinTech firms or by using mobile and internet banking. It can be 5–10 percent of the total loan portfolio of a bank (like it is 20 percent for SME lending following the Bangladesh Bank's rules) of total financing at initial attempts.

12. Bangladesh may also have a strategic and comprehensive vision and road map of bank-FinTech collaboration for debt financing for the next 5–10 years (say) in the backdrop of the Industrial Revolution (0.4), the changing competencies and choices of new customer segments like that of millennials, the customers' changed expectations, and the world market focus.

13. The regulatory authority can now impose a deadline for relevant institutions, including banks and FinTech, to adopt and join the IDTP platform (like Bangladesh Bank successfully pushed and activated the eKYC guidelines within December, 2020 being initiated just one year before in January, 2020; by all the BFIs, NBFIs, MFS, FinTech, and all other institutions regulated under Bangladesh Bank) with a specific focus on ensuring its fastest mainstreaming.

14. Although various national projects are taken with the application of API in Bangladesh. In their chapters, this study showed that the country doesn't have any regulatory mandate or given guidelines yet on API allegations. Another two areas in terms of new policy enactments or existing policy adjustments are cloud computing (CC) and biometric data (refer to Section 4.4

8.2 Concluding Remarks

Small enterprises have been a key source of economic growth in all economies (Beck, 2008). But lack of access to finance is found to be the biggest constraint to SME growth (AFI, 2019; Dinh et al., 2010) and that of SEs. In the 1980s, world finance studies were found to work on SME growth problems, with a rapidly increasing focus on access to finance problems, and by the early 2000s, they followed two alternative approaches, where one set of studies was merely institutional development intensive. Going beyond that, another set of studies focuses on tech-based innovative financing (Beck et al., 2006; Beck et al., 2008). At the same time, the well-documented problems of the banking system in many parts of the world following the credit crunch of 2008 and the subsequent outcomes from the G20 summit of 2009 (ACCA, 2014) made it mandatory to have alternative and innovative solutions for access to finance for SMEs. As was added by Cortina & Schmukler (2018), *"the retrenchment and intensified regulation of the traditional banking system after the global financial crisis of 2008, combined with greater access to information technology and wider use of mobile devices, have allowed the FinTech generation of firms to deliver financial services."* The term FinTech can therefore be classified as an emerging type of financial service of the 21st century that provides services using the internet, mobile phones, cloud computing, and open-source software at minimum time and cost. This is being termed a disruptive phenomenon that brought a paradigm shift in the world of the financial services industry, including debt finance (World Economic Forum, 2015; BIS, 2018; OECD, 2020).

These innovative, non-traditional financing methods brought about by FinTech have been gaining recognition in both developed and emerging economies throughout the world. FinTech solutions and innovations in digital financial services are gaining momentum in Bangladesh as well. But the technology that banks are mainly interested in is relevant to mobile banking technology, online services, and payment technology only. This is consistent with the study

by Korn et al. (2016), which shows banks' major interest areas in FinTech applications in developing economies. However, this trend has the potential to be a game changer for small business financing because it embodies a new set of products tailored to the needs of small businesses. These include bank finance through online platforms, e-commerce finance, invoice finance, online supply chain finance, or online trade finance, with collateral-free, real-time instant lending at the minimum cost.

This is where this study begins. By leveraging this FinTech, it strives to enhance access to debt finance and explores its prospects for SEs here in Bangladesh while presenting a country-specific application of FinTech. Hence, the study justifies a bank-centric FinTech model as the country-specific model for Bangladesh (Section ref. 1.4).

In exploring the prospects, as shown, a mixed method of research is employed throughout the study. Therefrom, a comparison to the practices of FinTech-led countries around the world in terms of relevant legal and regulatory initiatives in facilitating a FinTech environment, including lending aspects of FinTech, has occurred in the first qualitative research through document analysis. It helped find out what further policies were needed to enable Bangladesh to have FinTech credit implications. The findings of the second approach, a quantitative survey, revealed that SEs leveraging FinTech has a statistically significant impact on the relevant indicators of the overall parameter of access to finance for SMEs and SEs in Bangladesh. Then, a set of in-depth interviews with bankers found that 90 percent of responding banks agreed to work with FinTech in financing small businesses. The determinants of the motivations of the bankers to have this bank-centric FinTech model for managing debt are also sorted out. It is evident from another qualitative in-depth interview session of this study that the regulators and experts also found a bank-centric FinTech model in debt finance for SEs to be prospective in the Bangladesh context on different merit grounds despite having some challenges.

As another prime focus of the broad research objective was to identify major policy issues to be addressed further, the study proposed policy recommendations based on all the quantitative and qualitative research conducted with the perseverance to facilitate policy formulation where needed, to have a bank-centric FinTech model for debt finance for small enterprises.

Thus, the broad research objective is considered to be attained as it was designed to explore the prospects of leveraging FinTech to enhance access to finance for small enterprises in Bangladesh and recommend required policy measures. The study explored the ‘leveraging of FinTech’ as a ‘prospective phenomenon’ to enhance the access to finance for the SEs in Bangladesh, given the country’s present regulatory infrastructure (based on the research on specific objective 1), from a comprehensive 360-degree outlook that is from the demand side of debt finance for the SEs in Bangladesh (attained from research on specific objective 2), also from the supply-side of debt finance (from the attainment of specific objective 3), and from regulators, academic experts, and experts in practice—both banks and FinTech companies—experienced in working under collaboration (from the attainment of specific objective 4). The regulatory and legal areas to further develop also came up (from attaining specific objective 5) and were recommended to provide an enabling environment for FinTech credit and further move toward a bank-centric FinTech model in managing debt finance for SEs.

Lastly, being well concerned, taking initiatives, and given its legal, regulatory, financial, and technical-infrastructure and the market base; in this study, Bangladesh is found to have a good start and is passing a transition period to fully blossom and reach a mature stage on the implication of FinTech credit. It has also joined the ranks of the FinTech-adopting developed and developing countries, evidencing its present regulatory base with a good start and being considered not to be that far. Following the top-performing developing countries that are well exposed to the industry, Bangladesh is at its peak, particularly in terms of regulatory initiatives (including the Interoperable Digital Transaction Platform, IDTP; the application of API to national projects; the BFIU's release of 2020 e-KYC guidelines; and the application of regulatory sandbox activities by the RFFO). Initiatives by executive bodies (biometric and microchip-embedded Smart ID cards since 2016; the National Blockchain Strategy of 2020; and the Digital Security Act of 2018, ongoing National Strategy for AI) are also commendable and deserve recognition. Collaboration between banks and FinTech firms on debt financing projects has already started (such as the City Bank-bKash and BRAC-ShopUp projects). Further development areas are basically some legal (for instance, the acceptance of virtual documents by the court) and technical (data adequacy and authentication issues, establishing the central servers, and others) areas. According to this study, given the right environment, debt finance managed by bank-centric FinTech models could be among the strongest instruments to support

small businesses and thus stimulate viable economic growth.

8.3 Limitations of the Study

Although the thesis makes key contributions and has policy implications, the researcher acknowledges certain limitations of the study.

Although the use of FinTech is seen as prospective on both objective (quantitative) and subjective (qualitative) grounds, it becomes a relative measure to some extent. In its interpretation, the inference is made on the use of FinTech in Bangladesh to be prospective as in the quantitative survey the variations in all the five dependent variables (relevant indicators of the ultimate parameter of the SEs' access to finance) ranged from .10 to .27, and the findings from the thematic analysis of the interview of the debt finance providers demonstrated more than 90 percent of the respondent banks (14 out of 15 PCBs) agreed to work in a given proposition of bank-FinTech collaboration for managing debt finance for SEs. Given the lack of previous research on measuring the prospects of any issue, and the limited available data, the study followed other social research works in general. Thus, a lack of data and documentary evidence can be an impediment to working with them and a limitation of the study.

The concept of FinTech itself is an 'underexplored phenomenon' to date, going under research worldwide, having been inaugurated markedly after the 2008-09 financial crunch but flourished at a high rate in this sort span of time. Further, the FinTech approach for credit risk assessment is an even newer but growing field of research. A few papers analyze the role of digital footprints in enhancing credit (IMF, 2020) and being the subject of a rising trend the daily inputs and updates are mostly available at news. Accordingly, it obviously lacks enough research work in an emerging economy like Bangladesh as well. To remain updated and to follow its present trend for the purpose of having policy for implications, the study had to rely on global and local current papers, websites, and newsfeeds even in some cases alongside the well-documented works of international financial organizations (like of FBS, BIS, the IFC, the World Bank, the IMF, and the OECD) and others.

As noted in the research methodology chapter, the research study presented data collected up to its completion date of collection, November 2021. But the ever-changing trend, toward digitalization in the bank's FinTech contacts in particular, is in operation. The industry is changing over the days. As stated in section 8.1.5, Prime Bank (with product 'PrimeAgrim')

and Dhaka Bank Ltd (with its eRin product) are two other new adopters of digital Nano loans. They have come to the industry on the successful repercussions of the earlier projects (The City Bank-bKash, and BRAC-ShopUp). The Prime Bank presently is collaborating with the program with a British FinTech AGAM International. Dhaka Bank tied up with a local FinTech Firm. (respective banks' websites and The Business Standard. January 17, 2022). Details of all these projects' experiences could not be covered for time constraints.

However, given the challenges and limitations presented above, utmost care was taken in the review and interpretation of the results from the different empirical findings. For instance, the study may be suspected to have a self-reporting bias since the researcher conducted surveys and interviews as the primary method of data collection. To mitigate this risk, the reliability and validity of the data were checked through triangulation (Boyce & Neale, 2006) where triangulation refers to using multiple datasets, methods, and theories to address the research questions. For this purpose, in the quantitative survey, the same set of questions was asked to the banked, unbanked, underbanked, and online borrowers of FinTech firms—that is, respondents from different identity groups. In the qualitative parts, on the other hand, in-depth interviews were conducted with different data sources – the bankers, policy executors (Bangladesh Bank), and other experts from relevant academicians, agencies, forums, and banking and FinTech companies directly working under a bank-FinTech setup on debt finance. Data from interviews on regulations and others were found to be consistent by examining secondary data sources on a random set of samples to confirm that the data supplied by regulators and other experts are correct; this approach is consistent with prior academic research of Zahra, Ireland, & Hitt, 2000; Miloud, Aspelund, & Cabrol, 2012. Input from one domain was compared with the findings from the other where needed, and no major inconsistencies were discovered. Data saturation, the point when no new information is observed in new data (Boyce & Neale, 2006), is claimed to be attained from the last interview and thus it ensures the absence of biasness and generalization of findings.

8.4 Contribution of the Thesis

It is expected that the findings of the study might be useful to the relevant academic and professional community.

Academic Contribution:

Firstly, besides other academic contributions, this study combined basically two prime issues: financial inclusion (in terms of access to finance) and FinTech applications. According to one school of thought, the literature had even established indexes (SMEF, ESAF indexes) to improve access to finance, while another set of studies was demonstrating the disruption of FinTech in the financial service industry. But no such study, as was found, measured attainable access in the indexes in terms of using FinTech. This study initiates and has success in finding a significant relationship among them.

Secondly, following the Beck and Demirguc-Kunt (2006) study, it can be argued that the Bangladesh studies comprise the initial set of SME studies with a focus on institutional developments only. But the studies following the world studies in this regard, on innovative financing in any institutional setup, are rarely available. This study presents, for the first time of its type as found, an immense elaborative research work covering the existing FinTech ecosystem currently prevailing in Bangladesh as a whole and, in addition, recommends required policy measures to enable a more FinTech-intensive environment and further move toward a bank-centric FinTech model.

Thirdly, previous FinTech studies captured a vast arena of financial studies covering both its revolution and evolution, world surveys, and ways and means of disruption, all from world perspectives. Bangladesh's studies on FinTech are mostly found on its issues of concern. But rarely do any study consider the market study by adding the demand-side view of debt financing. Furthermore, it provides an understanding of and insights into FinTech adoption practices in an emerging or transition economy where its adoption in the real market is still supposed to be in question.

Practical Significance

Firstly, the findings might help execute policy measures to have a bank-centric FinTech model in debt finance for SEs that will combat barriers of information asymmetries, lack of collateral, and high time and cost effects through having a ‘collateral free instant lending module at minimum cost’ and increase the financial inclusion of more small enterprises that had no or less access to bank finance in Bangladesh.

Secondly, the study focused on and offered solutions not only to the literature gap areas but also to the regular gap in banking practices under traditional lending mechanism, in combination with the regulation gap at the same time.

Thirdly, according to the IMF study of 2016, digital technologies in general are transforming the financial services industry in three main ways. First, digital financial solutions are expanding access to all customers, including the unbanked and underbanked. Second, significantly lower the costs of providing financial services by profitably leveraging the technologies, which was not possible before. Third, enabling new business models creates a win-win situation for both the provider and the customer. But the three building blocks that are required to achieve the potential economic impacts of digital financial inclusion are: first, widespread ‘digital infrastructure’ in the form of robust digital applications and widespread connectivity; second, a dynamic financial services market with an enabling regulatory framework that promotes financial innovation; and third, ‘new digital products that truly solve customers’ problems and provide an advantage in cost and utility (Manyika et al., 2016). This study, standing alone, strived to facilitate the establishment of both ‘the infrastructural and connectivity base’ of a FinTech enabling environment for debt finance and mostly to assess the dynamism of the ‘relevant financial service market with a guideline on required regulatory frameworks’ in the same endeavor for Bangladesh and in other contemporary countries with similar financial setups as well.

8.5 Future Research Directions

This study is limited to the selected segment as all enterprises in it share the same characteristics, namely, small businesses. But it can be expanded to SMEs to have a wider aspect and coverage. Quantitative research can be conducted to examine whether the variables identified are similar. Though a set of dependent variables were sourced from the ESAF Index (EIF, 2018) with the parameter, SME access to finance, the variables or the relevant indicator are less likely to differ if the same index is used. But the sets of independent variables that come with using FinTech might vary in terms of their applicability and significance even in the same country context. This study opens up the scope for adding this to the SME literature of the country.

Again, some research studies can be developed focusing on specific FinTech credit products. A further elaboration on one or more services of FinTech to manage debt for SEs can take place. A market review and the feasibility of the FinTech credit products (like automated underwriting or credit scoring, documentation tracking, disbursement management or customer management, etc.) are required to support the opening of more FinTech firms here in Bangladesh with priority products. For instance, the empirical result from the quantitative research of the study shows, a total of six predictors out of the ten studied have a statistically significant impact on the variations of the dependent variables. But product-wise, elaborate discussion or research work could be there that could contribute to adding more insights for better understanding and choosing the products and eventually using FinTech.

Most importantly, it has been found that policy enablers and enabling technologies are of immense importance for enabling the FinTech ecosystem in any country. But there is no such an in-depth study on bringing up and facilitating more use of these technologies (including APIs, Cloud Computing, Biometrics, DLT or Blockchain, ML, and AI) and the implications of the policy enablers (including digital ID, data protection, cyber security, open banking, and innovative facilitators) in Bangladesh's debt finance context. Relevant extensive studies in these regards with deeper insights and implication measures are required to a massive extent.

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APPENDIX A-1: SURVEY QUESTIONNAIRE

Section A: Screening Questions

1. Business Name and Address

At which sector does your business operate? Please tick.

- | | | |
|--|--|---|
| <input type="checkbox"/> Electronics and Electrical | <input type="checkbox"/> Backward linkage | <input type="checkbox"/> Trading |
| <input type="checkbox"/> Software Development | <input type="checkbox"/> Hand-operated welding | <input type="checkbox"/> Fruit processing |
| <input type="checkbox"/> Light Engineering and Metal Works | <input type="checkbox"/> Food processing and linkage | <input type="checkbox"/> Poultry farming, fisheries |
| <input type="checkbox"/> Agro processing/Agri-Business related | <input type="checkbox"/> Fashion-rich personal wear and consumption goods. | <input type="checkbox"/> Tea gardening and Processing |
| <input type="checkbox"/> Leather-making and leather goods | <input type="checkbox"/> Small scale chemical engineering | <input type="checkbox"/> Vegetable seed farming |
| <input type="checkbox"/> Knitwear and ready-made garments | <input type="checkbox"/> Rubber industries | <input type="checkbox"/> Construction industries |
| <input type="checkbox"/> Plastics and other synthetics | <input type="checkbox"/> Computer industries | <input type="checkbox"/> Transportation (including automobiles) |
| <input type="checkbox"/> Healthcare and diagnostics | <input type="checkbox"/> Handicrafts | <input type="checkbox"/> Pathological laboratories |
| <input type="checkbox"/> Pharmaceuticals | <input type="checkbox"/> Silk industries | <input type="checkbox"/> Cold storage |
| <input type="checkbox"/> Cosmetics/Toiletries | <input type="checkbox"/> Multilateral jute goods | <input type="checkbox"/> Furniture |
| <input type="checkbox"/> Ceramics | <input type="checkbox"/> Fast food, frozen food, | <input type="checkbox"/> Others |

2. What is the fixed asset value (except land and factory building) of the business?

- Below Tk 10 lac
- Tk.10 lac to below Tk.2 crore
- Tk. 2 crore to Tk below 15 crore
- Tk 15 crore and above

3. How many paid employees did the business have?

- Below 16
- 16 to 30
- 31 to 120
- 121 or above

4. At what group does the enterprise belong to? Please tick.

A/C holder			No A/c								
A1: FinTech platform A/c holder		A2: Bank A/c holder	B1: Potential A/c holder. You don't have any Bank or FinTech platform A/c		B2:						
<input type="checkbox"/>	1	On line Borrowers- The enterprise does business through FinTech platform and borrowed from there	<input type="checkbox"/>	3	The enterprise has Bank A/c but no loan	<input type="checkbox"/>	5	Potential FinTech platform A/c holder	<input type="checkbox"/>	7	Neither of any from 1 to 6
<input type="checkbox"/>	2	FinTech Platform User only- You do business through FinTech platform but never borrowed there from.	<input type="checkbox"/>	4	The Enterprise has bank loan	<input type="checkbox"/>	6	Potential Bank A/c holder	Note: If you are in group 7, you are suggested not to take part in the survey. Thank you.		

[If anyone belong to more than one groups, please mark tick in the earlier one]

Section B: General Business Information

1. How many years has the company been in existence?

- _____ Year.
- Less than one year

2. What is the ownership pattern?

- Sole proprietorship
- Partnership
- Private limited

3. Do the owner(s) hold a smartphone or have access to net?

- Yes
- No

Section C: Regarding leveraging FinTech to have bank finance.

1. In case of A/c holders (group A1 and A2), tentative what percentile of business information you could give to the loan officer while he asked in processing your last loan proposal (if any, both in case of approved or rejected case)?

- N/A
- 100 percent , all the business questions
- More than 50 percent
- Less than 50 percent

2. Does your business have last two years financials (income statement, balance sheet)?

- Yes
- No

3. Do you have business transaction history maintained in any account?

- Yes
- No

4. In case of Bank A/c holders (group A2) could you place any security (Cash collateral-FDR, inventory, property mortgage) against your loan (if any)?

- N/A
- Yes
- No

5. In case of Potential A/c holder (group B1), can you place any security (cash collateral-FDR, inventory, property mortgage) if you apply for any loan?
- N/A
 - Yes
 - No
6. To your perception, loan interests of banks are-
- - Don't know, neutral
 - Too high
 - High
 - Moderate
 - Minimum
 - Low
7. In case of Bank A/C holders (group A2), have you ever been referred by the bank to any FinTech platform or to have an online App to get a collateral free loan?
- N/A
 - No
8. Do you do every business transaction through your bank a/c?
- - N/A
 - No
 - Yes
9. If you are given collateral free loans in few minutes will you do every business transaction through your account?
- - N/A
 - No
 - Not sure
 - Yes
10. If you are given collateral free loans in few minutes would you like to have a bank account and have an access to a referred online based platform or App?
- N/A
 - No
 - Not necessarily
 - Indifferent
 - Probably will go
11. If it gets necessary, will you give consent to share your mobile financial/transaction data with your bank recommended FinTech platform?
- - N/A
 - No
 - Not sure
 - Yes

12. In case of FinTech a/c holders (group A1), are you referred for bank finance by the platform to their lending partner bank?

- N/A
- No
- Yes

13. Do you do every business transaction through your FinTech platform a/c?

- N/A
- No
- Yes

14. Does automated loan advice can better help you decide and apply for a loan?

- No
- Not sure
- Yes

15. In case of online borrowers (group A1-1), did you have Automated loan advice before borrowing through the FinTech platform? [Here, automated loan advice means.....]

- N/A
- No
- Yes

16. In case of others than on line borrowers (group A1-2, A2, B1), would you like to have Automated loan advice to borrow finance?

- N/A
- No
- Yes

17. In case of online borrowers (group A1-1), have your loan portfolio been managed while borrowing by the platform? [Here, loan portfolio management refers to.....]

- N/A
- No
- Yes

18. In case of others than on line borrowers (group A1-2, A2, B1), would you let your loan portfolio be managed while borrowing finance?

- N/A
- No
- Yes

19. In case of online borrowers (group A1-1), were you on boarded by the FT platform?
 [Here, on boarding or using loan application dashboard means.....]
- N/A
 No
 Yes
20. In case of others than on line borrowers (group A1-2, A2, B1), would you like to be on boarded by the bank or FinTech platform?
- N/A
 No
 Yes
21. In case of online borrowers (group A1-1), were your necessary documents tracked by the FinTech platform? [Here, document tracking refers to.....]
- N/A
 No
 Yes
22. In case of others than on line borrowers (group A1-2, A2, B1), would you let your necessary documents to be tracked while borrowing finance by the bank or FinTech platform?
- N/A
 No
 Yes
23. In case of online borrowers (group A1-1), did the FinTech platform do credit scoring of your enterprise for the finance? [Here, credit scoring or automated underwriting means.....]
- N/A
 No
 Don't know
 Yes
24. In case of online borrowers (group A1-1), did the FinTech platform disbursed the loan to the a/c of the enterprise?
- N/A
 No
 Don't know
 Yes

25. Can automated and customer friendly (with soft loan terms like collateral free, lower interest) loan arrangements help increase bank finance?

- No
- Not sure
- Yes

26. Can service after disbursement (like 24/7 services, customer centricity, borrowings from remote locations, loan account updates) help increase demand for bank finance?

- No
- Not sure
- Yes

27. In case of online borrowers (group A1-1), after the loan disbursement has the platform been managing all your loan issues in need?

- N/A
- No
- Don't know
- Yes

28. In case of online borrowers (group A1-1) does your loan get repaid automatically?

- N/A
- No
- Yes

29. In case of others than on line borrowers (group A1-2, A2, B1) would you give consent your borrowings to be repaid automatically from you're a/c?

- N/A
- No

30. Do you have any bank loan?

- No
- Yes

31. If no, will you apply for a bank loan?

- N/A
- Yes
- No

32. If no, please tick the reasons.

- N/A
- Complicated procedures
- Costly
- Time consuming -1/2 months
- Collateral needed
- Others, please specify

33. If you are given collateral free small ticket loan in few minutes through FinTech platform /App will you like to open a bank account (where needed) and have the loan?

- No
- Not necessarily
- Indifferent/don't know
- Probably will go
- Will definitely go

34. To your considerations, all your answers and opinion given above (from 30 to 33) will be applicable for-

- Bank loan only
- Credit line only
- Both for a bank loan and a credit line
- Others, please mention.....

35. Did the enterprise ever get rejected to have bank finance?

- N/A
- No
- Yes

36. If yes, which of the following reasons were given as for loan rejection?

- N/A
- No reasons given by credit suppliers
- Insufficient business or cash-flow/ lack of financials
- Insufficient collateral or security
- Lack of credit information/history
- Others, please specify_____

37. Did the enterprise ever hesitate to apply for borrowings from banks because of possible rejections?

-
- Yes
- No

38. To what extent having collateral free small ticket loan within few minutes would make you feel, a loan application may not possibly be rejected?

- N/A
- Will not be rejected, surely 100 percent
- Will not be rejected, mostly in 80 percent cases.
- Will not be rejected, generally in 50percent cases
- Indifferent, don't know
- May easily be rejected

39. Will you go for it and have a bank a/c (if needed)?

- N/A
- Definitely will go
- Not sure
- No

40. To your considerations, all your answers and opinion given above (from 35 to 39) will be applicable for-

- N/A
- Bank loan only
- Credit line only
- Both for a bank loan and a credit line
- Others, please specify

41. In case of online borrowers (group A1-1), do you find, the on line business platform your enterprise is doing business with, as customer centric or positive (easy, intuitive, understandable and prompt)?

- N/A
- No
- Neutral
- Yes

42. Categorize your loan quality in terms of cost involved-

- N/A
- Too expensive
- Costly
- Moderate
- Minimum cost
- No cost

43. Was collateral taken?

- N/A
- Yes
- No

44. Categorize your loan quality in terms of given other conditions.

- N/A
- Strict and not attainable
- Not necessarily user friendly
- Indifferent
- Strict but attainable
- Easy and user friendly

45. To what extent having finance through online FinTech platform/App, is making you feel, there is no financial obstacle?

- N/A
- Incapable of reducing financing obstacles
- May lessen some financing obstacles
- Indifferent
- Reduces many financing obstacles
- Definitely reduces all financing obstacles.

Concluding Text

As the follow-up query (if any) will be mostly electronic, could you please provide us with your email address?

Thank you for your time and concern in participating in the survey. It would definitely provide us with a resource on the financing of small enterprises in Bangladesh. Please note any comments you would like to add.

APPENDIX A-2: SET OF QUESTIONS FOR THE VARIABLES MEASUREMENT PURPOSE

(dedicated Section C of the questionnaire)

Q no.	Questions	Given Score or points following Likert-type scale	
Measuring Variable- Control Variable (CV) Information Asymmetry			
1.	In case of A/c holders (group A1 and A2), tentative what percentile of business information you could give to the loan officer while he asked in processing your last loan proposal (if any, both in case of approved or rejected case)?	<input type="checkbox"/> N/A	0
		<input type="checkbox"/> 100 %, all the business questions	1
		<input type="checkbox"/> More than 50%	2
		<input type="checkbox"/> Less than 50%	3
CV-Lack of Credit Worthiness			
2.	Does your business have last two years financials (income statement, balance sheet)?	<input type="checkbox"/> Yes	1
		<input type="checkbox"/> No	2
3.	Do you have business transaction history maintained in any account?	<input type="checkbox"/> Yes	1
		<input type="checkbox"/> No	2
CV-Lack of Security			
4.	In case of Bank A/c holders (group A2) could you place any security (Cash collateral-FDR, inventory, property mortgage) against your loan (if any)?	<input type="checkbox"/> N/A	0
		<input type="checkbox"/> Yes	1
		<input type="checkbox"/> No	2

5. In case of Potential A/c holder (group B1), can you place any security (cash collateral-FDR, inventory, property mortgage) if you apply for any loan?
- N/A 0
 - Yes 1
 - No 2

CV-High bank Interest

6. To your perception, loan interests of banks are-
- Don't know, neutral 0
 - Too high 1
 - High 2
 - Moderate 3
 - Minimum 4
 - Low 5

Independent Variable(IV)- Outbound Referral

7. In case of Bank A/C holders (group A2), have you ever been referred by the bank to any FinTech platform or to have an online App to get a collateral free loan?
- N/A 0
 - No 1
 - Yes 2
8. Do you do every business transaction through your bank a/c?
- N/A 0
 - No 1
 - Yes 2

- | | | | | |
|-----------------------------|--|--------------------------|--------------------|---|
| 9. | If you are given collateral free loans in few minutes will you do every business transaction through your account? | <input type="checkbox"/> | N/A | 0 |
| | | <input type="checkbox"/> | No | 1 |
| | | <input type="checkbox"/> | Not sure | 2 |
| | | <input type="checkbox"/> | Yes | 3 |
| 10. | If you are given collateral free loans in few minutes would you like to have a bank account and have an access to a referred online based platform or App? | <input type="checkbox"/> | N/A | 0 |
| | | <input type="checkbox"/> | No | 1 |
| | | <input type="checkbox"/> | Not necessarily | 2 |
| | | <input type="checkbox"/> | Indifferent | 3 |
| | | <input type="checkbox"/> | Probably will go | 4 |
| | | <input type="checkbox"/> | Will definitely go | 5 |
| 11. | If it gets necessary, will you give consent to share your mobile financial/transaction data with your bank recommended FinTech platform? | <input type="checkbox"/> | N/A | 0 |
| | | <input type="checkbox"/> | No | 1 |
| | | <input type="checkbox"/> | Not sure | 2 |
| | | <input type="checkbox"/> | Yes | 3 |
| IV- Inbound Referral | | | | |
| 12. | In case of FinTech a/c holders (group A1), are you referred for bank finance by the platform to their lending partner bank? | <input type="checkbox"/> | N/A | 0 |
| | | <input type="checkbox"/> | No | 1 |
| | | <input type="checkbox"/> | Yes | 2 |

18. In case of others than on line borrowers (group A1-2, A2, B1), would you let your loan portfolio be managed while borrowing finance?
- N/A 0
- No 1
- Yes 2

IV- Loan Application Dashboard

19. In case of online borrowers (group A1-1), were you on boarded by the FT platform? [Here, on boarding or using loan application dashboard means.....]
- N/A 0
- No 1
- Yes 2
20. In case of others than on line borrowers (group A1-2, A2, B1), would you like to be on boarded by the bank or FinTech platform?
- N/A 0
- No 1
- Yes 2

IV-Document Tracking

21. In case of online borrowers (group A1-1), were your necessary documents tracked by the FinTech platform? [Here, document tracking refers to.....]
- N/A 0
- No 1
- Yes 2
22. In case of others than on line borrowers (group A1-2, A2, B1) would you let your necessary documents to be tracked while borrowing finance by the bank or FinTech platform?
- N/A 0
- No 1

Yes 2

IV- Automated Underwriting/ Credit Scoring

23. In case of online borrowers (group A1-1), did the FinTech platform do credit scoring of your enterprise for the finance? [Here, credit scoring or automated underwriting means
- N/A 0
- No 1
- Don't know 2
- Yes 3

IV-Disbursement Management

24. In case of online borrowers (group A1-1), did the FinTech platform disbursed the loan to the a/c of the enterprise?
- N/A 0
- No 1
- Don't know 2
- Yes 3
25. Can automated and customer friendly (with soft loan terms like collateral free, lower interest) loan arrangements help increase bank finance?
- No 0
- Not sure 1
- Yes 2

IV-Customer Management

26. Can service after disbursement (like 24/7 services, customer centricity, borrowings from remote locations, loan account updates) help increase demand for bank finance?
- | | | |
|--------------------------|----------|---|
| <input type="checkbox"/> | No | 0 |
| <input type="checkbox"/> | Not sure | 1 |
| <input type="checkbox"/> | Yes | 2 |
27. In case of online borrowers (group A1-1), after the loan disbursement has the platform been managing all your loan issues in need?
- | | | |
|--------------------------|------------|---|
| <input type="checkbox"/> | N/A | 0 |
| <input type="checkbox"/> | No | 1 |
| <input type="checkbox"/> | Don't know | 2 |
| <input type="checkbox"/> | Yes | 3 |

IV-Repayment

28. In case of online borrowers (group A1-1) does your loan get repaid automatically?
- | | | |
|--------------------------|-----|---|
| <input type="checkbox"/> | N/A | 0 |
| <input type="checkbox"/> | No | 1 |
| <input type="checkbox"/> | Yes | 2 |
29. In case of others than on line borrowers (group A1-2, A2, B1) would you give consent your borrowings to be repaid automatically from you're a/c?
- | | | |
|--------------------------|-----|---|
| <input type="checkbox"/> | N/A | 0 |
| <input type="checkbox"/> | No | 1 |
| <input type="checkbox"/> | Yes | 2 |

Dependent Variable(DV)- % of SEs Using Bank Loan

30.	Do you have any bank loan?	<input type="checkbox"/> N/A	0
		<input type="checkbox"/> No	1
		<input type="checkbox"/> Yes	2
31.	If no, will you apply for a bank loan?	<input type="checkbox"/> N/A	0
		<input type="checkbox"/> No	1
		<input type="checkbox"/> Yes	2
32.	If no, please tick the reasons.	<input type="checkbox"/> N/A	0
		<input type="checkbox"/> Complicated process	1
		<input type="checkbox"/> Costly	2
		<input type="checkbox"/> Time consuming – 1/2 months	3
		<input type="checkbox"/> Collateral needed	4
		<input type="checkbox"/> Others, please specify	5
33.	If you are given collateral free small ticket loan in few minutes through FinTech platform /App will you like to open a bank account (where needed) and have the loan?	<input type="checkbox"/> No	1
		<input type="checkbox"/> Not necessarily	2
		<input type="checkbox"/> Indifferent/don't know	3
		<input type="checkbox"/> Probably will go	4

Will definitely go 5

DV- % of SEs Using Credit Line

34. To your considerations, all your answers and opinion given above (from 30 to 33) will be applicable for-

N/A 0

Bank loan only 1

Credit line only 2

Both for a bank loan and a credit line 3

Others, please mention... 4

DV- % of SEs Not applying for bank loan because of possible rejection

35. Did the enterprise ever get rejected to have bank finance?

N/A 0

No 1

Yes 2

36. If yes, which of the following reasons were given as for loan rejection?

N/A 0

No reasons given by credit suppliers 1

Insufficient business or cash-flow/ lack of financials 2

Insufficient collateral 3

Lack of credit information/history 4

Others, please specify_____ 5

- | | | | | |
|-----|--|---|---|--|
| 37. | Did the enterprise ever hesitate to apply for borrowings from banks because of possible rejections? | <input type="checkbox"/> Yes | 1 | |
| | | <input type="checkbox"/> No | 2 | |
| 38. | To what extent having collateral free small ticket loan within few minutes would make you feel, a loan application may not possibly be rejected? | <input type="checkbox"/> N/A | 0 | |
| | | <input type="checkbox"/> Will not be rejected, surely 100% | 1 | |
| | | <input type="checkbox"/> Will not be rejected, mostly in 80% cases. | 2 | |
| | | <input type="checkbox"/> Will not be rejected, generally in 50% cases | 3 | |
| | | <input type="checkbox"/> Indifferent, don't know | 4 | |
| | | <input type="checkbox"/> May easily be rejected | 5 | |
| 39. | Will you go for it and have a bank a/c (if needed)? | <input type="checkbox"/> N/A | 0 | |
| | | <input type="checkbox"/> Definitely will go | 1 | |
| | | <input type="checkbox"/> Not sure | 2 | |
| | | <input type="checkbox"/> No | 3 | |

DV- % of SEs not applying for credit line because of possible rejection

- | | | | | |
|-----|--|---|---|--|
| 40. | To your considerations, all your answers and opinion given above (from 36 to 40) will be applicable for- | <input type="checkbox"/> N/A | 0 | |
| | | <input type="checkbox"/> Bank loan only | 1 | |
| | | <input type="checkbox"/> Credit line only | 2 | |

- Both for a bank loan and a credit line 3
- Others, please specify 4

DV- % of SEs feeling that there is no financial obstacles

- | | | | | |
|-----|--|--------------------------|---------------|---|
| 41. | In case of online borrowers (group A1-1), do you find, the on line business platform your enterprise is doing business with, as customer centric or positive (easy, intuitive, understandable and prompt)? | <input type="checkbox"/> | N/A | 0 |
| | | <input type="checkbox"/> | No | 1 |
| | | <input type="checkbox"/> | Neutral | 2 |
| | | <input type="checkbox"/> | Yes | 3 |
| 42. | Categorize your loan quality in terms of cost involved | <input type="checkbox"/> | N/A | 0 |
| | | <input type="checkbox"/> | Too expensive | 1 |
| | | <input type="checkbox"/> | Costly | 2 |
| | | <input type="checkbox"/> | Moderate | 3 |
| | | <input type="checkbox"/> | Minimum cost | 4 |
| | | <input type="checkbox"/> | No cost | 5 |
| 43. | Was collateral taken? | <input type="checkbox"/> | N/A | 0 |
| | | <input type="checkbox"/> | Yes | 1 |
| | | <input type="checkbox"/> | No | 2 |

44. Categorize your loan quality in terms of given other conditions.
- N/A 0
 - Strict and not attainable 1
 - Not necessarily user friendly 2
 - Indifferent 3
 - Strict but attainable 4
 - Easy and user friendly 5
45. To what extent having finance through this online FinTech platform, is making you feel, there is no financial obstacle?
- N/A 0
 - Incapable of reducing financing obstacles 1
 - May lessen some financing obstacles 2
 - Indifferent 3
 - Reduces many financing obstacles 4
 - Definitely reduces all financing obstacles. 5

APPENDIX B: SEMI-STRUCTURED INTERVIEW QUESTIONNAIRE FOR BANKERS

1. Would you please prioritize by putting numbers among the more significant constraint factors regarding the SE finance gap?

- Not cost-effective
- Lack of security
- Information asymmetry
- Lack of clients' creditworthiness/ unappealing business profile and cash flow
- Others. Please mention

Given two facilities in BD's financial infrastructure-

- I. Regulatory clearance from Bangladesh Bank is there.
 - II. A trusted FinTech firm is there to manage all the above constraints at minimum time, cost, and authentication (through machine learning, Blockchain, application programming interface, artificial intelligence, and so on).
2. What do you think? Would you like to work with or go in collaboration with third-party FinTech companies as their lending partner? Here for clarification, I can cite two cases. -
- A. Collaboration between BRAC Bank and ShopUp for SE finance
 - B. City Bank and bKash are collaborating on a personal loan product called "Nano credit."
3. Why or why not? If so, please cite the causes.
4. If no, then what would be the determinants of motivation to work in collaboration with them?
5. Would you like to share any other views you feel necessary to share in this regard?

APPENDIX C: SEMI-STRUCTURED INTERVIEW QUESTION GUIDE FOR EXPERTS

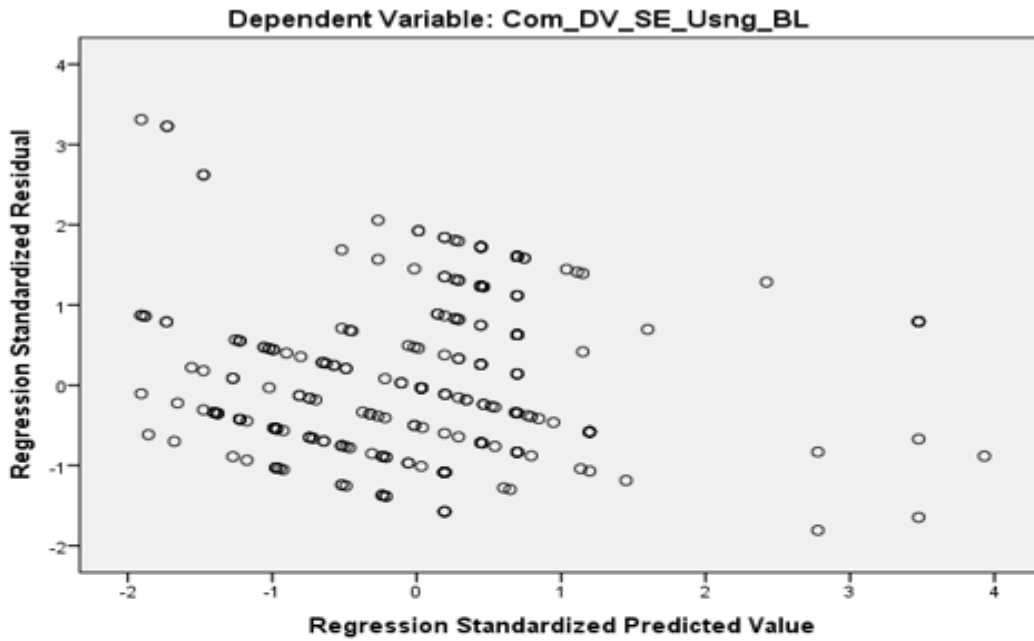
1. Introducing the research topic.
2. Introducing the findings from quantitative (survey) and qualitative (in-depth interview of bankers) studies.
3. What are the prospects of the Bank FinTech collaboration in extending services to finance SEs in Bangladesh under given regulatory and other related infrastructures?
4. What are the challenges, as well? What are the areas to develop further?

APPENDIX D: SPSS RESULTS FROM MULTICOLLINEARITY TESTS

Coefficients^a				Coefficients^a				Coefficients^a			
Model		Collinearity Statistics		Model		Collinearity Statistics		Model		Collinearity Statistics	
		Tolerance	VIF			Tolerance	VIF			Tolerance	VIF
1	OUTR	.869	1.150	2	OUTR	.869	1.150	3	OUTR	.869	1.150
	INBR	.079	12.633		INBR	.079	12.633		INBR	.079	12.633
	ADV	.808	1.238		ADV	.808	1.238		ADV	.808	1.238
	DBOARD	.777	1.287		DBOARD	.777	1.287		DBOARD	.777	1.287
	DOC	.799	1.252		DOC	.799	1.252		DOC	.799	1.252
	CUS	.082	12.252		CUS	.082	12.252		CUS	.082	12.252
	REPAY	.863	1.159		REPAY	.863	1.159		REPAY	.863	1.159
	PORT	.089	11.177		PORT	.089	11.177		PORT	.089	11.177
	DISB	.856	1.168		DISB	.856	1.168		DISB	.856	1.168
Dependent Variable: BL				Dependent Variable: BL_REJC				Dependent Variable: CL			
Coefficients^a				Coefficients^a				Coefficients^a			
Model		Collinearity Statistics		Model		Collinearity Statistics		Model		Collinearity Statistics	
		Tolerance	VIF			Tolerance	VIF			Tolerance	VIF
4	OUTR	.869	1.150	5	OUTR	.869	1.150				
	INBR	.079	12.633		INBR	.079	12.633				
	ADV	.808	1.238		ADV	.808	1.238				
	DBOARD	.777	1.287		DBOARD	.777	1.287				
	DOC	.799	1.252		DOC	.799	1.252				
	CUS	.082	12.252		CUS	.082	12.252				
	REPAY	.863	1.159		REPAY	.863	1.159				
	PORT	.089	11.177		PORT	.089	11.177				
	DISB	.856	1.168		DISB	.856	1.168				
Dependent Variable: CL_REJC				Dependent Variable: OBST							

APPENDIX E (1): SPSS RESULTS FROM HETEROSCEDASTICITY

Scatterplot



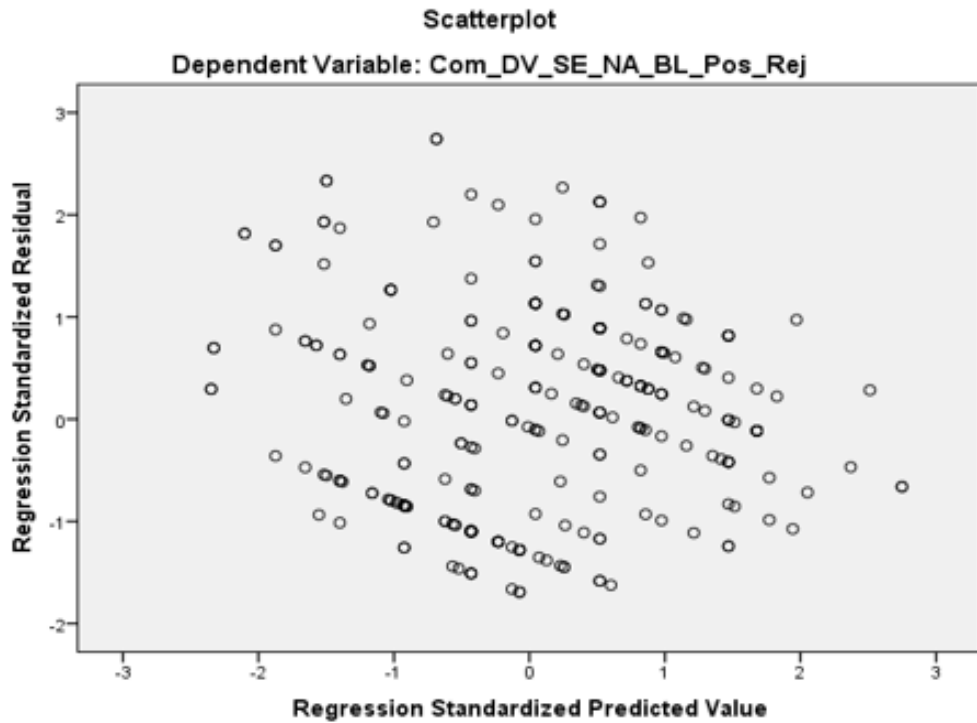
ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	419.685	9	46.632	1.390	.192 ^b
	Residual	10101.145	301	33.559		
	Total	10520.830	310			

a. Dependent Variable: BL
(Composite Dependent variable of Percentage of SEs Using Bank Loan/
COM_DV_SE_Usng_BL)

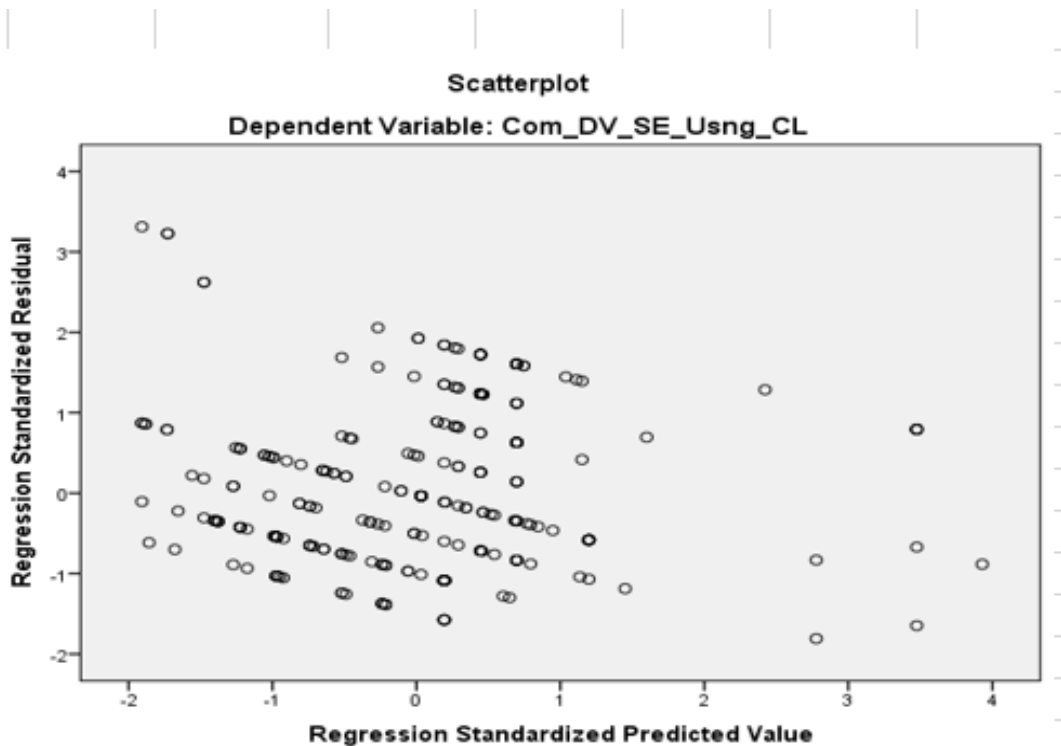
b. Predictors: (Constant), REPAY, PORT, ADV, DBOARD, OUTR, DOC, INBR,
DISB, CUS

APPENDIX E (2): SPSS RESULTS FROM HETEROSCEDASTICITY



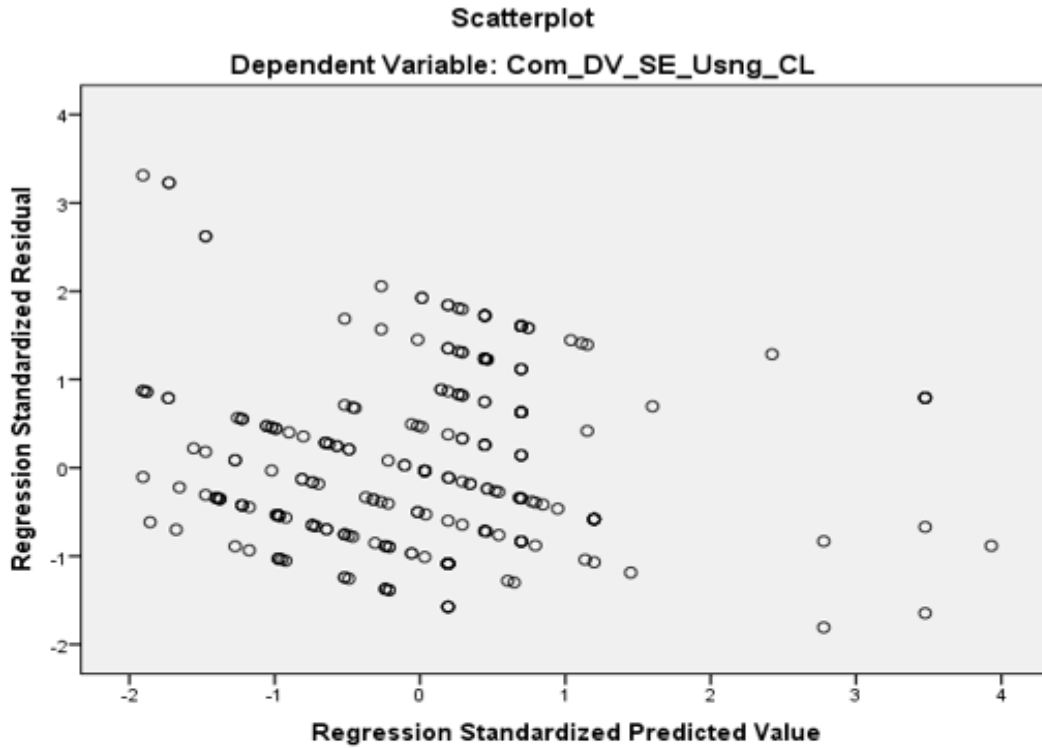
ANOVA^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	419.685	9	46.632	1.390	.192 ^b
	Residual	10101.145	301	33.559		
	Total	10520.830	310			
a. Dependent Variable: BL_REJC (Composite Dependent variable of Percentage of SEs not applying for bank loan because of possible rejection/ COM_DV_SE_NA_BL_Pos_Rej)						
b. Predictors: (Constant), REPAY, PORT, ADV, DBOARD, OUTR, DOC, INBR, DISB, CUS						

APPENDIX E (3): SPSS RESULTS FROM HETEROSCEDASTICITY



ANOVA^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
3	Regression	419.685	9	46.632	1.390	.192 ^b
	Residual	10101.145	301	33.559		
	Total	10520.830	310			
a. Dependent Variable: CL (Composite Dependent variable of Percentage of SEs Using Credit Line/ COM_DV_SE_Usng_CL)						
b. Predictors: (Constant), REPAY, PORT, ADV, DBOARD, OUTR, DOC, INBR, DISB, CUS						

APPENDIX E (4): SPSS RESULTS FROM HETEROSCEDASTICITY

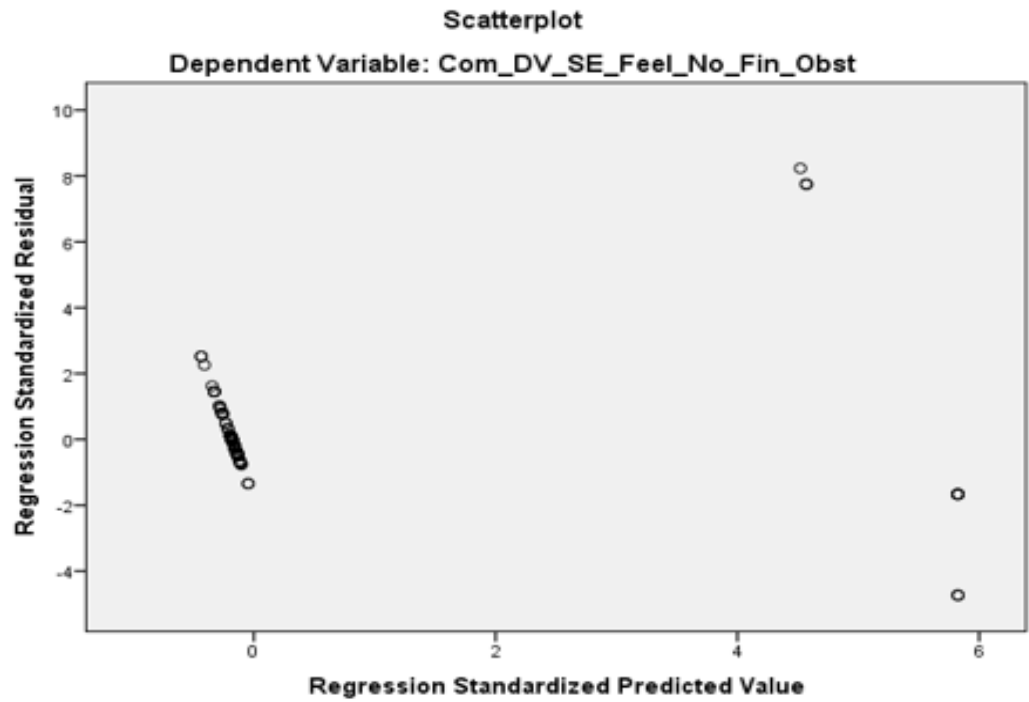


ANOVA^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
4	Regression	419.685	9	46.632	1.390	.000 ^b
	Residual	10101.145	301	33.559		
	Total	10520.830	310			

a. Dependent Variable: CL_REJC
(Composite Dependent variable of Percentage of SEs not applying for credit line because of possible rejection/ COM_DV_SE_NA_CL_Pos_Rej)

b. Predictors: (Constant), REPAY, PORT, ADV, DBOARD, OUTR, DOC, INBR, DISB, CUS

APPENDIX E (5): SPSS RESULTS FROM HETEROSCEDASTICITY



ANOVA^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
5	Regression	61.023	10	6.780	24.177	.000 ^b
	Residual	84.413	301	.280		
	Total	145.436	311			
a. Dependent Variable: OBST						
b. Predictors: (Constant), REPAY,PORT, ADV,DBOARD, OUTR, DOC, INBR, DISB,CUS						

APPENDIX F (1): MODEL 3 SUMMARY

Regression coefficient for the prediction of percentage of SEs using Credit Line(CL)

Variables	B (Coeff.)	95%CI	β(Standardized Coeff.)	t	p(Sig)
(Constant)	2.534	[-3.573,8.640]		0.817	0.415
OUTR	0.417	[0.238,0.595]	0.370	4.600	0.000
INBR	2.052	[-0.793,4.896]	0.605	1.420	0.157
ADV	0.465	[-0.148,1.079]	0.088	1.493	0.136
DBOARD	0.640	[-1.479,2.760]	0.036	0.594	0.553
DOC	-0.420	[-1.137,0.298]	-0.067	-1.151	0.250
CUS	-1.054	[-2.503,0.394]	-0.269	-1.432	0.153
REPAY	0.228	[-0.418,0.873]	0.039	0.694	0.488
SCORE	0.029	[-3.861, 3.918]	0.007	0.014	0.988
PORT	-0.514	[-1.904,0.877]	-0.130	-0.727	0.468
DISB	1.057	[0.532,1.582]	0.226	3.960	0.000
ASYM	-0.434	[-0.897,0.028]	-0.138	-1.847	0.066
CW	0.231	[-0.160,0.623]	0.085	1.163	0.246
SEC	-0.771	[-1.212,-0.329]	-0.262	-3.433	0.001
INT	0.064	[-0.344,0.472]	0.020	0.309	0.758

Adjusted R-square=0.177(N=311, Sig .000).CI=confidence interval for B

APPENDIX F (2): MODEL 4 SUMMARY

Regression coefficient for the prediction of percentage of SEs not applying for credit line because of possible rejections (CL_REJC)

Variables	B(Coeff.)	95%CI	β(Standardized Coeff.)	t	p(Sig)
Const	5.102	[-1.797,12.002]		1.455	0.147
OUTR	0.618	[0.416,0.819]	0.455	6.030	0.000
INBR	1.086	[-2.128,4.300]	0.266	0.665	0.507
ADV	-0.089	[-0.782,0.604]	-0.014	-0.253	0.800
DBOARD	0.886	[-1.509,3.282]	0.041	0.728	0.467
DOC	-0.982	[-1.793,-0.171]	-0.130	-2.383	0.018
CUS	-1.532	[-3.169,0.105]	-0.325	-1.842	0.066
REPAY	-0.289	[-1.018,0.440]	-0.041	-0.780	0.436
SCORE	0.328	[-4.067,4.723]	0.064	0.147	0.883
PORT	0.125	[-1.445,1.696]	0.026	0.157	0.875
DISB	0.887	[0.293,1.480]	0.158	2.941	0.004
ASYM	0.328	[-0.195,0.851]	0.086	1.232	0.219
CW	-0.117	[-0.559,0.326]	-0.036	-0.520	0.604
SEC	-1.034	[-1.533,-0.535]	-0.291	-4.076	0.000
INT	-0.001	[-0.462,0.460]	0.000	-0.005	0.996

Adjusted R-square=0.276(N=311, Sig .000). CI=confidence interval for B

APPENDIX F (3): MODEL 5 SUMMARY

Regression coefficient for the prediction of percentage of SEs feeling that there is no financial obstacle (OBST)

Variable	B(Coeff.)	95%CI	β(Standardized Coeff.)	t	p(Sig)
Const	-.051	[-0.258,0.156]		-.489	.625
OUTR	.002	[-0.004,0.008]	.001	.510	.611
INBR	.700	[0.603,0.796]	.141	14.284	.000
ADV	.000	[-0.021,0.021]	.000	-.014	.989
DBOARD	-.017	[-0.088,0.055]	-.001	-.453	.651
DOC	.022	[-0.002,0.046]	.002	1.775	.077
CUS	.005	[-0.044,0.054]	.001	.196	.845
REPAY	-.003	[-0.024,0.011]	.000	-.269	.788
SCORE	5.298	[5.166,5.403]	.859	79.088	.000
PORT	-.001	[-0.048,0.046]	.000	-.036	.971
DISB	-.007	[-0.024,0.011]	-.001	-.735	.463
ASYM	.001	[-0.014,0.017]	.000	.160	.873
CW	.009	[-0.005,0.022]	.002	1.282	.201
SEC	-.001	[-0.016,0.014]	.000	-.107	.915
INT	.006	[-0.008,0.020]	.001	.839	.402

Adjusted R-square=.100(N=311, Sig .000). CI=confidence interval for

