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Bangladesh Institute of Bank Management
Section - 2, Mirpur, Dhaka - 1216

Roundtable Discussion Series 2020

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Foreword

Bangladesh Institute of Bank Management (BIBM) organized seven roundtable discussions on various banking related contemporary issues in 2019. Papers presented in these roundtable discussions have been compiled in this publication titled “Roundtable Discussion Series 2020”. The keynote papers are prepared by research teams comprising of the faculty members of BIBM and experienced bankers from different banks. The research papers are finalized after accommodating the suggestions of discussants of the programs.

This Discussion Series would, we hope, attract attention of not only bankers, but also other professionals like credit analysts, economic consultants, economists, development practitioners as well as the academic community. BIBM would also welcome comments, critiques and suggestions on the themes contained in these research-based discussion papers.

Md. Akhtaruzzaman, Ph.D.
Director General, BIBM

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Paper One

Relevance of Blockchain for Banks in Bangladesh

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List of Abbreviations

AML	Anti Money Laundering
ASIC	Application Specific Integrated Chips
BCT	Block Chain Technology
BIS	Bank for International Settlement
CBDC	Central Bank Digital Currency
CCPs	Central Counterparties
CSDs	Central Securities Depositories
DLT	Distributed Ledger Technology
HTLCs	Hashed Timelock Contracts
IDRBT	Institute for Development and Research in Banking Technology
KYC	Know Your Customer
PoC	Proof of Concepts
PoW	Proof of Work
PoS	Proof of Stake
RTGS	Real Time Gross Settlement System
RBI	Reserve Bank of India
SCI	SEPA Creditor Identifier
SEPA	Single Euro Payment Area
SPV	Simplified Payment Verification
UAE	United Arab Emirates
ISID	Information Services International-Dentsu

Executive Summary

Now-a-days Blockchain Technology (BCT) is compared to the Internet in the early 1990s. Over the past three decades, ‘Internet of Information’ has changed our society. We are now entering a stage where BCT may do the same by embracing ‘Internet of Trust’ and ‘Internet of Value’. The financial sector may be one of the firsts to be impacted by broader implementation of Blockchain Technology.

In order to identify the potential application areas of BCT in banking, it may be prudent to look at the various use-cases of BCT taking shape across the world. Globally many banks, financial institutes and central banks have already adopted BCT in the areas like Digital Currency, Foreign Trade, Cross-border Payments, e-KYC Document Management, Capital Markets, Syndication of Loans, Supply Chain Finance, etc. where a number of stakeholders are involved in the transaction. The use cases of blockchain can broadly be classified into information sharing based and digital currency based applications. The set of use cases of the first category have ready applicability in banking and financial sector. On the other hand digital currencies like ‘Bitcoin’ is the perfect example of the use cases of the second category. On a pilot basis banks may setup a private blockchain for their internal purposes. This not only helps them to train human resources in the technology, but also benefits by enabling efficient asset management, opportunities for cross-selling, etc.

BCT is highly scalable and used to automate processes, reduce total number of intermediate business processes, reduce data storage costs, minimize data duplication and enhance data security. About 64% of the respondents believe that blockchain technology is broadly scalable and will eventually achieve mainstream adoption. Blockchain technology can be a competitive weapon to survive in the market. Around 51% banks worried about losing competitive advantages if they do not accept blockchain. As the technology is very new in Bangladesh and increase competitive advantages by reducing cost over traditional system, management of all banks may consider this factor seriously and make a common roadmap to implement this technology step by step in the banking system.

As blockchain is fundamentally different than the traditional ledger-based approach used in the banking sector, the hardware and software infrastructure will need to be reconstructed from the ground up in order to permit blockchain use. Around 43% of the CTOs believe that biggest challenges for adopting blockchain technology is the high cost. Though many banks are interested to invest in BCT in the coming years, about 64% of the respondents do not have any plan to invest in blockchain technology due to high cost. The top level executives may determine which business functions should move to blockchain first, and how to make this transition. Banks joining together can develop a common fund and build blockchain platforms that will give value for all participants at a reduced cost.

In a bid to evolve towards a cashless society, many central banks around the globe including Canada, England, Sweden, and Netherlands have started exploring the use of BCT for digitizing their currency, and many more are converging to the idea. From a technological perspective, we feel that BCT has matured enough and by increasing awareness among the stakeholders, appropriate time has come for initiating suitable efforts towards digitizing the Bangladeshi Taka through BCT. Government of Bangladesh can do this with the help of all stakeholders. Bangladesh Bank may take necessary initiatives in this regard.

Perception of banks' top level executives (CEOs and MDs) about how blockchain will change the way of doing business in next years is not very clear. About half of them (49%) think that this technology definitely change the business process, 27% believe the process will be more or less the same as before and 24% are not taking any sides of the two. Some respondents also think that blockchain technology is overhyped. CTOs about blockchain and associated components are not very aware. While measuring the awareness, in a scale out of 10, they achieved an average score of 3.5. Only 20% banks arranged training program on blockchain and took initiative to explore blockchain in the next 3 years, which is not encouraging at all. Also, only 15% banks have conducted an assessment about the effect of blockchain in banking industry. 75% respondents said that they do not find any proven case about the success of this

technology, whereas 19% said intricate technology may pose a negative role in embracing blockchain.

The banking industry is one of the most attackable fields. It requires high security. Blockchain can eliminate the threat or the risk of fraud in all areas of banking. Now a days, blockchain technology is widely used due to its proven tight security. Though 60% CTOs think that blockchain technology is more secured than conventional banking technology systems and if implemented properly then blockchain technology definitely brings some advantages like cyber security to banking industry, but about 22% percent of the respondents do not think that blockchain is a secured system. Moreover, 18% banks don't have any clear idea about security issues. Banks can individually or jointly setup blockchain technology for inter or intra-bank transactions in a limited scope. Then blockchain security testing can be designed to evaluate every aspect of the blockchain from policies, system design through the security of the blockchain itself to ensure the confidentiality, availability and integrity of the entire blockchain.

It is evident from the findings that our banking industry is not ready yet to embrace this new technology. Though Bangladesh Bank has been closely monitoring developments related to blockchain technology. BB may take the initiative of exploring the applicability of blockchain to the Bangladeshi banking and financial industry by conducting a series of workshops or seminars involving all the stakeholders such as the academicians, bankers, regulators and technology partners. In the process, the participants of the workshop may come together to bring out a White Paper detailing the technology, concerns, global experiences and possible areas of adoption in the financial sector in Bangladesh. The white paper may highlights several advantages of blockchain technology regarding cost savings, efficiency, and transparency. BB may develop a guideline regarding the implementation of blockchain technology in the banking and financial sector of Bangladesh. The government may enact corresponding laws for this technology, and enterprises should be ready to embrace blockchain technologies.

Over the next few years, it is expected that many central banks will use this technology to improve their processes and economic wellbeing. With a clear concept of the various features of BCT including – the underlying technology, advantages, diversity, security, privacy, scalability, it is the right time to adopt BCT in Bangladesh.

Relevance of Blockchain for Banks in Bangladesh

1. Introduction

The cutting-edge technology that create waves on the fintech landscape and has brought disruption to the business industry by this time is Blockchain. There is no doubt that, blockchain is not the only answer to cure all the evils of banking. A similar outcome can be found in many use cases using conventional database configurations or processes without the expenses and challenges of a blockchain solution. Examples include computerization of internal processes, reduction in manpower and subcontracting/offshoring. Many existing clearing and settlement procedures can be drastically lessened by blockchain technology, if not eradicate. Massive implications of blockchain has been observed in the field of trade approvals, settlement, cash managing, asset optimization and other business logic methods that charge billion of dollars a year. Furthermore, it also assures to improve settlement by greatly decreasing the time or even eradicating processes for delivery versus payment, while assisting the requirements of market makers depending on the underlying asset(s) and counterparty necessities.

In the era of 1970s and 1980s the progress of the Internet, the “first horizon” in our paradigm was started. The formation of instinctive navigation and cross connection of information is possible through the “second horizon” of the World Wide Web that was promoted by Sir Tim Berners-Lee and others at the beginning of 1990. While “cloud computing” had its roots in other technologies, we claim that the development of Salesforce.com in 1999 marked a key milestone in its evolution into the “third horizon” of networked modernization. Also in the year of 1999, a remarkable publication around Byzantine Fault Tolerance which is vital to the theoretical foundations of blockchain and the promotion of SETI@Home which anticipates the distributed nodes of blockchain were created. In 2006, we trace the “fourth horizon” with the promotion of mobile broadband services which is fueled by low bandwidth costs and increasing ubiquity of smart phones and devices.

This brings us to the blockchain, with Satoshi's October 2008 paper beginning the "fifth horizon".

Tech savvy banks around the globe have begun exploring how blockchain technology can ease their business processes, with many use cases now being conducted over the past year or so. It supports the use of cryptocurrencies like Bitcoin, but eventually has grown as a technology that can convert many legacy business paradigms of banking sector.

Till now blockchain is considered as a promising tool to lessen costs and reorganize business processes of commercial bodies. But the actual excitement about the technology is to generate new techniques of doing trade. In addition to aiding the bottom line, blockchain can support modernization across top line applications such as loyalty and rewards, Internet of Things, marketplaces, and more - basically any process where digital assets are exchanged. Also predictions about medium-term cost savings of key processes are promising.

Accenture, a global management consulting and professional services firm has conducted a study. They have surveyed eight among the world's ten largest investment banks and found that it could help lessen the infrastructure costs to support their operations by as much as 30 per cent. As a result a saving between \$8.0 billion and \$12 billion a year is possible, with benefits to be found in processes such as regulatory compliance, financial reporting and KYC (Know Your Customer) activities. Business Insider Intelligence led a study to find out the most common reasons for which financial service organizations in Europe, the Middle East, and Africa (EMEA) region are investing in blockchain technology. The most important reason they have found is that it is an innovative way to craft new business models or launch start-ups. Nearly four out of ten firms (37 per cent) highlighted this as a motive for their concern in this particular technology.

As understanding raises, banks are beginning to confine their attention. They are watching for more tangible, targeted use cases for blockchain to solve real difficulties handled by their industries. Such as, one significant area where business organizations have a clear line of view to generate value is cross-border payments. The governor of the Bank of England

Mark Carney, in a speech made in April 2017 suggested that it could save "tens of billions of pounds" by refining the "accuracy, efficiency and security" of payments, clearing and settlement processes. Many mediators are involved in traditional settlement chains which makes them relatively sluggish, as well as leaving them unprotected to greater operational jeopardy and a higher potential for deception. We could not only cut costs but boost security and productivity by embracing blockchain technology in this area.

Many existing and developing use cases can be found to implement blockchain in banking industry. Even though this technology is still in a budding period financial companies are the first driving force to get the most out of this technology. Many companies like telecom, healthcare and life sciences, travel and hospitality, and energy, are also observing closely on the prospective blockchain use cases to positively disrupt their out-of-date business models.

If we want to implement blockchain as a mainstream banking technology the main challenge is to overcome some of the regulatory issues that will need to be addressed. These include issues like jurisdiction and liability if something goes erroneous, as distributed ledgers are, by definition, not reserved to any one location. Also we need to develop a legal framework that can establish blockchain structures as "unique and trusted sources of identity" and to be documented as tamper-proof. Because of the open nature of publicly distributed ledgers, privacy is a crucial issue in this technology, particularly when we want to safeguard the security of consumer records. This challenge is one of the in-built hitches of this technology witnessed by FinTech Network. In spite of these teething troubles, interest in blockchain shows no symbols of waning. This technology is surely a podium for disruptive innovation, its potential spreading far beyond redesigning financial facilities.

There is, in fact, no comprehensive study found on relevance of blockchain for banks in Bangladesh. In this state of affairs a research on this area is crucial to uncover the significant facts.

1.2 Objectives of the Study

The specific objectives of the study are to: first, in depth analysis of blockchain technology and its use in financial sector across the globe; second, discuss the relevance of blockchain technology in the banking sector of Bangladesh; third, analyze the awareness and readiness of banks regarding implementation of blockchain technology; and fourth, identify the challenges and suggest some future courses of actions to ensure better and secured blockchain operations in banks.

1.3 Methodology and Data

Both primary and secondary data have been collected to accomplish the objectives of the study. Secondary information have been collected from various publications of BB and BIBM, research articles, and websites. Primary data have mainly been collected from the IT departments of banks, using a structured questionnaire. A total of 34 banks and 100 top level executives related to IT and business operations were selected based on the consideration that the sample banks should represent all categories of banks in terms of ownership, number of branches and state of computerization.

1.4 Organization of the Review Report

The paper is organized into nine sections. After an introductory section with objectives and methodological issues, Section-2 discusses the blockchain concept. Section-3 reviews the use of blockchain globally. Section-4 identifies ways central banks are working on blockchain technology today. Section-5 and 6 include security issues and challenges. Section-7 analysed the findings of research data. Section-8 proposed a roadmap for the adoption of blockchain technology in the banking sector of Bangladesh. Finally, Section-9 puts forward concluding remarks and some recommendations.

2. Blockchain: Understanding the Theoretical Concepts

A blockchain is a data structure that makes it possible to create a digital ledger of transactions and share it amongst a distributed network of computers. It uses cryptography to allow each participant on the network to manipulate the ledger in a secure way without the need for a central

authority. Once a block of data is recorded on the blockchain ledger, it's extremely difficult to change or remove. When someone wants to add to it, participants in the network (called miners) — all of which have copies of the existing blockchain — run algorithms to evaluate and verify the proposed transaction (Norton, 2016).

Deloitte (2017) defined blockchain as a digital, immutable, distributed ledger that chronologically records transactions in near real time. The prerequisite for each subsequent transaction to be added to the ledger is the respective consensus of the network participants (called nodes), thereby creating a continuous mechanism of control regarding manipulation, errors, and data quality. Simply put, Blockchain is a protocol for exchanging value over the internet without an intermediary.

2.1 Features of Blockchain

Deloitte (2017) identified that blockchain, by virtue of its design and architecture, offers some inherent benefits which the industry has been looking for quite some time now. The distributed nature of Blockchain brings in a lot of transparency in processing and thereby reduces the need for manual verification and authorisation.

Near Real Time: Blockchain enables the near real-time settlement of recorded transactions, removing friction, and reducing risk.

No Intermediary: Blockchain technology is based on cryptographic proof instead of trust, allowing any two parties to transact directly with each other without the need for a trusted third party.

Distributed Ledger: The peer-to-peer distributed network records a public history of transactions. The blockchain is distributed and highly available. The blockchain does not typically preserve the identities of the parties or the transaction data, only the proof of the transaction existence.

Irreversibility & Immutability: The blockchain contains a certain and verifiable record of every single transaction ever made. This prevents past blocks from being altered and in turn stops double spending, fraud, abuse, and manipulation of transactions.

Smart Contracts: Stored procedures executed in a Blockchain to process pre-defined business steps and execute a commercially/legally enforceable.

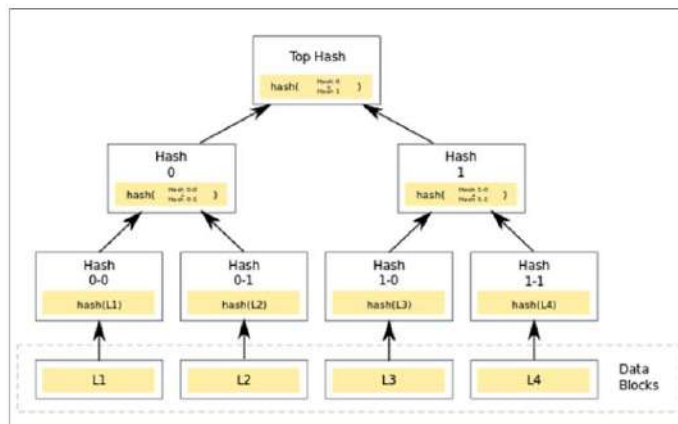
2.2 The Structure of Blockchain

Merkle Tree is at the Heart of the Blockchain Technology

The immutability of a Blockchain makes it nearly impossible for changes to be made once established, which increases confidence in data integrity and reduces opportunities for fraud. The immutability and irreversibility feature of a Blockchain comes from the underlying data structure which is called a Merkle tree or Hash tree (Deloitte, 2017).

The cryptographic security in Blockchain comes from a binary data structure with hash pointers. Merkle tree, or hash tree, as it is called, is a distributed data structure where data blocks are grouped in pairs and the hash of each of these blocks is stored in a parent node. This grouping of hash codes continue till the root node. This gives rise to the immutability of a Blockchain as tampering of any block will lead to tampering of all the preceding hashes till the root node which is tamper proof. The other advantage of Merkle tree is the proof of membership/ownership as knowing the root member is enough to know all the members in the tree. As a result hash tree provides faster processing of data as compared to traditional binary tree (Deloitte, 2017).

Figure 1: Merkle Tree as a Binary Tree Connected by Hash Pointers

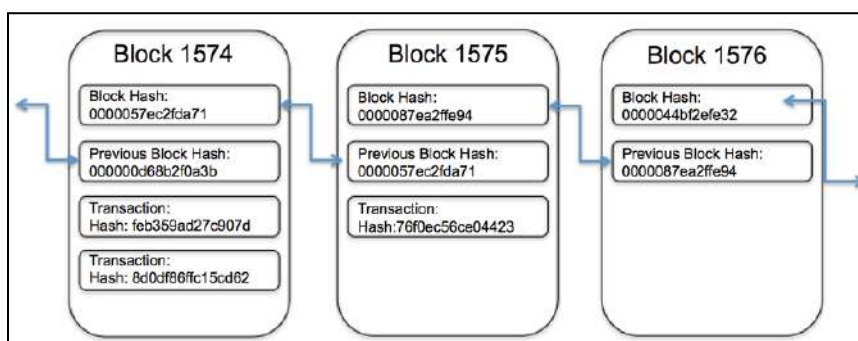


Source: Wikipedia

Lin I.C. and Liao T.C. describes data block critically in 2017. It is shown that generally in the block, it contains main data, hash of previous block, hash of current block, timestamp and other information. Figure-1 shows the structure of block.

Main data: Depending on what service is this blockchain provides, for example: transaction records, bank clearing records, contract records or IOT data record.

Figure 2: Blockchain Stores Transaction Records in a Series of Connected Blocks



Hash: When a transaction executed, it had been hash to a code and then broadcast to each node. Because it could be contained thousands of transaction records in each node's block, blockchain used Merkle tree function to generate a final hash value, which is also Merkle tree root. This final hash value will be recorded in block header (hash of current block), by using Merkle tree function, data transmission and computing resources can be drastically reduced.

Timestamp: Time of block generated.

Other Information: Like signature of the block, Nonce value, or other data that user define.

Cryptographic Components

A rigorous study by IDRBT (2017) regarding “Applications of Blockchain Technology to Banking and Financial Sector in India” critically analyzed the blockchain technology. It mentions that the Blockchain Technology relies heavily on fundamental tools from

Cryptology and Data Security, especially in terms of message authentication targeted towards tamper-evidence and tamper-resilience. In its most abstract form, a Blockchain may be described as a tamper-evident ledger shared within a network of entities, where the ledger holds a record of transactions between the entities. To achieve tamper-evidence in the ledger, Blockchain exploits cryptographic hash functions.

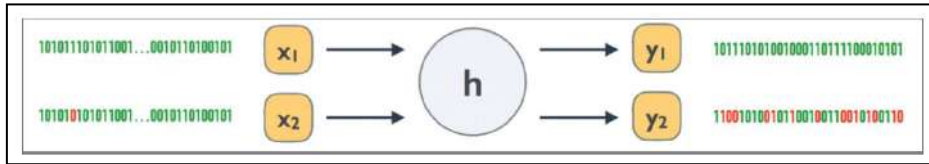
Cryptographic Hash Function

A generic hash function maps arbitrary size inputs or messages to fixed size hash values or tags. In order to justify the authenticity of a message through its tag, a cryptographic hash function tries to ensure pseudo one-wayness, that is, the practical infeasibility of generating the input message given the tag, and pseudo collision resistance, that is, the practical infeasibility of generating two input messages that produce the same hash value or tag. Due to these two properties of cryptographic hash functions, it is probabilistically ensured that if a message is inadvertently exposed to errors, or has been intentionally tampered with, its hash value will not match with the original tag, and thus, the tampering will be evident. In fact, for minor differences in the input message, the tag generated by a cryptographic hash function is supposed to exhibit major (random) difference. This allows us to utilize hash functions for creating tamper evident structures (IDRBT, 2017).

Hash Pointer

A pivotal construct in blockchain technology is the hash pointer – a combination of a regular pointer structure with the hash value of the data fragment it points to. This produces an inbuilt data integrity mechanism, as storing the hash pointer simultaneously guarantees the location evidence of the data (through the regular pointer) as well as the tamper evidence of the same (through the hash value). In other words, storing the hash pointer to any piece of data acts as a commitment towards the location as well as the integrity of the specific data fragment. The hash pointer is flexible enough to replace the regular pointer in any acyclic pointer based linked data structure, and hence is capable of producing a variety of data structures with inbuilt data integrity and tamper evidence. An example of such a tamper-evident data structure is the Blockchain (IDRBT, 2017).

Figure 3: Minor Input Difference Leads to Major Output Difference



Source: IDRBT

Blockchain: Tamper-evident Linked-List

Let us consider a linked-list, with the regular pointers linking the nodes replaced by hash pointers – this is precisely what a blockchain data structure looks like. Each block in the blockchain acts as a node in the list (or chain), holding some amount of data, and a hash pointer pointing to the previous block on the chain. The first block in the chain is called the genesis block, and this is the only one that does not have to contain a hash pointer.

It is important to note that if any block in the blockchain incurs an inadvertent error or is tampered with, the block containing the hash pointer of the erroneous block will not match anymore. Thus, any inadvertent error may be traced in a blockchain. If the tampering is intentional, the adversary is forced to fix the hash pointer in all of the blocks following the tampered block, in order to validate the complete blockchain. However, if someone holds the last block of the blockchain as a commitment value, it will be easy to prove any such attempt at tampering, anywhere within the blockchain. Thus, we have a tamper-evident data structure in the form of this blockchain, which allows a constant size commitment. In case, a network of entities tracks the last block of the blockchain, simultaneously, we automatically have a completely decentralized platform to store the commitment and hence a decentralized network to ensure tamper-evidence of the blockchain. One may extend the chain quite easily; by creating a new block containing the hash pointer to the last existing block in the chain, which in turn appends the newly created block to the existing chain. However, one may not insert a new block in between two existing blocks in the chain as easily. That would require changing an internal hash pointer, which leads to changing all subsequent hash pointers, and hence, all the subsequent

blocks in the blockchain. Exactly the same holds for deletion of a block from within the blockchain (IDRBT, 2017).

MerkleTree: Tamper-evident Binary Tree

Similar to the blockchain, one may construct a binary tree, replacing the regular pointers by hash pointers, to obtain a Merkle Tree. In a Merkle tree, the leaf nodes contain the data blocks, and the intermediate nodes contain the cumulative hash pointers to the respective subtrees, in a hierarchical fashion. The hash pointer to the root node of the Merkle Tree (top hash) acts as a constant size commitment for the whole tree, similar to the case of blockchains.

If any inadvertent error or malicious tampering causes the data in any of the nodes of the tree to change, it will be evident to everyone holding the hash pointer to the root node. In case of a network, the hash pointer to the root node may be stored as a commitment in a distributed fashion, with every entity, and in such a case, the Merkle Tree will act as a decentralized tamper-evident storage for data (IDRBT, 2017).

Blockchain Protocol

IDRBT (2017) also identified that the driving force behind the recent fame and success of blockchain technology is the wide range and flexibility of protocols that can be realized using the basic data structures defined in the previous section. To understand the blockchain protocols, it defined some essential functional components, as follows:

Network

The blockchain protocol, in its most generality, establishes a consensus over a decentralized network of members involved in the respective protocol. The members participating in the protocol may have various roles and actions in managing the authenticated data structure, as specified in the protocol. Such roles and actions may depend upon a pre specified access control mechanism, or a set of permissions, as and when applicable, to make the protocol fully flexible. Consequently, the structure of the blockchain network may be peer-to-peer (flat) or hierarchical, as and when required by the respective protocol (IDRBT, 2017).

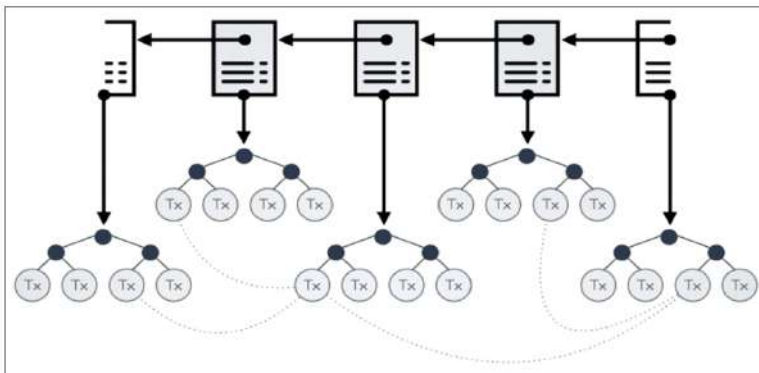
Transactions

A mutual contract struck between any set of entities in the blockchain network is generally termed as a transaction. Owing to the historical origin of blockchain technology from Bitcoin, any such contract is called a 'transaction'. However, in its most generality, a transaction can be a complex multiparty contract encoded as a Boolean logic, implemented in the form of an executable script. These generic blockchain transactions are also called Smart Contracts. The transactions are the fundamental atomic components of a blockchain protocol, and the other structures in the protocol are built on top of transactions. One may in fact view a blockchain platform as a tamper-evident distributed ledger of transactions (IDRBT, 2017).

Ledger

A collection of transactions in a blockchain network is generally stored in the form of a Merkle Tree, to ensure tamper-evidence of the set of transactions using a constant size commitment (hash pointer to the root of the tree). Each such set of transactions, recorded as a Merkle Tree, is included in the data segment of a block, and these blocks are stored chronologically (as per their time-stamps) in a blockchain ledger, that is, in the form of a tamper evident linked-list, as shown in Figure-4.

Figure 4: Blockchain Architecture as a Ledger of Transactions



Source: IDRBT, 2017

Verification

Blockchain is inherently meant to be a decentralized ledger of transactions. Thus, each transaction or contract between two (or more)

members in the network requires verification or validation by the network itself, without going through an independent arbitrator. This is achieved by incorporating a verification scheme in the protocol. In practical blockchain schemes, this verification scheme is often implemented as a part of the transaction in the form of an executable script, which results in either acceptance or rejection of the specific transaction. In certain practical applications of blockchain technology, the verification routine also connects the current transaction to previously existing transactions in the blockchain, which have been verified earlier as inputs. These connections have been depicted by the dotted lines in Figure-4. Depending on the application, the verification scheme may be designed in such a way that the transactions admit to public verification, or it may be entirely permissioned (IDRBT, 2017).

Consensus

The transactions are grouped together in a Merkle Tree, and the block containing this tree is recorded in the blockchain ledger. It is to be noted that in a distributed network, the task of creating a block and appending it to the ledger should also be natively decentralized. The blockchain technology is flexible enough to accommodate a suitable form of decentralized appending process, known as mining in general.

Irrespective of the exact mining process that updates the blockchain ledger, it is imperative to ensure that the ledger is universally accepted across the network at any given point of time. This warrants for a consensus scheme in the protocol. This decentralized consensus mechanism ensures a consistent version of the blockchain ledger amongst all members of the network, and provides the most important tamper-detection and tamper-resilience property to the blockchain. In fact, if any member introduces an inconsistency in the ledger through the mining process, the other members have the power to negate the block appended by that member, and rectify the ledger by forking the chain. Depending on the nature of the application and the structure of the network, specific consensus schemes may be constructed for the blockchain to ensure tamper-resilience. Note that the mining and consensus schemes constitute

the backbone for any blockchain protocol, and hence should be chosen carefully (IDRBT, 2017).

How to Get Consensus?

Lin and Liao (2017) show that consensus function is a mechanism that make all blockchain nodes have agreement in same message, can make sure the latest block have been added to the chain correctly, guarantee the message that stored by node was the same one and won't happened "fork attack", even can protect from malicious attacks.

Proof of Work (PoW)

A proof of work is a piece of data which is difficult (costly or time-consuming) to produce but easy for others to verify and which satisfies certain requirements. Producing a proof of work can be a random process with low probability so that a lot of trial and error is required on average before a valid proof of work is generated. Bitcoin uses the Hashcash proof of work system.

When calculating PoW, it's called "mining". Each block has a random value called "Nonce" in block header, by changing this nonce value, PoW have to generate a value that makes this block header hash value less than a "Difficulty Target" which has already been set up. Difficulty means how much time it will take when the node calculating hash value less than target value.

In order for a block to be accepted by network participants, miners must complete a proof of work which covers all of the data in the block. The difficulty of this work is adjusted so as to limit the rate at which new blocks can be generated by the network to one every 10 minutes. Due to the very low probability of successful generation, this makes it unpredictable which worker computer in the network will be able to generate the next block (Lin and Liao, 2017).

Proof of Stake (PoS)

Because Proof of Work method will cause a lot of electricity power and computing power be wasted, Proof of Stake doesn't need expensive computing power. With Proof of Stake, the resource that's compared is

the amount of Bitcoin a miner holds - someone holding 1% of the Bitcoin can mine 1% of the Proof of Stake blocks.

According to Lin and Liao (2017), a Proof of Stake method might provide increased protection from a malicious attack on the network. Additional protection comes from two sources:

1. Executing an attack would be much more expensive.
2. Reduced incentives for attack. The attacker would need to own a near majority of all bitcoin.

Therefore, the attacker suffer severely from his own attack.

Smart Contracts

It is seen from the research by IDRBT (2017) that smart contracts are pieces of software, that extend blockchains' utility from simply keeping a record of financial transaction entries to automatically implementing terms of multi-party agreements. Smart contracts are executed by a computer network that uses consensus protocols to agree upon the sequence of actions resulting from the contract's code. With a shared database running a blockchain protocol, the smart contracts auto-execute, and all parties validate the outcome instantaneously and without need for a third-party intermediary.

Ethereum is an open source blockchain platform combining Smart Contract, offering decentralized virtual machine to handle the contract, by using its digital currency called ETH, people can create many different services, applications or contracts on this platform.

Classification of Blockchain Ledgers/ Type of Blockchain

Based on the choice of the functional components described above, Lin and Liao (2017) broadly classified blockchain architectures into two categories – public and private. Another category also identified by ‘Consortium’ blockchain.

In case of public architectures, the process of generation and verification of transactions is publicly available, so that anyone in the network may perform these actions. Everyone can check the transaction and verify it, and can also participate the process of getting consensus. In fact, the

mining process is also open to anyone in the network. However, most often, the mining process relies on some proof-of-work concepts, which may be monopolized by supremacy in financial or computing power. Bitcoin and Ethereum are both Public Blockchain. Figure 5 shows public blockchain.

Figure 5 (a): Public Blockchain

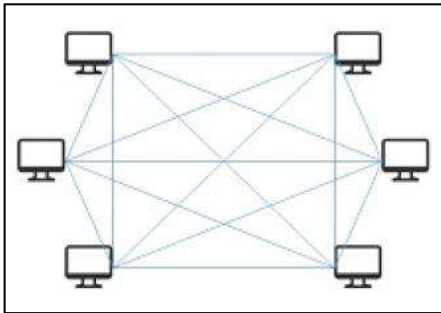


Figure 5 (b): Private Blockchain

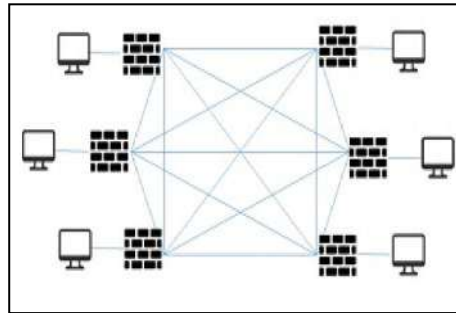
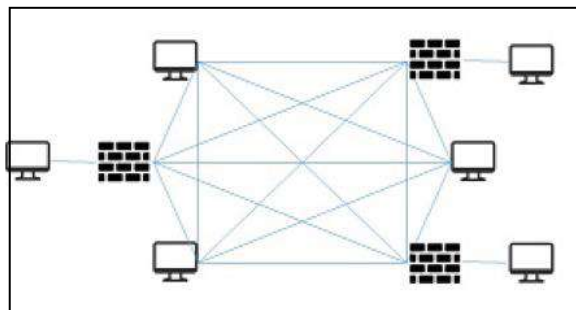


Figure 5 (c): Consortium Blockchain



In case of private blockchain architectures, the processes involving the generation and verification of transactions may be access controlled, and restricted to only a fraction of the members on the network. Node will be restricted, not every node can participate this blockchain, has strict authority management on data access. Figure-5(b) shows private blockchain. Quite often, this results in a simpler consensus mechanism, which may or may not require a competitive mining at all.

Consortium blockchain means the node that had authority can be choose in advance, usually has partnerships like business to business, the data in blockchain can be open or private, can be seen as Partly Decentralized.

Like Hyperledger and R3CEV are both consortium blockchains. Figure-5(c) shows consortium blockchains.

No matter what types of blockchain is, it both has advantage. Sometimes we need public blockchain because its convenience, but sometimes we may be need private control like consortium blockchains or private blockchain, depending on what service we offer or what place we use it.

According to IDRBT (2017), another popular nomenclature in this line classifies the blockchain architecture as permissioned and permissionless. A blockchain is said to be permissionless if the transactions can be made or verified by anyone in the network, while a blockchain is said to be permissioned if the transactions can be made or verified by predetermined authorized entities. In addition, the permissioned blockchains might include specifically designed access control structure to determine who in the network can view the blockchain ledger, mine blocks and verify blocks. In permissionless blockchain protocols, like Bitcoin, majority consensus is followed in general, where the longest chain sustains. In case of permissioned blockchains, the miners and auditors are trusted entities, and hence the consensus scheme may be designed to be much simpler in such cases. In fact, the mining may be a delegation scheme, instead of a competitive scheme, in a permissioned setting.

Permissionless Blockchain

Let us illustrate the generic structure of a permissionless blockchain architecture by taking the pioneering Blockchain application—Bitcoin—as an example.

Block: A Bitcoin block contains the hash of itself, the hash of the previous block, the Merkle root of the transactions that are included in the block, a nonce that is used by a miner to solve the Bitcoin computational hash-puzzle, and the time at which the block was created. The first block in the ledger is the genesis block, and subsequent blocks form a block chain, publicly maintained in a ledger. Some examples of such ledgers are available at blockchain.info, blockexplore.com, etc.

A new block is added approximately every 10 minutes through a mining process.

Transaction: A Bitcoin transaction contains a header, inputs and outputs:

- The header contains the transaction ID, hash of the transaction, number of inputs and outputs, time of the transaction, and a version number that tells the verifier which set of rules to use to validate the transaction
- Input to a Bitcoin transaction is another transaction. Each input contains sequence number of the input transaction, address information about the previous output, input script containing the signature with the private key of the user who is spending the coins, and the value of the transaction
- Each output contains the transaction index, address of the recipient, value of the output, and an output script described below.

Verification: Verification of Bitcoin transactions is performed through scripts, implemented in a Turing incomplete stack based scripting language. There are two types of scripts – input scripts and output scripts. Every transaction contains an output script, which states that–“This transaction can be redeemed (spent) by anyone who possesses the public key which hashes to address of the recipient, and also possesses the signature from the owner of that public key”. The verification of a transaction is essentially verification of the digital signature against the corresponding public key. This verification routine combines the new input script of a new transaction with the output script of the input transactions, and executes the combination. It might be necessary in certain cases to obtain the approval of multiple parties in order to process a transaction; this is done in Bitcoin using multisig. Bitcoin scripts are even more flexible, and can allow payments to be redeemed after a certain time interval (defined by a time lock).

Mining: Bitcoin follows a competitive mining scheme, based on a hash-puzzle. The miners have to compete with one another, using the computing resources at their disposal, to append a new block to the

blockchain ledger. Bitcoin employs a smart incentive mechanism to ensure honesty of the miners, as well as to regulate the influx of Bitcoins in the market. To further regulate the flow of Bitcoins, the hash-puzzle is designed in such a way that new Bitcoin blocks are created (mined) every 10 minutes, on an average. The mining competition based on the hash-puzzle is also known as a proof-of-work strategy for consensus.

Consensus: Bitcoin follows a standard majority consensus, where each miner may choose which block in the chain to append to, and eventually the longest chain sustains. It is widely believed that as long as honest parties control majority of the computing power, the longest chain will grow and outperform other forks.

Ethereum is another widely used crypto-currency facilitating the users of the platform to extend the basic transaction flow with much richer control flow called smart contract. Ethereum currently uses proof-of-work algorithm called ETHash which is designed to disallow the mining to be done by pools based on Application Specific Integrated Chips (ASIC). This technique allows the GPUs to be used for mining and currently the latency in block creation is 12 seconds as opposed to 10 minutes of Bitcoin. There are proposals to move from this proof-of-work system to proof-of-stake in the next version of Ethereum Consensus algorithm. Like Bitcoin, Ethereum gives an incentive of 5 Ether (Coins in Ethereum).

Ethereum is designed for implementation of complex workflows on the top of distributed ledger. Unlike Bitcoin, Ethereum Virtual Machine allows a workflow involving loops. To facilitate this, the consensus and mining algorithms account for the amount of resources spent for the longer workflows (resource intensive). Any physical asset such as a car manufactured in a company can be represented as digital entity in the blockchain. Once represented in the blockchain, the complex processes involving the ownership purchase of this digital entity can be transparently handled through blockchain.

Permissioned Blockchain

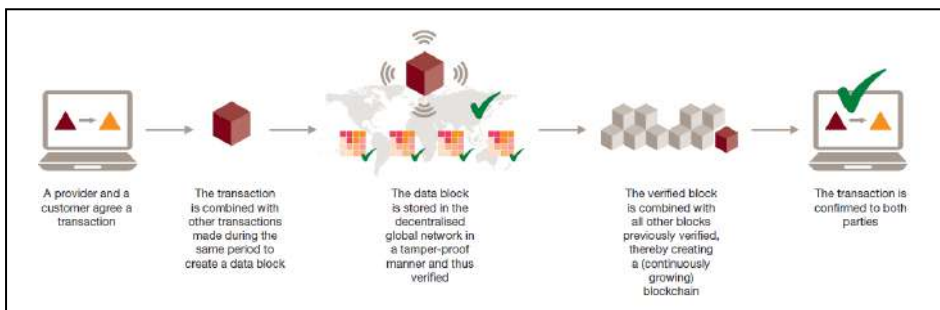
IDRBT (2017) also shows that the main difference in the structure of a permissioned blockchain as compared to that of a permissionless blockchain arises from the mining process. In a permissioned blockchain, authorized members perform the mining, and in certain applications, the mining process may actually be delegated to authorized members of the network. Verification of transactions and blocks, similarly, may be delegated to authorized members. Consequently, in practical cases, quite often the ledger does not require a consensus scheme to ensure tamper resilience. In fact, each and every functional component of the blockchain architecture, as discussed earlier, may be custom designed for a permissioned platform.

2.3 How Blockchain Works?

The main working processes of blockchain are as follows:

1. The sending node records new data and broadcasting to network.
2. The receiving node checked the message from those data which it received, if the message was correct then it will be stored to a block.
3. All receiving node in the network execute Proof of Work (PoW) or Proof of Stake (PoS) algorithm to the block.
4. The block will be stored into the chain after executing consensus algorithm, every node in the network admit this block and will continuously extend the chain base on this block.

Figure 6: The Blockchain Process



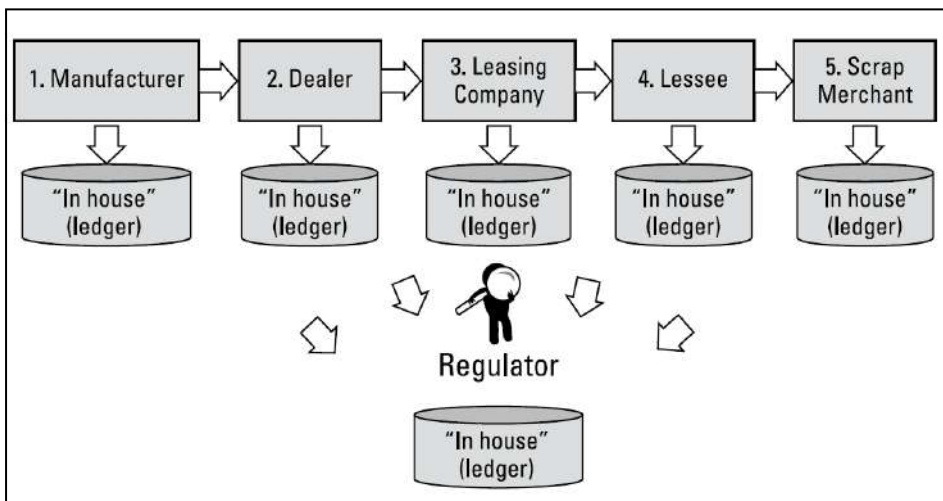
Source: PwC

2.4 Exploring a Blockchain Application

Gupta (2018) in his book titled “Blockchain” explained some recent business application of blockchain. One of them is ‘Tracking Vehicle Ownership’ which is explained below.

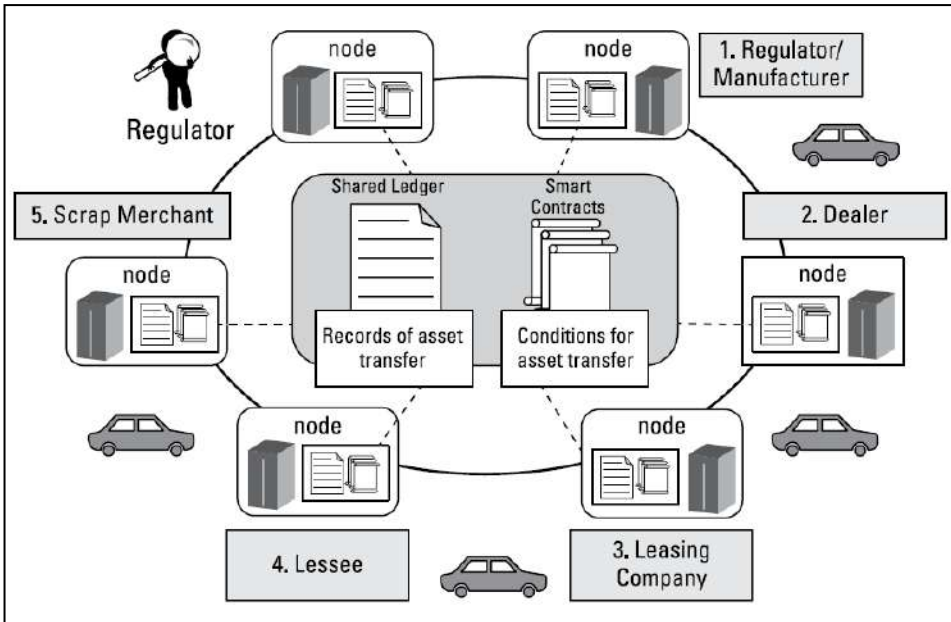
Car companies make leasing a vehicle look easy; in reality, it can be quite complicated. A significant challenge faced by today’s car leasing networks is that even though the physical supply chain is usually integrated, the supporting systems are often fragmented. Each party within the network maintains its own ledger, which can take days or weeks to synchronize (Figure-7). By using a shared ledger on a blockchain network, every authorized participant can access, monitor, and analyze the state of the Vehicle regardless of where it is within its life cycle (Figure-8).

Figure 7: Tracking Vehicle Ownership Without Blockchain



Source: Gupta (2018)

Figure 8: Tracking Vehicle Ownership with Blockchain



Source: Gupta (2018)

With blockchain, network participants can interact as follows:

1. The regulator creates and populates the registration for the new vehicle on the blockchain and transfers vehicle ownership to the manufacturer.
2. The manufacturer adds the make, model, and vehicle identification number to the vehicle template within the parameters allowed by the *smart contract* (a digital agreement or set of rules that govern a transaction).
3. The dealer can see the new stock availability. Ownership of the vehicle can be transferred from the manufacturer to the dealership after a smart contract is executed to validate the sale.
4. The leasing company can see the dealer's inventory. Ownership of the vehicle can be transferred from the dealer to the leasing company after a smart contract is executed to validate the transfer.
5. The lessee can see the cars available for lease and complete any form required to execute the lease agreement.

6. The leasing process continues between various lessees and the leasing company until the leasing company is ready to retire the vehicle.

At this point, ownership of the asset is transferred to the scrap merchant, who, according to another smart contract, has permission to dispose of the vehicle.

2.5 The Benefits of Using Blockchain

IDRBT (2017) study shows that the benefits of using Blockchain varies from case to case. However, in most cases, Blockchain becomes a good fit when there is a lot of data that is shared across multiple parties with no Trust mechanism among the participants. The advantages brought by BCT broadly classified into cost savings, efficiency, and transparency by IDRBT (2017).

Cost Savings

Fraud Prevention: As BCT is built on the concept of sharing information across parties and consensus during transactions; it saves on reconciliation cost between banks and prevents losses because of documentary frauds.

Save Costs on Forex Volatility: BCT used in cross border payments can help the consumers and banks to take advantage of the forex marketplace to get the best deal transparently from the market players. Since the transactions are processed in near real time, the players need not suffer through the vagaries of currency volatility.

Save Costs over Delayed Settlements: In case of a distributed payment network, BCT ensures the transaction settlement information is also processed simultaneously along with the payment messages. Since, the payments and settlements happen in real time, the participating banks and financial institutions can enjoy reduced pressure on the treasury management to keep their settlement accounts well-funded.

Efficiency

Resilience through Redundancy: Being a distributed architecture by design, BCT enables the network to be operated by all permissioned nodes in the ecosystem. All the important members of the payment ecosystem – banks, financial institutions shall effectively become the participating nodes in the BCT network. In the case of an untoward event affecting the ecosystem (like war, floods, earthquakes, cyber-attacks), even if some nodes of the network are unavailable, the consensus algorithms built as a part of the BCT network ensure a transaction can be approved by the remaining nodes in the network. BCT also brings in a high level of redundancy in the network, as the copy of the ledger is available with all the nodes in the network.

Reduced Time for Processing: Most of the conventional banking processes are linear and hierarchical, akin to the assembly line of the manufacturing industry, e.g., maker-checker/cross check/approval processes. While the maker checker- approver process helps the banks and FIs to gain control and puts the emphasis on ownership of decisions, it delays in decision making and can lead to longer processing time, costs and lower customer satisfaction. BCT can radically alter the way such transactions are processed by banks and FIs today.

In BCT, the transaction is relayed to all the approving nodes simultaneously, as and when the approvals are provided, the information is updated in the ledgers of all the nodes, instantly. Thus, BCT can help in improving the speed of processing transactions by reduction in decision making time across the organizations resulting in reduced cost of processing and enhanced transparency of decisions to all participating nodes.

Smart Contracts are business terms that are embedded in the transaction database and gets automatically executed when certain business conditions are met. Smart Contract feature in the BCT enables speed of processing and helps banks to create and execute complex business rules that have minimal human intervention and it can address the market needs that could not be satisfied before.

Faster Settlements: Blockchain can also help to address KYC and identity management challenges as a lot of the data to prove identity is already in digital form and BCT could enable instant verification. Use of BCT can reduce duplicative recordkeeping, eliminate reconciliation, minimize error rates and facilitate faster payment/asset settlement. In turn, faster settlement means less risk in the financial system and lower capital requirements.

Saving in Decision Making Time: BCT helps in improving the rate of processing transactions by reducing decision making time, thus resulting in reduced cost of processing and enhanced transparency of decisions to all the participating nodes. As BCT brings transparency to the system, availability of audit trails brings in the necessary control and trust to the participating members which may help improve the services through continuous innovation.

Transparency

Immutable Transactions: Maintaining an immutable record of transaction events in a chronological order being a main pillar of its architecture, BCT guarantees much desired attributes to banking and financial transactions such as immutability and finality. Although blockchain is imagined as an open system for transaction processing across the financial system, banks are initially looking inward, experimenting with the distributed ledger approach to create efficiencies and a single version of digital truth. Subsequently, onboard other external parties in the ecosystem for mutual benefits with a permission-based ledger system that can move cash and assets in real-time to settle market transactions.

Provenance: In the area of payments, while the exchange of messages reasonably offer clarity on each step in the payment process, BCT could add to it by providing provenance and auditability for these messages and thus bringing about transparency and efficiency in the processes leading to reduction in overall settlement time and risk.

Provenance ensures the finality of the ownership of the asset and it saves efforts and processes to prevent double collateralization of the same asset. As a ledgering technology, blockchain will not replace the payment

systems or the messaging systems deployed by banks, but these systems will connect to the blockchain, augmenting existing business networks and providing increased discoverability and trust.

2.6 Applications of Blockchain Technology

In order to identify the potential application areas of BCT in banking, it may be prudent to look at the various use-cases of BCT taking shape across the world. The use-cases examined by IDRBT (2017) are explained below.

Digital Currency

Electronic Money, which is an early version of digital currency is formally defined as “value stored electronically in a device such as a chip card or a hard drive in a personal computer”. The value stored and transferred needs to be denominated in a sovereign currency to be considered e-money; while, in many cases digital currencies are not denominated in or even tied to a sovereign currency, but rather are

denominated in their own units of value. A cryptocurrency is a form of digital currency designed to work as a medium of exchange using cryptography to secure the transactions and to control the creation of additional units of the currency. The examples of cryptocurrencies include Bitcoin, Litecoin, Ripple, Ethereum and Dogecoin. Typical cryptocurrencies have their own advantages and disadvantages.

Advantages

Control and Security: Users are in control of their transactions, without foregoing their privacy while overcoming identity theft. Due to the fact that blockchain transactions cannot be reversed, do not carry with them personal information, and are secure, merchants are protected from potential losses that might occur from fraud.

Transparency: All finalized transactions are available for everyone to see thus allowing immediate verification of transactions. Protocols being open source undergo wide scrutiny, thus enabling trust in the underlying platform and guaranteeing that they cannot be manipulated by any single person, organization, or government. It is possible to send and receive

money anywhere in the world at any given time, without a central authority.

Very Low Transaction Cost: Currently, blockchain payments fees is very low. With transactions, users might include fees in order to process the transactions on a priority basis. Digital currency exchanges help merchant process transactions by converting them into fiat currency by charging lower fees than credit cards and PayPal.

Disadvantages

Risk and Volatility: Digital currencies are very volatile mainly due to the fact that there is a limited amount of coins and the demand for them increases by each passing day. A Committee on Digital Currencies set up by Bank for International Settlements (BIS), is cautious about Digital Currencies. They have observed that unlike traditional e-money, digital currencies are not a liability of an individual or institution, nor are they backed by an authority. Furthermore, they have zero intrinsic value and, as a result, they derive value only from the belief that they might be exchanged for other goods or services, or a certain amount of sovereign currency, at a later point in time. Accordingly, holders of digital currency may face substantially greater costs and losses associated with price and liquidity risk than holders of sovereign currency.

The degree of anonymity provided by some digital currency schemes may discourage a range of financial system participants from direct use or from providing facilities for digital currency use to their customers, as AML/CFT requirements may be difficult to satisfy in relation to digital currency transactions. Also increased adoption and use of digital currencies could affect the conduct of monetary policy.

Central Bank Issued Digital Currencies

While there are disadvantages of existing cryptocurrencies, many central banks around the world have stepped up their efforts towards developing digital versions of their fiat currency to leverage the benefits of the underlying technology – BCT.

The Central Bank of Canada has revealed recently that it is developing a digital version of the Canadian dollar based on BCT, called CAD-coin.

Other major banks including Bank of Montreal, CIBC, Royal Bank of Canada, Scotia bank and TD Bank, as well as banking consortium startup R3CEV, are said to be involved in the effort. Bank of England is also exploring the area of digital currency.

LHV Pank — the largest independent Estonian bank — became the first bank in the world to experiment with programmable money when it issued €100,000 worth of cryptographically-protected certificates of deposits. Cuber (Cryptographic Universal Blockchain Entered Receivable) Technology, a subsidiary of LHV Pank, focuses exclusively on Bitcoin-based digital securities. Cuber's work comprises two strands: CUBER securities and the CuberWallet.

The Dutch central bank is experimenting with a bitcoin-based virtual currency called “DNBCoin”. Russian government-controlled Sberbank of Russia owns “Yandex.Money” – electronic payment service and digital currency of the same name. In 2016, a city government in Switzerland, first accepted digital currency in payment of city fees. Zug, Switzerland added bitcoin as a means of paying small amounts, up to Sfr 200, in a test. Swiss Federal Railways, government-owned railway company of Switzerland, sells bitcoins at its ticket machines.

BCT Applications without Native Currency

Analyzing the solution proposed by World Economic Forum (2016), Deloitte (2017) explained the potential application areas of BCT without native currency in banking across the world. The use-case examined by Deloitte (2017) is explained below.

Trade Finance Application (Permissioned Blockchain): Letters of credit are one of the most commonly used trade finance instruments today and rely on highly manual, paper-based processes. Due to extended processing time in a trade transaction, purchasers and suppliers are not making the most efficient use of their capital as well as the authenticity of trade documents is required throughout the process to prevent fraudulent transactions.

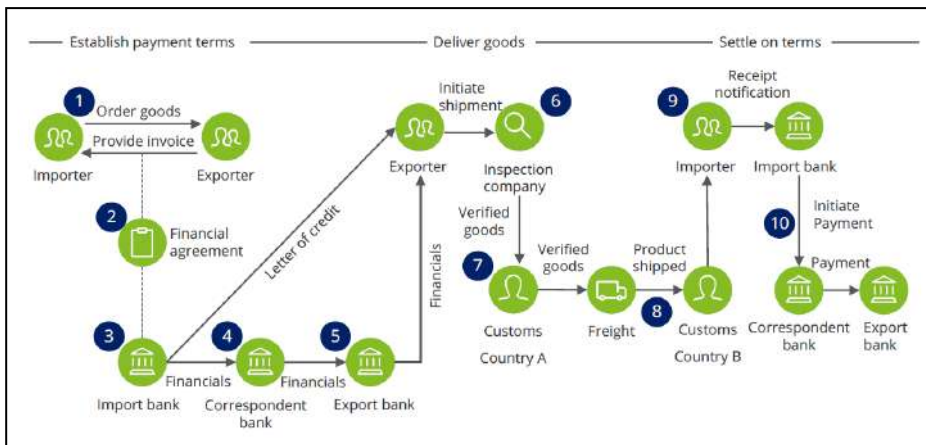
One of the most frequently suggested examples of where blockchain can be applied is in the trade finance area. If some banks decide to put the

letters of credit – on the blockchain, then that is pretty powerful – but to be really powerful the big corporates, the big shippers, and manufacturers, need to be on board, as well as the customs authorities. As both letters of credit and bills of lading have very complex and intricate information flows, even if only a few participants were using a blockchain solution this would generate significant advantages.

A Blockchain-based solution can capture the details contained in a purchase order, bill of lading, invoice, and tracking of shipment in a smart contract on the Blockchain. Blockchain can reduce the turn-around-time of Letter of Credit (LC) processing by a huge margin; thereby reducing the processing cost and efforts.

The solution proposed by World Economic Forum suggests a world where the shipper and customs officer will have a transparent and real-time view of the processing of a Letter of Credit. This will provide the government bodies and regulators a real-time view of essential documents to assist in enforcement and AML activities.

Figure 9: Current Process of LC Processing

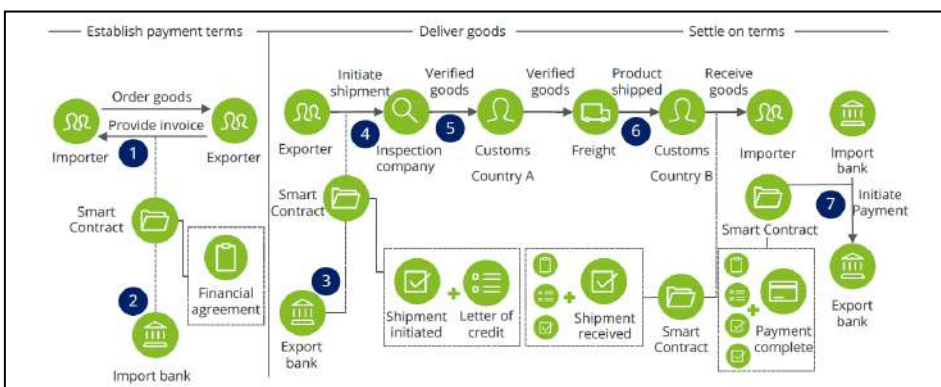


Source: World Economic Forum: The Future of Financial Infrastructure

1. An importer and exporter agree to the sale of a product at a future date and time.
2. The financial agreement is captured within an invoice, which identifies the quality of good sold, price and delivery timeline.

3. The importer provides a bank with a copy of the financial agreement for review.
4. The importer bank reviews the financial agreement and provides financials on behalf of the importer to the correspondent bank, which has established a relationship with the exporter bank.
5. The export bank provides the exporter with the financing details, which enables the exporter to initiate the shipment.
6. A trusted third-party organization inspects the goods for alignment with the invoice.
7. Local customs agents within the export country inspects the goods based on the country code.
8. The goods are transported by freight from Country A to Country B and local customs agents within the import country inspect the goods based on the country code.
9. Following inspection, the goods are delivered to the importer, which provides a receipt notification to the importer bank.
10. Upon receiving notification, the import banks initiates the payment to the export bank through the correspondent bank.

**Figure 10: Blockchain Based on LC Processing
(Proposed by World Economic Forum)**



1. Following the sales agreement, the financial agreement is shared with the import bank through a smart contract.
2. The import bank reviews the arrangement, drafts the terms of the letter of credit and submits it to the export bank for approval.

3. The export bank reviews the letter of credit; once approved a smart contract is generated to cover the terms and conditions of the letter of credit.
4. The exporter digitally signs the letter of credit within the smart contract to initiate shipment.
5. Goods are inspected by a third-party organization and the customs agent in the country of origin (all requiring a digital signature for approval).
6. The goods are transported by freight from Country A to Country B and inspected by local customs agents prior to being received by the importer.
7. The importer digitally acknowledges receipt of the goods, which initiates payment from the import bank to the export bank via a smart contract.

The solution proposed by World Economic Forum suggests a world where the shipper and customs officer will have a transparent and real-time view of the processing of a Letter of Credit. This will provide the government bodies and regulators a realtime view of essential documents to assist in enforcement and AML activities.

Some other BCT Applications without Native Currency examined by IDRBT (2017) are explained below.

Barclays and an Israel-based start-up company have carried out what they say is the world's first trade transaction using BCT, cutting a process that normally takes between seven and 10 days to less than four hours. The transaction guaranteed the export of almost \$100,000 worth of cheese and butter from Irish agricultural food co-operative Ornuia – formerly the Irish Dairy Board – to the Seychelles Trading Company. The deal was executed via a blockchain platform set up by Wave, a firm that came through a Barclays development programme.

Bank of America, Merrill Lynch, HSBC and the Infocomm Development Authority of Singapore have claimed success in demonstrating the application of distributed ledgers to replace paper-based Letters of Credit in trade finance transactions. The application enables exporters, importers and their respective banks to share information on a private distributed

ledger. The trade deal can then be executed automatically through a series of digital smart contracts once certain conditions are satisfied. The parties involved in the transaction can visualize data in real-time on their devices and see the next actions to be performed. The application uses the open source Hyperledger as blockchain fabric, supported by IBM Research and IBM Global Business Services.

Cross-border Payments: Ripple is using distributed ledger technologies to transform the cross-border payment business, to make international payments easier and faster and has added a few banks to its network. The recent cyber attacks in Bangladesh, Vietnam and Ecuador have highlighted the vulnerabilities in cross-border transaction banking. Distributed ledgers present an opportunity to help banks partially overcome such vulnerabilities in the future. Santander Bank launched a new app to facilitate live international payments (foreign remittances), powered by BCT. The app uses core technology provided by Ripple.

FX Trading: Currently multiple records for currency trade have to be created for buyer, seller, broker, clearer and third parties and then continuously reconciled across multiple systems. Cobalt DL uses BCT, eliminating multiple trade records for buyer, seller, broker, clearer and third parties from each transaction. By presenting a shared view of a trade, Cobalt DL frees up back- and middle-office resources that are currently overwhelmed by the need for continuous reconciliation across multiple systems. This is backed by eight major banks and financial institutions.

The technology is designed to integrate seamlessly with all trading sources and venues, providing immediate efficiency benefits, analysis of which has shown to deliver a significant cost reduction when compared with existing infrastructure. FX market participants incur multiple unnecessary license fees, ticketing charges, IT overheads and staff costs as a result of the complexity of existing structures.

BCT in Capital Markets: R3 is a financial innovation firm that leads a consortium partnership with over 50 of the world's leading financial institutions, to work together to design and deliver advanced distributed ledger technologies to the global financial markets.

BCT can revolutionize the Capital Market trading processes. There are several intermediaries involved in a trade, like exchanges, Central Counterparties (CCPs), Central Securities Depositories (CSDs), brokers, custodians and investment managers. For correct accounting and to complete the business transaction, intermediaries need to update their respective ledgers based on the messages exchanged between them. This creates a delay and also additional cost. Sometimes, to enable a particular transaction and the corresponding ledger updates, intermediaries may need to complete a few additional ledger transfers in the form of realignment, securities borrowing or cash management. This introduces additional delays in the transaction lifecycle, increasing the time for final settlement. BCT will benefit Capital Market Services at all stages of Trade and securities servicing.

Pre-Trade: A blockchain system that stores and facilitates KYC data will help in reducing cost and eliminating the number of KYC checks. It will also help in transparency and verification of holdings, leading to reduced credit exposures.

Trade: BCT ensures a Secure, real-time transaction matching, and immediate irrevocable settlement; it also helps in Automatic DVP on a cash ledger and automatic reporting & more transparent supervision for market authorities, establishing higher AML standards.

Post-Trade: Eliminates intermediaries as no central clearing is needed for real-time cash transactions; results in reduced margin/ collateral requirements; faster and efficient post-trade processing; fungible use of assets on BCT as collateral; auto-execution of smart contracts establishes the liabilities of parties over the life-cycle, like in derivatives.

Custody and Securities Servicing: Securities are directly issued onto a blockchain to the parties; the servicing processes are automated and duplication avoided. Fund subscriptions and redemptions are processed automatically making it simple for accounting, allocations and administration. **Pre-IPO shares allotment:** NASDAQ announced that it has issued its first investor shares on the platform Linq, a blockchain-based service, to issue pre-IPO shares of companies.

Loan Syndication: Financial services giant Mizuho has announced a BCT trial to be focused on syndicated loans, including Information Services International-Dentsu (ISID), blockchain startup Currency Port and Microsoft Japan.

Bond Trading: IBM and SBI Securities, a subsidiary of SBI Holdings, are looking to create new mechanisms for trading bonds, using IBM's Hyperledger as a basis for the trials. The goal of the collaboration between SBI and IBM is to test commercially viable platforms for blockchain-based bond trading.

Supply Chain Financing: The IBM business unit deals with 4,000 suppliers, financing customers and partners who conduct about three million transactions per year, worth \$44 billion. About 25,000 disputes arise annually over issues such as the wrong number of computer parts in an order or deliveries that go awry. Normally, it takes an average of 44 days to resolve such issues. Furthermore, employees use roughly six to seven software applications to verify steps taken in the arrangement as well as having to call banks, financial institutions, and associated partners. IBM said the use of Distributed Ledger Technology (DLT) records faster and more accurately than IBM's traditional resources, has resulted in a 10-day resolution period. The same solution can be deployed by any big corporate and banks for supply chain finance.

Monitoring of Consortium Accounts

IBA is suggesting an innovative usage of BCT – Monitoring of Financial Transactions of a borrower financed by a consortium of banks. This will help in preventing “diversion of funds”, which is a major concern of the banks today. The borrower moves funds from one bank to another and the end-usage is not known to the lenders. In the absence of a central entity, it is not operationally feasible to securely and reliably track the movement of money between accounts maintained across multiple financial institutions. A collaboration-based approach among financial institutions, on the other hand, can enable them to monitor money movement and perform the desired analytics thereon to detect anomalies as per the mutually agreed rules and patterns. The blockchain-based collaboration can also assist the participating banks/institutions to have

better visibility of the use of loan money provided to corporates by tracking the movement of funds and analyzing how the said money was spent/paid and generating leads therefrom for auditing and scrutiny. Use of BCT will make the information of movement of funds available to all consortium members and help strengthen the monitoring mechanism.

KYC

The increasing cost of regulatory compliance is among every banker's top concerns, having to comply with regulations such as Anti-Money Laundering (AML) and Know Your Customer (KYC). Every bank and financial institution has to perform the KYC process individually, and upload the validated information and documents to the central registry that stores digitized data tagged to a unique identification number for each customer. By using this reference number, banks can access the stored data to perform due diligence whenever customers request for a new service within the same banking relationship, or from another bank.

A blockchain-based registry would remove the duplication of effort in carrying out KYC checks. The ledger would also enable encrypted updates to client details to be distributed to all banks in near real-time.

The KYC ledger would provide a historical record of all documents shared and compliance activities undertaken for each client. This will form the evidence to be provided to the regulators. It would be useful to identify entities attempting to create fraudulent histories. The data within it could be analyzed to spot irregularities or foul play – directly targeting criminal activity.

SWIFT launched the SWIFT KYC Registry in December 2014, and more than 2000 banks have already enrolled with it. Banks are struggling to manage and integrate all the data required for KYC compliance to obtain a consolidated view of the customer, which explains the popularity of central registries like the one managed by SWIFT. SWIFT is now exploring the use of BCT for the same.

2.7 Determining How Blockchain Fits in Your Industry

As we find out more about blockchain, we may discover how it's already impacting our industry, or certain applications of blockchain may seem obvious to us as solutions for addressing current challenges.

Gupta (2018) in his book titled "Blockchain" explained the factors to determine how blockchain fits in our industry are listed below.

If we're uncertain of whether blockchain has a place in our industry, answer the following questions:

- Does my business network need to manage contractual relationships?
- Do we need to track transactions that involve more than two parties?
- Is the current system overly complex or costly, possibly due to the need for intermediaries or a central point of control?
- Can the network benefit from increased trust, transparency, and accountability in recordkeeping?
- Is the current system prone to errors due to manual processes or duplication of effort?
- Is the current transaction system vulnerable to fraud, cyberattack, and human error?

If we answered "yes" to any of these questions, blockchain can likely benefit our industry.

3. Use of Blockchain in India

According to Deloitte (2017) blockchain is seeing a lot of traction within India majorly in Banking, Insurance and Cards industry. In most of these industries, players are coming together to form a consortium to realize the benefits of Blockchain at an industry level. However, some of the business conglomerates have evinced interest to explore Blockchain for improving their business processes across their subsidiaries and business partners as well.

Blockchain Applications Explored by Indian Players

A lot of Indian players have tested usage of Blockchain in the areas of Trade Finance, Cross-border Payments, Bill Discounting, Supply chain

financing, Loyalty and Digital Identity areas. Some of the Indian banks, business conglomerates, and one stock exchange are among the pioneers for exploring Blockchain in India Delloitte (2017).

Trade Finance

A private sector bank in India and a leading banking group in Middle East successfully executed transactions in international trade finance and remittance using blockchain.

Supply Chain Financing

An Indian conglomerate has designed a cloud-based application to transform supplier-to-manufacturer trade finance transactions through a permissioned distributed ledger. A lighting equipment manufacturer in India experimented with Blockchain to reduce the cycle time of Bill Discounting process for paying its suppliers from five days to almost real-time.

e-KYC Document Management

A leading stock market exchange in India is exploring blockchain for management of KYC documents in collaboration with some of the leading banks in India.

Cross-border Payments

Stellar has partnered with four financial institutions to enable low-cost global money transfers to the Philippines and cross border payments to and from India, Europe, Kenya, Ghana and Nigeria. Two of the private sector banks in India are jointly testing Blockchain transactions focused mostly on cross-border remittance and trade settlements.

Though all these early adopters wanted to experiment with Blockchain to identify a futuristic solution, the road that lead to this experiments were full of challenges. The major reasons for this were lack of awareness, evolving nature of Blockchain platforms, and application integration challenges.

Challenges Faced by Early Adopters in India– A Report from the Trenches

The Delloitte (2017) survey conducted among the participants revealed that the Blockchain journey was clearly segregated into three major stages, with challenges skewed towards adoption than implementation.

Based on the observations from the trenches the challenges faced by businesses while performing the

Proof of Concepts (PoC) are classified broadly under the following six major areas:

- Lack of Internal Awareness
- Identification of business case and business partners for PoC
- Selection of vendor/platform
- Partner on-boarding
- Development environment and security related issues
- Integration challenges

On deep dive into each of the areas, it was discovered that the challenges related to adoption and use case identification were the most difficult to surmount in pre-POC stage of development while lack of common standards and complexity of current IT landscape is a key deterrent for PoC development and subsequent full fledged implementation. However, ensuring the right mix of business partners, platform and vendor was what made the difference between a successful PoC and a failure.

Mitigation Steps Adopted against the Challenges Faced

Lack of Awareness: The major hindrance to Blockchain adoption being lack of awareness, the first step undertaken by the business houses was to form an internal team focused to understand the technology, its impact, and areas of usage. In some cases, employees were sent for external conferences and industry working groups or internal knowledge sessions and Hackathons were conducted. Some firms even included Blockchain as part of their strategic investment.

Identifying the Right Platform, Vendor, and Partner for PoC: Once the use case had been identified, the next hurdle was to identify the right platform, vendor and partner firms for conducting a successful test. To overcome this challenge, organisations created cross-functional teams, conducted focused group discussions with the IT team of the partner firm identified, and developed a detailed project charter with milestones and metrics defined.

Integration and Data Security Challenges: To ensure that integration and data security challenges (e.g., customer data encryption) don't pose a threat to the execution of PoC, early adopters ensured only a minimum viable product was being built to test out the potential of Blockchain and identified alternate strategy for data purging/masking (e.g., destroy the key to data block to ensure nobody can access it).

Reserve Bank of India's Activities around Blockchain

Reserve Bank of India (RBI) has been closely monitoring developments related to Blockchain technology. In July 2016, Institute for Development and Research in Banking Technology (IDRBT) the technology research arm of RBI took the initiative of exploring the applicability of Blockchain to the Indian Banking and Financial Industry by conducting a workshop involving all the stakeholders such as the academicians, bankers, regulators and technology partners. The working group included experts from the central bank, IBA, NPCI, CCIL, ISI, State Bank of India, Punjab National Bank, Bank of Baroda, ICICI Bank, HDFC Bank, Axis Bank, Citi Bank, Deutsche Bank, Infosys, TCS, IBM Research, Deloitte and MonetaGo.

In the process, the participants of the workshop came together to bring out a White Paper detailing the technology, concerns, global experiences and possible areas of adoption in the financial sector in India. The whitepaper highlights several advantages of Blockchain technology, such as cost savings, efficiency, and transparency have been highlighted. The Institute has also developed a Proof of-Concept (PoC) on the applicability of Blockchain to a trade finance application with active participation of NPCI, banks and solution provider, the details of which are presented in the White Paper (www.bankingtech.com/702131/rbi-investigates-blockchain-for-financial-applications-in-india/).

Box 1: Use of Blockchain – Reduction of Fraud

Chris Mager of BNY Mellon Treasury Services acknowledged that “one of the main challenges facing the banking industry today is the growth of fraud and cyber-attacks.”

Traditionally, bank ledgers have been created within a centralised database. This model has been more susceptible to hackers and cyber-attacks as all the information is located in one place – usually secured behind outdated legacy IT systems. Hackers and cyber-criminals are well aware of evolving digital technology and have been able to bypass these security systems to commit data breaches and fraud.

In contrast, as the blockchain is decentralised it is less prone to this type of fraud. By using blockchain there would not only be real-time execution of payments but also complete transparency which would enable real-time fraud analysis and prevention.

Chris Huls of Rabobank defined blockchain as “a ledger or database that can store all types of information or value exchange that is publicly available for all participants in a group where they all see exactly the same data.” Therefore, as blockchain is checked at every step of a transaction by independent miners, with all data being open and publicly available, there is a real-time analysis and verification of every bit of data and all information during the transaction.

The blockchain ledger can provide a historical record of all documents shared and compliance activities undertaken for each banking customer. Malicious attempts to view or change the data become part of the data itself, making thirdparty hacks immediately obvious.

For example, this record could be used to provide evidence that a bank has acted in accordance with the requirements placed upon it – should regulators ask for such clarification. It would also be of particular use in identifying entities attempting to create fraudulent histories. Subject to the provisions of data protection regulation, the data within it could even be analysed by the banks to spot irregularities or foul play – directly targeting criminal activity.

This would be an advantage over the current banking and payments systems, which are more susceptible to fraud and hacking. Chris Huls stated, though, that there would need to be collaboration to achieve this in blockchain. Banks would need to partner with regulators and FinTechs to “develop credible, decentralised ledgers permitting rapid adoption of global real-time payments and settlement.”

On 30 December 2015 Nasdaq announced that it had made its first ever share trade using blockchain technology. Nasdaq used its proprietary Linq platform (developed in collaboration with Chain.com and global design firm IDEO) to sell shares.

As Nasdaq has pointed out, within the multi-step manual process used today in banks and financial institutions there is not only plenty of room for error but also for fraud. By utilising blockchain, organisations can reduce risk and administrative burden, as well as saving time and money.

Nevertheless, banks must consider that blockchain doesn't yet eliminate all types of fraud. In August 2016, nearly 120,000 units of digital currency Bitcoin worth about US \$72 million was stolen from the exchange platform Bitfinex in Hong Kong. The Bitcoin was stolen from users' segregated wallets and amounted to about 0.75% of all Bitcoin in circulation at that time. Since the hack, Bitfinex has taken steps to reimburse account holders with “BFX tokens” which are cryptographic tokens on the Omni blockchain that can be exchanged for \$1 beneficial interests in iFinex (Bitfinex's parent company).

Source: Fintech Network

Box 2: Use of Blockchain – Implementation of KYC

Know Your Customer (“KYC”) requests currently can cause delay to banking transactions, typically taking 30 to 50 days to complete to a satisfactory level. Current KYC processes also entail substantial duplication of effort between banks (and other third party institutions). While annual compliance costs are high, there are also large penalties for failing to follow KYC guidelines properly.

The average bank spends £40 million a year on KYC Compliance, according to a recent Thomson Reuters Survey, which also revealed that some banks spend up to £300 million annually on KYC compliance, Anti Money Laundering (“AML”) checks and Customer Due Diligence (“CDD”).

Since 2009, regulatory fines, particularly in the USA, have followed an upward trend with record-breaking fines levied during 2015. On-going regulatory change, with no one internationally agreed standard, makes it increasingly hard for banks to remain compliant. Thus, as it can take such a long time to on-board a new customer because of lengthening KYC procedures, this is having an increasingly negative effect on customer experience.

Chris Huls of Rabobank proposed the use case that “KYC statements can be stored on the blockchain.” Once a bank has KYC’d a new customer they can then put that statement, including a summary of the KYC documents, on a blockchain which can then be used by other banks and other accredited organisations (such as insurers, car rental firms, loan providers etc.) without the need to ask the customer to start the KYC process all over again.

These organisations will know that the customer’s ID documents have been independently checked and verified so they will not need to carry out their own KYC checks, reducing their administrative burdens and costs. As data stored on a blockchain is irreversible, it would provide a single source of truth thereby minimising the risk of duplication or error.

There is also the advantage for the customer that they only have to supply KYC documents once (until they need to be updated) and that they are not then disclosed to any other party (except for their own bank) as the other organisations will not need to see and check the ID documents but will just rely on the blockchain verification.

SWIFT has established a KYC Registry with 1,125 member banks sharing KYC documentation – however, this is only 16% of the 7,000 banks on their network. The KYC Registry meets the need for an

efficient, shared platform for managing and exchanging standardised KYC data and it's free to upload the documentation to the Registry and to share it with other institutions. SWIFT validates the data rigorously, informs the client if it's incomplete or needs updating, and sends out alerts to correspondents whenever the data changes.

There will still be issues surrounding security and privacy of customer's KYC information but, as long as all KYC is held on a private blockchain rather than a public one, these issues should be minimal from a bank customer's point of view. The data on the blockchain will merely be a reference point with a digital signature or cryptographic hash – which would give individuals access to the relevant client information in a repository separate to the blockchain, ensuring a secure and private way of conducting and storing a customer's KYC information. Equally important, though, is ensuring financial institutions only have permissioned access on a temporary basis so that access to KYC information is only granted when strictly necessary for that purpose, and for no other ancillary reason.

Therefore, it is evident that Blockchain could have a major role in streamlining these KYC and AML processes –although this may require cross-border consensus as to what is regarded acceptable KYC documentation and what needs to be done in terms of acceptable verification of those documents.

According to a Goldman Sachs Report, Case Study 7, the banking sector can achieve 10% headcount reduction with the introduction of blockchain in the KYC procedures. This amounts to around \$160 million in cost-saving annually. Blockchain will also reduce the amount of budgetary resources allocated for employee training, there will be 30% headcount reduction amounting to \$420 million.

Overall operational cost savings are estimated to be around \$2.5 billion dollars. AML penalties will also be reduced by estimated amount between \$0.5 to \$2 billion dollars.

Source: Fintech Network

Box 3: Use of Blockchain – Payments

The main use case that is focused on when looking at the possibilities of blockchain for banking is that of payments. Chris Huls of Rabobank said that blockchain could be used as “another way of paying each other, not depending on SWIFT and other payment schemes.”

Chris Mager of BNY Mellon also recognises that there is a potential role for blockchain in payments and that currently there is an “unprecedented period of change and transformation.” Mager recognised that blockchain could have benefits for not only bank customers, but this could also lead to operational efficiencies and cost savings for banks themselves. He also stated that payment systems collectively are currently under a lot of pressure, as there has been urgency to modernise payments and to address the questions of safety and security since the 2008 financial crash.

This has led to new market entrants, such as FinTechs, looking to solve these problems using blockchain.

The existing payment system has always gone through banks and central banks, a process that was first put into place in the 1970s and 1980s. Apart from speeding up money transfers, blockchain could also help banks to operate continuously, 24 hours a day. This is now somewhat expected by customers who want an omni-channel banking experience at any time day or night – especially, according to Chris Mager, for “millennials who are now firmly within the workforce and want a better, quicker and easier way to make payments.”

Rabobank has been heavily involved in the on-going development and use of Ripple Lab’s blockchain Ripple protocol. It was announced in December 2014 that the three banks had started to test blockchain technology in making payments to customers and cross-border transactions. Ripple has said that its technology could give banks a 33% reduction in their operating costs during the international payment process and allow lenders to move money “in seconds.”

Ripple is a “Real-Time Gross Settlement System” (RTGS), currency

exchange and remittance network. Released in 2012, Ripple purports to enable “secure, instant and nearly free global financial transactions of any size with no chargebacks.” It supports tokens representing fiat currency, cryptocurrency, commodity or any other unit of value.

Ripple can be used by banks for an open-source approach to payments to replace many of the common

intermediaries in the payments industry, thereby passing on savings to partner institutions, and thus by extension, to their customers.

Thus blockchain can be used to make payments in real-time globally, with real-time execution, complete transparency, real-time fraud analysis and prevention and also at a reasonable cost. The only issue with Ripple, at the moment, is that it is a proprietary blockchain network that cannot yet connect with other systems. In order to connect Ripple to other blockchain protocols an inter-ledger protocol will have to be developed, tested and put in place.

There are, however, other blockchain protocols in limited use and in development for the payments industry.

In Estonia, LHV Bank is experimenting with blockchain through coloured coins called “Cuber” as a “cryptographically protected” certificate of deposit. The project would enable the bank’s FinTech offshoot, Cuber Technology, to develop mobile apps using blockchain to provide free P2P fiat currency transfers.

Rain Lõhmus, Chairman of the Supervisory Board of LHV Bank, said that all Estonian government and finance infrastructure relies on public-key cryptography, which makes exploring blockchain to be a natural next step.

As Chris Mager from BNY Mellon also highlighted, VISA Europe Collab and BTL Group are working on a separate concept to make cross-border payments between banks using distributed ledgers. The project will use BTL’s crossborder settlement platform Interbit to explore the ways in which a distributed ledger-based settlements system (as well as utilising “smart contracts”) can reduce the friction of

domestic and cross-border transfers between banks. This is a similar goal to Ripple but, as it is based on the Ethereum smart contracts concept, it is not proprietary like Ripple and thus is potentially more scalable.

Chris went on to explain that, similarly, UBS, Deutsche Bank, Santander and BNY Mellon have teamed up with blockchain developer Clearmatics and trading company ICAP to create a new digital representation of fiat currency called the “Utility Settlement Coin.” Although this is still a proof of concept, it could potentially reduce friction in delivery versus payment scenarios by providing a faster and less expensive settlement mechanism than existing funds transfer and currency exchange mechanisms.

Source: Fintech Network

4. Ten Ways Central Banks are Working on Blockchain Technology Today (World Economic Forum)

While research and experimentation with blockchain technology across sectors have been underway for the past several years, few organizations have deployed the technology. Although central banks are among the most cautious and prudent institutions in the world, World Economic Forum (WEF) indicates that these institutions, perhaps surprisingly, are among the first to implement blockchain technology.

Central bank activities with blockchain and distributed ledger technology are not always well known or communicated. At least 40 central banks around the world are actively investigating whether blockchain can help solve long-standing interests such as banking and payments system efficiency, payments security and resilience, as well as financial inclusion.

According to Lannquist (2019), Blockchain Project Lead at the World Economic Forum, identified top ten central bank use cases on blockchain technology as follows.

Top Ten Central Bank Use Cases identified by WEF

1. **Retail Central Bank Digital Currency (CBDC)** – A central bank-issued digital currency that is operated and settled in a peer-to-peer and decentralized manner (with no intermediary), and is widely available for consumer use. This form of CBDC serves as a complement or substitute for physical cash and an alternative to traditional bank deposits. Central banks from several countries are experimenting with this, including those from the Eastern Caribbean, the Bahamas, and Cambodia.
2. **Wholesale Central Bank Digital Currency (CBDC)** – A central bank-issued digital currency that is operated and settled in a peer-to-peer and decentralized manner (no intermediary) but is only available only for commercial banks and clearing houses for use in the wholesale interbank market. Central banks researching this include those from South Africa, Canada, Japan, Thailand, Saudi Arabia, Singapore, and Cambodia.
3. **Interbank Securities Settlement** – A focused application of blockchain-based digital currency, including CBDC, enabling the rapid interbank clearing and settlement of securities for cash. The goal is to develop “delivery versus payment” interbank systems where two parties trading an asset, such as a security for cash, can conduct the payment for and delivery of the asset simultaneously. Central banks exploring include the Bank of Japan, Monetary Authority of Singapore, Bank of England and Bank of Canada.
4. **Payment System Resiliency and Contingency** – The use of distributed ledger technology in a primary or back-up domestic interbank payment and settlement system to provide safety and continuity from threats, including technical or network failure, natural disaster, cybercrime, and other threats. Often, this use case is coupled with others as part of the set of benefits that a DLT implementation could potentially offer. The central banks researching this use case include the Central Bank of Brazil and the Eastern Caribbean Central Bank.

5. **Bond Issuance and Lifecycle Management** – The use of DLT in the bond auction, issuance, or other lifecycle processes to reduce costs and increase efficiency. This concept could be applied to bonds issued and managed by sovereign states, international organizations or government agencies. Central banks or government regulators could be “observer nodes” to monitor activity where relevant. The World Bank launched the first blockchain-based bond, called the “BONDI,” in August 2018.
6. **Know-Your-Customer and Anti-Money-Laundering** – Digital KYC/AML processes that leverage DLT to track and share relevant customer payment and identity information to streamline processes. This solution could connect to a digital national identity platform or plug into pre-existing e-KYC or AML systems. It also could potentially interact with CBDC as part of payments and financial activity tracking. Central banks exploring include the Hong Kong Monetary Authority.
7. **Information Exchange and Data Sharing** – The use of distributed or decentralized databases to create alternative systems for information and data sharing between or within related government or private sector institutions. Among others, the Central Bank of Brazil is researching this use case.
8. **Trade Finance** – The employment of a decentralized database and functionality to enable faster, more efficient and more inclusive trade financing. This improves on today’s trade finance processes which are often paper-based, labour-intensive and time-intensive. Customer information and transaction histories are shared between participants in the decentralized database while maintaining privacy and confidentiality where needed. Central banks researching this include the Hong Kong Monetary Authority.
9. **Cash Money Supply Chain** – The use of DLT for issuing, tracking and managing the delivery and movement of cash from production facilities to the central bank and commercial bank branches. This could include the ordering, depositing or movement of funds, and

could simplify regulatory reporting. Central banks exploring include the Eastern Caribbean Central Bank.

10. **Customer SEPA Creditor Identifier (SCI) provisioning** – Blockchain-based decentralized sharing repository for SEPA credit identifiers managed by the central bank and commercial banks in the SEPA debiting scheme. Faster, streamlined and decentralized system for identity provisioning and sharing. Can replace pre-existing manual and centralized processes that are time and resource-intensive. This has already been implemented in the Bank of France’s Project MADRE.

For each of these use cases (listed in order by popularity), there is at least one central bank actively researching this area. This research and experience vary across countries, and many central bank researchers have yet to conclude whether DLT can provide value to their processes given salient risks and limitations.

In rare cases such as with the Bank of France, a central bank has successfully deployed a DLT-based application. In other cases, central banks have concluded that blockchain technology does not provide valuable opportunities for their economies when considering the risks and downsides. In the least, many monitor developments by peer institutions and within the private cryptocurrency markets.

Box 4: Monetary Authority of Singapore’s Collaboration with England and Canada’s Central Banks

The Monetary Authority of Singapore, Bank of England and Bank of Canada have jointly collaborated in publishing several research reports, as well as conducting several pilots using DLT. One of the main projects aims to combine the individual efforts of the respective countries in DLT for faster cross-border payments at a lower cost.

Notably, the Bank of England was the first central bank to publish research papers on DLT in 2014. Independently, the Bank of Canada runs Project Jasper, while the Monetary Authority of Singapore runs Project Ubin. Both projects are proof of concepts to explore “cash

on ledger” for clearing and settlement of high-value interbank payments, foreign exchanges, and securities.

Why this Makes Sense:

Canada, England, and Singapore are all arguably financial and technological powerhouses in their respective geographical regions. They also have in place robust laws and regulations that ensure efficiency, safety, and accountability in payments processes.

By combining their efforts in DLT research for domestic and cross-border payments, they are able to set a solid foundation to lead the industry standard for global payments.

Source: <http://fintechnews.sg/30096/blockchain/central-bank-digital-currency-blockchain-dlt>

Box 5: The Bank of France’s Project MADRE

One of the earliest adopters in DLT, the Bank of France has deployed a blockchain based technology to automate and digitise the process for provisioning and sharing SEPA Credit Identifiers (SCIs).

Single Euro Payments Area (SEPA) is a cross border payment system that aims to provide fast efficient payment transfers between Euro countries. The operations are managed by the respective central banks of member countries, which in turn coordinates with the local commercial banks.

Prior to using DLT, the SCIs were manually issued, which was time consuming and required coordination and information sharing with multiple banks.

The project started as a proof-of-concept in June 2016. Using “smart contracts”, the Bank of France is able to automate the management and sharing processes entirely, thus saving time while improving accountability for banks involved within the process.

Why this Makes Sense:

Europe has an extensive network of debit card rails in place, which has been extremely efficient for the past decade or so. For blockchain to make a significant impact, central banks will benefit the most from

improving operational efficiencies rather than introducing an entirely new blockchain based payments method.

Source: <http://fintechnews.sg/30096/blockchain/central-bank-digital-currency-blockchain-dlt>

Box 6: The Hong Kong Monetary Authority's eTradeConnect

In October 2018 HKMA launched [eTradeConnect](#) a blockchain-based trade finance platform developed by a consortium of twelve major banks in Hong Kong.

eTradeConnect aims to improve trade efficiency, build better trust among trade participants, reduce risks and facilitate trade counterparties to obtain financing by digitising trade documents, automating trade finance processes and leveraging the features of blockchain technology.

Why this Makes Sense:

Trade finance sorely needs disruption, it is often riddled with bottlenecks and inefficiencies. Deploying blockchain in this space could potentially increase global trade volumes [by US\\$ 1.1 trillion](#)

Source: <http://fintechnews.sg/30096/blockchain/central-bank-digital-currency-blockchain-dlt>

Box 7: Sveriges Riksbank's E-Krona (Sweden's Central Bank)

The Swedish central bank (Sveriges Riksbank) is investigating a blockchain-based “[e-krona](#)” to serve as an alternative form of central bank-issued money as cash usage in the country declines.

An e-krona would give the general public access to a digital complement to cash, the value of which will be guaranteed by the Swedish government. The bank is still determining if e-krona should be deployed using DLT or other technologies

Why it Makes Sense:

Sweden is largely considered one of the most cashless countries in the world, its central bank needs to consider digital currencies as possible way to navigate a future where cash is no longer relevant.

Source: <http://fintechnews.sg/30096/blockchain/central-bank-digital-currency-blockchain-dlt>

Box 8: The National Bank of Cambodia's Blockchain Based Payment System

Planned for release in the second half of 2019, Cambodia is set to be one of the first countries to use blockchain technology in its national payments systems for use by consumers and commercial bank. The country's central bank will be releasing a blockchain based payments system, as a way to increase financial inclusion and improve efficiency in commercial banking systems.

The new payments system is designed to facilitate interoperable retail payments. This means it will work with both private mobile payment applications and commercial bank accounts, enabling a smoother payment process between consumers and businesses.

Why this Makes Sense:

Cambodia has a high number of underbanked population that still relies heavily on cash. Combined with its highly fragmented mobile payments landscape, and a lack of efficient settlements process, there is a severe need for a centralised payments system.

The introduction of a new payments system for commercial use can help propel the entire system forward, while also promoting a culture of savings and financial stability by encouraging citizens to adopt bank accounts.

Source: <http://fintechnews.sg/30096/blockchain/central-bank-digital-currency-blockchain-dlt>

Box 9: More Use CASES BY Central Banks

European Central Bank and Bank of Japan Started in 2016, the joint effort saw the central banks designing prototypes to improve domestic interbank payments and settlements, as well as quickly facilitate interbank trading and settlement of securities for cash.

The Bank of Lithuania is testing blockchain in a small-scale, real environment. The bank will issue "Digital Collector Coin" that is linked to physical collector coins kept in its vaults.

The Bank of Thailand is running Project Inthanon, a concept similar to Singapore's Project Ubin. It is looking to implement a Central Bank Digital Currency (CBDC) for interbank payments and increasing efficiency in liquidity management.

Central Bank of Brazil runs Project SALT, an interbank payments contingency and resiliency system, and Project PIER, a decentralized information exchange platform.

The Eastern Caribbean Central Bank is assessing the suitability of a DLT based currency for advancing economic growth, improving financial inclusion, and enforcing a more resilient payments system.

Deutsche Bundesbank (Germany's Central Bank) runs the BLOCKBASTER prototype to improve efficiency and reduce risk in interbank securities settlement processes.

The Saudi Arabian Monetary Authority is running a joint project with the United Arab Emirates (UAE) called Project Aber, to enable DLT-based interbank payments and settlements between the two Gulf states.

The South African Reserve Bank is exploring the use of CBDC for domestic interbank payments and settlement efficiency under Project Khokha.

Source: <http://fintechnews.sg/30096/blockchain/central-bank-digital-currency-blockchain-dlt>

5. Security Issues of Blockchain

So far, blockchain has been gotten many attention in different areas, however, it also exists some problems and challenges needs to face it. Lin I.C. and Liao T.C. (2017) identified some security issues that are discussed below.

The Majority Attack (51% Attacks)

With Proof of Work, the probability of mining a block depends on the work done by the miner (e.g. CPU/GPU cycles spent checking hashes). Because of this mechanism, people will want to join together in order to mining more blocks, and become "mining pools", a place where holding

most computing power. Once it hold 51% computing power, it can take control this blockchain. Apparently, it cause security issues. If someone has more than 51% computing power, then he/she can find Nonce value quicker than others, means he/she has authority to decide which block is permissible.

What it can do is:

1. Modify the transaction data, it may cause double spending attack.
2. To stop the block verifying transaction.
3. To stop miner mining any available block.

A majority attack was more feasible in the past when most transactions were worth significantly more than the block reward and when the network hash rate was much lower and prone to reorganization with the advent of new mining technologies.

Fork Problems

Another issue is fork problem. Fork problem is related to decentralized node version, agreement when the software upgrade. It is a very important issue because it involving a wide range in blockchain.

Types of Forks

When the new version of blockchain software published, new agreement in consensus rule also changed to the nodes. Therefore, the nodes in blockchain network can be divided into two types, the New Nodes and the Old Nodes. So here come four situations:

1. The new nodes agree with the transaction of block which is sending by the old nodes.
2. The new nodes don't agree with the transaction of block which is sending by the old nodes.
3. The old nodes agree with the transaction of block which is sending by the new nodes.
4. The old nodes don't agree with the transaction of block which is sending by the new nodes.

Because of these four different cases in getting consensus, fork problem happens, and according to these four cases, fork problems can be divided into two types, the Hard Fork and the Soft Fork. In addition to distinguish

the new nodes and the old nodes, we have to compare the computing power of new nodes with old nodes, and assume that the computing power of new nodes are more than 50.

Hard Fork

Hard Fork means when system comes to a new version or new agreement, and it didn't compatible with previous version, the old nodes couldn't agree with the mining of new nodes, so one chain became two chains. Although new nodes computing power were stronger than old nodes, old nodes will still continue to maintain the chain which it though was right. When Hard Fork happens, we have to request all nodes in the network to upgrade the agreement, the nodes which haven't been upgrade will not continue to work as usual. If there were more old nodes didn't upgrade, then they will continue to work on the other completely different chain, which means the ordinary chain will fork into two chains.

Soft Fork

Soft Fork means when system comes to a new version or new agreement, and it didn't compatible with previous version, the new nodes couldn't agree with the mining of old nodes. Because the computing power of new nodes are stronger than old nodes, the block which is mining by the old nodes will never be approve by the new nodes, but new nodes and old nodes will still continue to work on the same chain.

When Soft Fork happens, nodes in the network don't have to upgrade the new agreement at the same time, it allows to upgrade gradually. Not like Hard Fork, Soft Fork will only have one chain, it won't affect the stability and effectiveness of system when nodes upgrade. However, Soft Fork makes the old nodes unaware that the consensus rule is changed, contrary to the principle of every nodes can verify correctly to some extent.

Scale of Blockchain

As blockchain growing, data becomes bigger and bigger, the loading of store and computing will also getting harder and harder, it takes plenty of time to synchronize data, in the same time, data still continually increase, brings a big problem to client when running the system. Simplified Payment Verification (SPV) is a payment verification technology,

without maintain full blockchain information, only have to use block header message. This technology can greatly reduce user's storage in blockchain payment verification, lower the user's pressure when transaction drastically increased in the future.

Time Confirmation of Blockchain Data

Compared to traditional online credit card transaction, usually takes 2 or 3 days to confirm the transaction, bitcoin transaction only have to use about 1 hour to verify, it's much better than the usual, but it's still not good enough to what we want it to. Lightning Network is a solution to solve this problem. Lightning Network is a proposed implementation of Hashed Timelock Contracts (HTLCs) with bi-directional payment channels which allows payments to be securely routed across multiple peer-to-peer payment channels. This allows the formation of a network where any peer on the network can pay any other peer even if they don't directly have a channel open between each other.

Current Regulations Problems

Use Biction for example, the characteristics of decentralized system, will weak the central bank's ability to control the economic policy and the amount of money, that makes government be cautious of blockchain technologies, authorities have to research this new issue, accelerate formulating new policy, otherwise it will have risk on the market.

Integrated Cost Problem

Of course it will have lot of cost including time and money to change existing system, especially when it's an infrastructure. We have to make sure this innovative technology not only create economic benefits, meet the requirements of supervision, but also bridge with traditional organization, and it always encounter difficulties from internal organization which is existing now.

6. Challenges of Blockchain

At the moment it is proposed that blockchain can resolve a number of issues and problems currently facing the banking and payments industry. However, there are still a number of challenges facing banks and

FinTechs before blockchain can be fully implemented as a viable alternative that can garner trust from the public.

FinTech Network (2017) identified some major challenges regarding blockchain technology. The main issue is one of privacy. With an open ledger system it becomes inherently difficult to ensure privacy of customer data. Although this can be mitigated in some way by the use of a private or permissioned blockchains with strong encryption, there will still be some cyber security concerns that need to be addressed before the general public will entrust their personal data to a blockchain solution.

As seen with the Ripple protocol there is also a question over how blockchain solutions can integrate not only with existing banking and payment systems but also with each other (especially if they are a proprietary system). In order to make the switch there needs to be collaboration and consensus between a number of different parties and stakeholders which will take time.

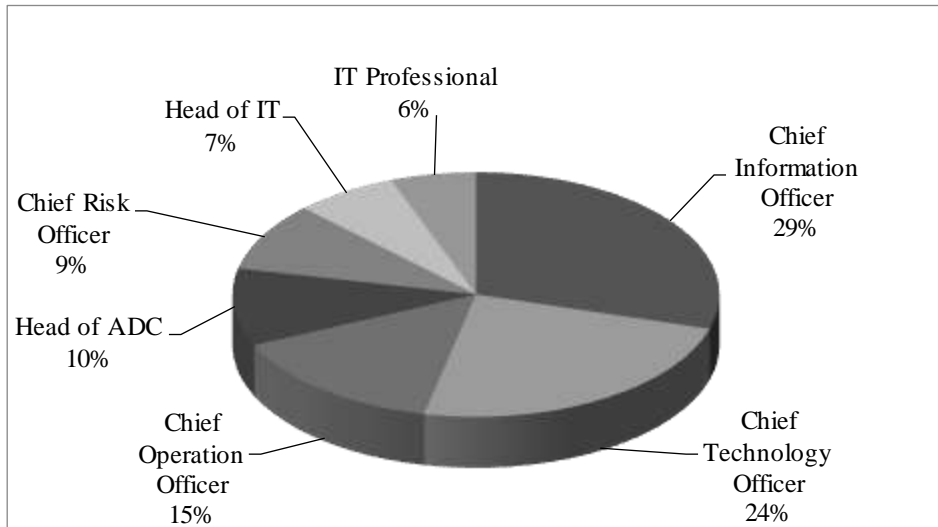
Blockchain also faces regulatory uncertainty. There is currently no central standard or organisation that monitors and regulates blockchain protocols. Eventually there will have to be some form of central governance but all parties will need to be careful “where the power lies”. Nevertheless, it will take time to develop agreed upon internationally accepted regulations.

There is also a question of scalability. One of the main challenges will be to resolve issues with transaction speed, the verification process and data limits that will be crucial in making blockchain widely applicable. It is also thought that this could take between 7 and 10 years to develop and to get to a fully working and integrated blockchain-based payment system for commercial and/or interbank payments.

7. Awareness of Blockchain Technology in Banks: Data Analysis and Findings

Data was collected from 34 banks and 100 executive of different level operating IT and business in banks. The official designation of the respondents in our survey is shown in the following figure (Figure-11). Among them, 29% are Chief Information Officer, 24% are Chief Technology Officer and 6% are IT Professionals.

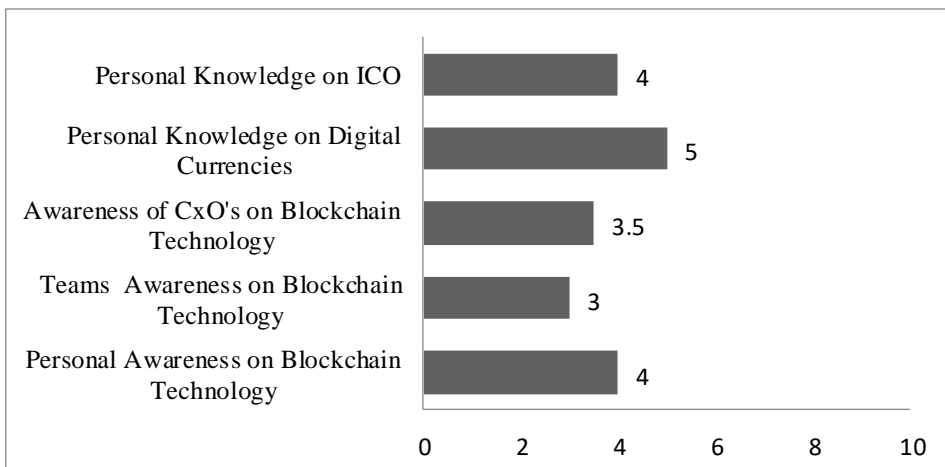
Figure 11: Distribution of Respondents



Source: Survey Data

Knowledge and awareness of CxO's about blockchain and associated components is shown in the following figure (Figure 12). It is clear that our CxOs are not very aware about this technology. In a scale out of 10, they achieved 3.5. Also team awareness about blockchain technology is very low (3 in a scale out of 10). However, they have personal knowledge about digital currencies (5 in a scale out of 10)

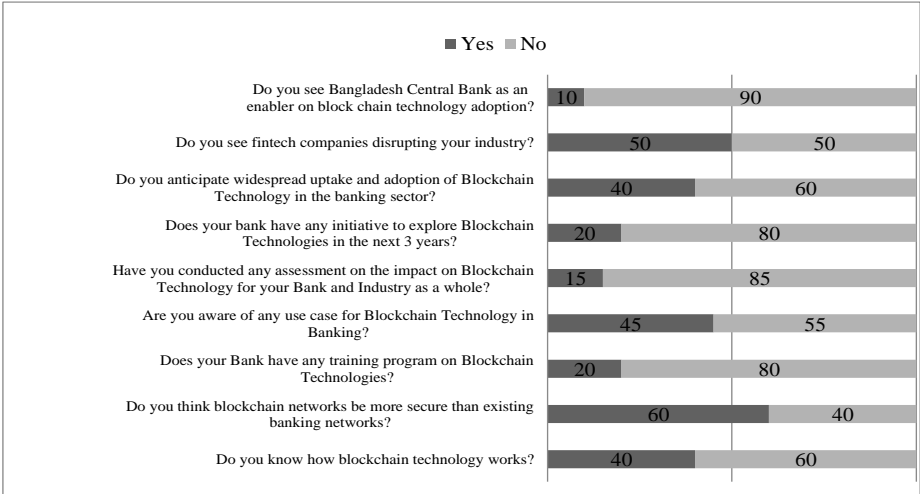
Figure 12: Knowledge and Awareness of CxO's



Source: Survey Data

We have asked several close ended questions to CxOs. Though 60% CxOs think that blockchain technology is more secure than existing banking network, bank management is not very positive about this technology (Figure-13). Only 20% banks arranged training program on blockchain and took initiative to explore blockchain in the next 3 years, which is not encouraging at all. Also, only 15% banks have conducted an assessment about the effect of blockchain in banking industry. Another shocking fact we have found from this graph that 60% CxOs don't know how this particular technology works.

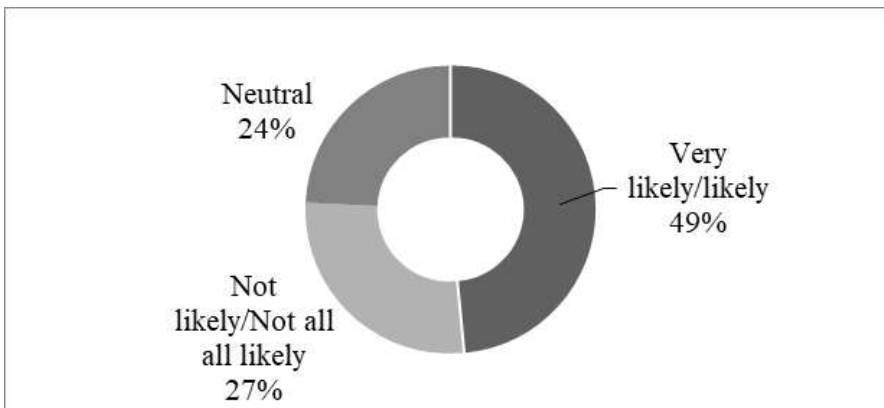
Figure 13: Knowledge and Awareness of CxO's



Source: Survey Data

Perception of banks' management about how blockchain will change the way of doing business in next 3 years is shown in Figure-14. 49% think that this technology definitely change the business process, 27% believe the process will be more or less the same as before and 24% are not taking any sides of the two.

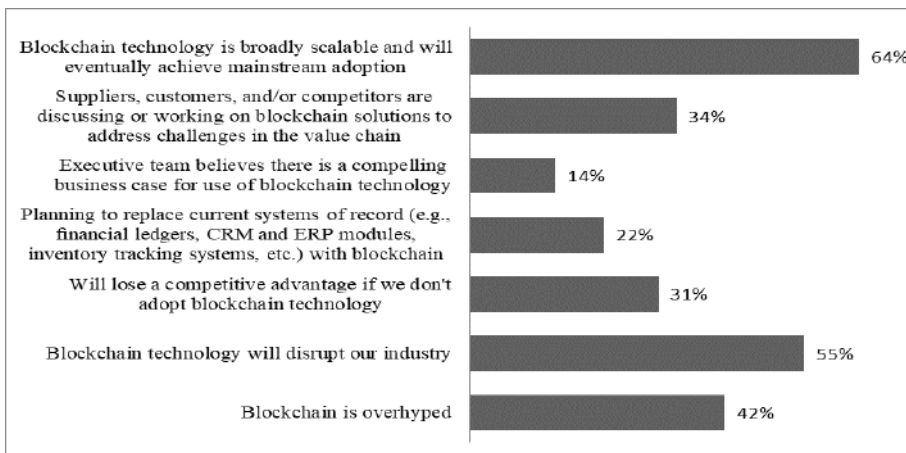
Figure 14: Likelihood that Blockchain will Change the Way Your Bank does Business in the Next 3 Years



Source: Survey Data

It is evident from the Figure-15 that 64 percent of the respondents believe that blockchain technology is broadly scalable and will eventually achieve mainstream adoption. It means blockchain technology has a bright future. Blockchain technology can be a competitive weapon to survive in the market. Around 31 percent worried about losing competitive advantages if they do not accept blockchain. Some respondents also think that blockchain technology is overhyped (42%) and some think that this technology will disrupt the industry (55%).

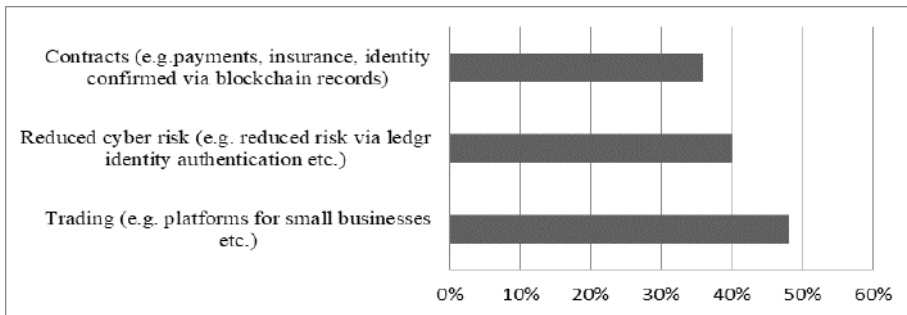
Figure 15: Opinion of CxO's Regarding Blockchain Technology



Source: Survey Data

Blockchain technology can change several business fields as shown in Figure-16. 48% respondents believe that trading business will be benefitted from this technology. Also 40% respondents have confidence that this technology will reduce cyber threat.

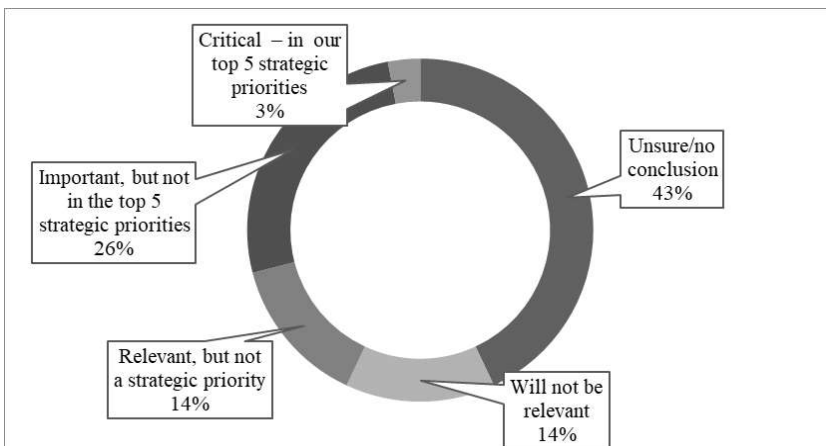
Figure 16: Greatest Disruption Resulting from Blockchain Initiatives in the Next 3 Years



Source: Survey Data

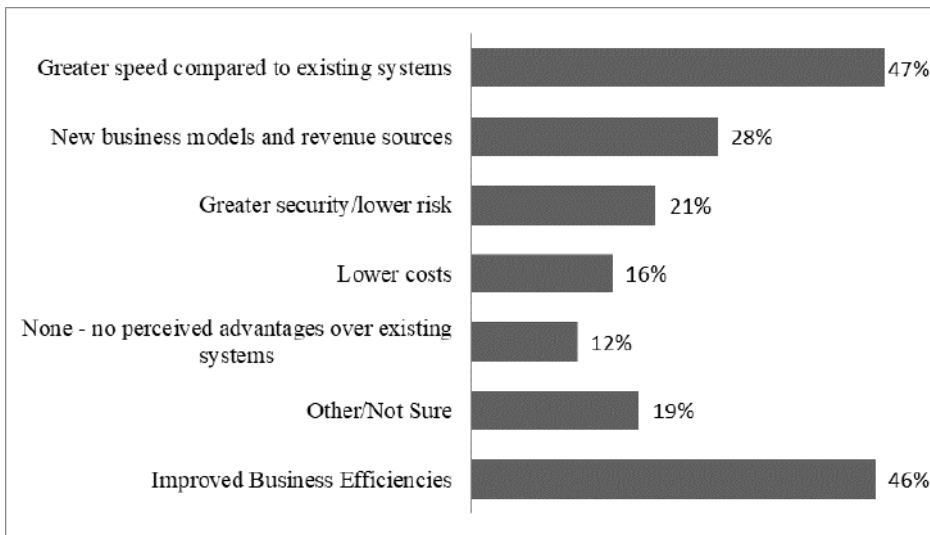
From Figure-17 we see that a significant majority of respondents consider blockchain technology to be very important to their organization, with accumulated 3 percent calling it somehow critical- in their top five strategic priorities, important and relevant with their business. This is in line with the investments in the technology many banks are making or planning to make. Whereas 43 percent are hesitant regarding this matter.

Figure 17: Relevance of Blockchain Technology



Source: Survey Data

Figure 18: Most Significant Advantage of Blockchain Over Existing Systems

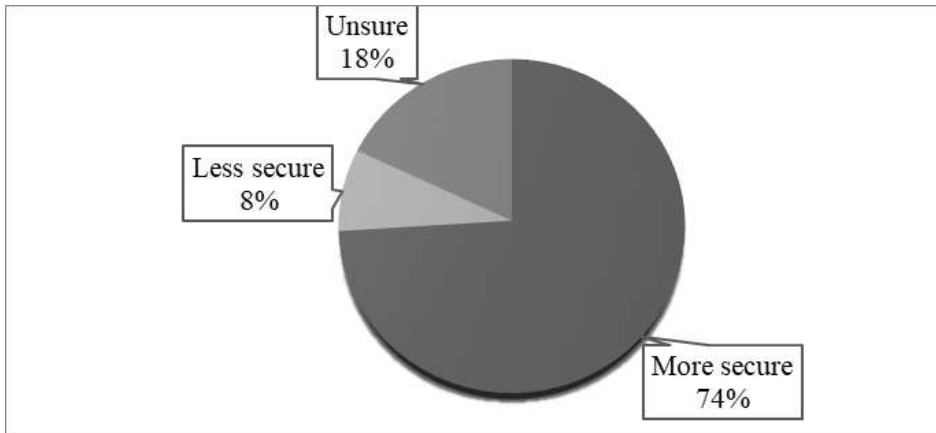


Source: Survey Data

Figure-18 shows that banks are positive about the speed of blockchain compared to existing systems. The most common answer when asked about blockchain’s advantages over existing systems was greater speed. This suggests banks are interested in leveraging blockchain’s real-time information exchange capabilities to speed up business processes and gain operational efficiencies. Additionally, 28 percent of respondents believe that blockchain can help them unlock new revenue sources and business models, underscoring the technology’s disruptive potential. 21 percent of the respondents think that blockchain technology has greater security compared to existing systems. If implemented properly then blockchain technology definitely brings some advantages to banking industry. 46% bankers believe that business efficacy will be upgraded.

Figure-19 illustrates that the overwhelming majority of respondents believe that blockchain is more secure than conventional IT systems. Albeit 8 percent of the respondents do not think that blockchain is a secured system. Moreover, 18% banks don’t have any clear idea about security issues.

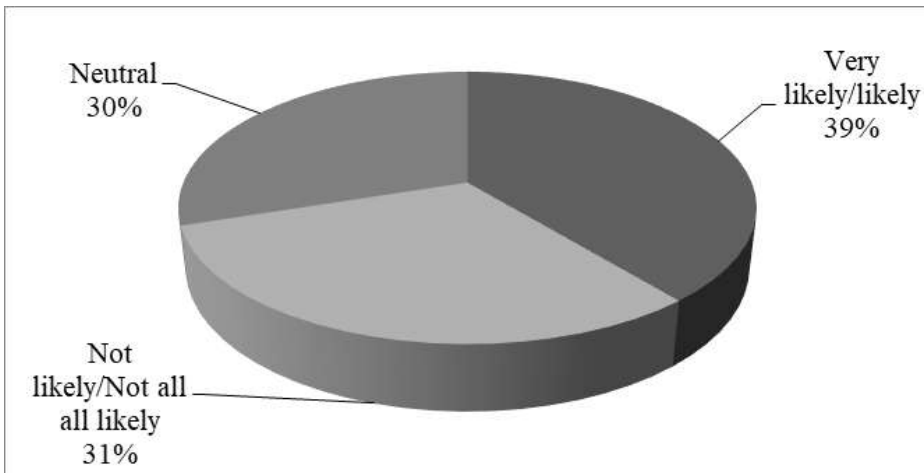
Figure 19: Security of Blockchain



Source: Survey Data

It is evident from Figure-20 that our banking industry is not ready yet to embrace this new technology. Less than 40% banks have planned to implement blockchain technology in their banks in the next 3 years. And a whopping percentage (31%) is not interested at all about it whereas 30% are not taking any sides of the two.

Figure 20: Likelihood Your Bank Will Implement Blockchain Technology in The Next 3 Years

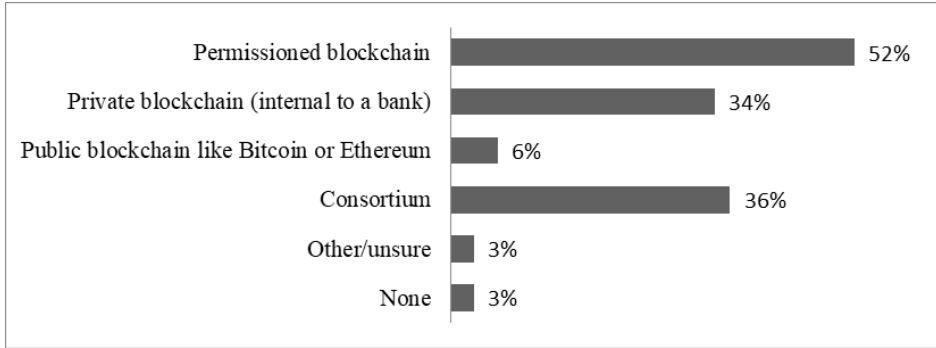


Source: Survey Data

In case of selection of blockchain model 52 percent of the respondents are positive about permissioned blockchain. 36 and 34 percent of the respondents would like to work with consortium and private blockchain,

respectively. Only 6 percent of the banks like public blockchain. Majority of the banks are afraid of using public blockchain due to security and fraud issues (Figure-21).

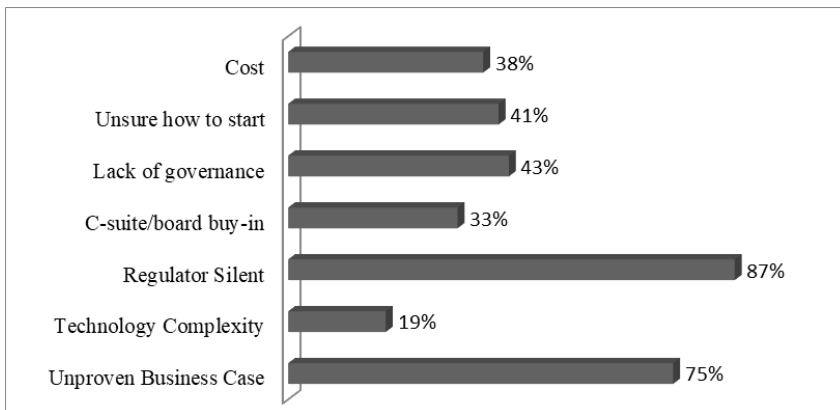
Figure 21: Selection of Blockchain Models



Source: Survey Data

Biggest challenges for adopting blockchain technology are shown in Figure-22. It is found that 87% respondents saw ‘silence of regulatory body’ as a major inhibition. 75% respondents said they do not find any proven case about the success of this technology, whereas 19% said intricate technology may pose a negative role in embracing blockchain. It is clear that absence/lack of governance is a major impediment (43%). Among other challenges, high cost is also an obstacle in employing this technology.

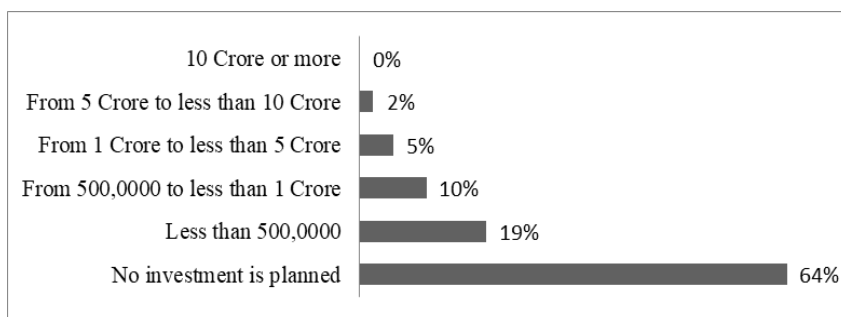
Figure 22: What's Stalling Blockchain Progress?



Source: Survey Data

Blockchain is a priority investment for many banks. Figure-23 depicts the percent of respondents by planned investment amount in Crore BDT. About 64 percent of the respondents do not have any plan to invest in blockchain whereas thirty-six percent of banks reported that their organization will invest in blockchain technology in the coming years. Among them only 17% have a plan to spend between BDT 50 lac to 10 crore to implement this technology. It is also seen from the graph that no respondents have any plan to invest more than 10 crore in blockchain.

Figure 23: Percent of Banks by Investment Plan



Source: Survey Data

8. A Prospective Roadmap for the Adoption of BCT to Banking and Finance in Bangladesh

Having had a good understanding of the various aspects around the blockchain technology including – the sound basis underlying the technology, the advantages to be had by its adoption, the variety of its applications that are being explored around the globe, security, privacy and scalability concerns and potential countermeasures, we recommend that the time is ripe for its adoption in Bangladesh.

The use cases of blockchain can broadly be classified into information sharing based and digital currency based applications. The set of use cases of the first category have ready applicability in banking and financial sector. These use cases help in bringing disparate entities on a common information sharing platform for deriving mutual benefits, while protecting their security privacy concerns. The information is maintained in a distributed fashion, mitigating the inherent delays resulting from the currently centralized systems. A suggested roadmap for the adoption of BCT to Bangladeshi banking is as follows:

Intra-bank

Banks may setup a private blockchain for their internal purposes. This not only helps them to train human resources in the technology, but also benefits by enabling efficient asset management, opportunities for cross-selling, etc.

Interbank

Proof-of-Concept implementation and testing may be carried out in the following order of increasing application complexity – mainly because of the number of stakeholders involved in the transaction. Centralized KYC: Secure, distributed databases of client information shared between institutions helps reduce duplicative efforts in customer onboarding. Secure codification of account details could enable greater transparency, efficiency in transaction surveillance and simplifies audit procedures. Cross-Border Payments: BCT enables real-time settlement while reducing liquidity and operational costs. Transparent and immutable data on BCT reduces fraudulent transactions. Smart contracts eliminate operational errors by capturing obligations among FIs to ensure that appropriate funds are exchanged. BCT allows direct interaction between sender and beneficiary banks, and enables low value transactions due to reduction in overall costs.

Syndication of Loans: Underwriting activities can be automated, leveraging financial details stored on the distributed ledger. KYC requirements can also be automatically enforced in real-time. BCT can provide a global cost reduction opportunity within the process execution and settlement sub-processes of syndicated loans.

Trade Finance: BCT usage for trade finance enables automation of LC creation, development of real-time tools for enforcing AML and customs activities, and associated cost savings.

Capital Markets: BCT brings the following advantages in the clearing and settlement processes – reducing or eliminating trade errors, streamlining back office functions, and shortening settlement times. Further areas where BCT can be applied advantageously in banking and financial sector would be supply chain finance, bill discounting,

monitoring of consortium accounts, servicing of securities and mandate management system.

Central Bank

In a bid to evolve towards a cashless society, many central banks around the globe including Canada, England, Sweden, and Netherlands have started exploring the use of BCT for digitizing their currency, and many more are converging to the idea. From a technological perspective, we feel that BCT has matured enough and by increasing awareness among the stakeholders appropriate time has come for initiating suitable efforts towards digitizing the Bangladeshi Taka through BCT.

Role of Bangladesh Bank around Blockchain

Though Bangladesh Bank has been closely monitoring developments related to Blockchain technology. BB may take the initiative of exploring the applicability of Blockchain to the Bangladeshi banking and financial industry by conducting a workshop involving all the stakeholders such as the academicians, bankers, regulators and technology partners. In the process, the participants of the workshop may come together to bring out a White Paper detailing the technology, concerns, global experiences and possible areas of adoption in the financial sector in Bangladesh. The whitepaper may highlights several advantages of Blockchain technology regarding cost savings, efficiency, and transparency. The Institute may also develop ways on the applicability of Blockchain to a trade finance application with active participation of bankers and solution provider. BB may develop a guideline regarding the implementation of Blockchain technology in the banking and financial sector of Bangladesh.

9. Findings and Recommendations

9.1 Global Use of Blockchain Technology (BCT), and Scope for Banks and Financial Institutes of Bangladesh

Globally many banks, financial institutes and central banks have already adopted BCT in the areas like Digital Currency, Foreign Trade, Cross-border Payments, e-KYC Document Management, Capital Markets, Syndication of Loans, Supply Chain Finance, etc. The use cases of blockchain can broadly be classified into information sharing based and

digital currency based applications. The set of use cases of the first category have ready applicability in banking and financial sector. On the other hand digital currencies like bitcoin is the perfect example of the use cases of the second category.

It is clear that there can be many different use cases for banks to utilize blockchain technology. Each well implemented use should result in quicker transactions, less friction, greater robustness and more transparency and immutability. With a good understanding of the various aspects regarding the blockchain technology, it is the right time for its adoption in Bangladesh. In order to identify the potential application areas of BCT in banking, it may be prudent to look at the various use-cases of BCT taking shape across the world. On a pilot basis banks may setup a private blockchain for their internal purposes. This not only helps them to train human resources in the technology, but also benefits by enabling efficient asset management, opportunities for cross-selling, etc.

9.2 Security of BCT

The bank industry is one of the most attackable fields. It requires high security. Blockchain can eliminate the threat or the risk of fraud in all areas of banking. Now a days, blockchain technology is widely used due to its proven tight security. Though 60% CTOs think that blockchain technology is more secured than conventional banking technology systems and if implemented properly then blockchain technology definitely brings some advantages like cyber security to banking industry, but about 22% percent of the respondents do not think that blockchain is a secured system. Moreover, 18% banks don't have any clear idea about security issues.

Though BCT is mainly used for robust security it is seen that most of the banks still not well conscious about its proven security. There are many scopes to implement BCT in Bangladeshi Banks and Financial Institutes. Banks can individually or jointly setup blockchain technology for inter or intra-bank transactions in a limited scope. Then blockchain security testing can be designed to evaluate every aspect of the blockchain from policies, system design through the

security of the blockchain itself to ensure the Confidentiality, Availability and Integrity of the entire blockchain.

9.3 Competitive Advantages

BCT is highly scalable and used to automate processes, reduce total number of intermediate business processes, reduce data storage costs, minimize data duplication and enhance data security. About 64% of the respondents believe that blockchain technology is broadly scalable and will eventually achieve mainstream adoption. Blockchain technology can be a competitive weapon to survive in the market. Around 51% banks worried about losing competitive advantages if they do not accept blockchain.

As the technology is very new in Bangladesh and increase competitive advantages by reducing cost over traditional system, management of all banks may consider this factor seriously and make a common roadmap to implement this technology step by step in the banking system.

9.4 Cost of BCT

As blockchain is fundamentally different than the traditional ledger-based approach used in the banking sector, the hardware and software infrastructure will need to be reconstructed from the ground up in order to permit blockchain use. Around 43% of the CTOs believe that biggest challenges for adopting blockchain technology is the high cost. Though many banks are interested to invest in BCT in the coming years, about 64% of the respondents do not have any plan to invest in blockchain technology due to high cost.

The top level executives may determine which business functions should move to blockchain first, and how to make this transition. Banks joining together can develop a common fund and build blockchain platforms that will give value for all participants at a reduced cost.

9.5 Developing Digital Currency: In a bid to evolve towards a cashless society, many central banks around the globe including Canada, England, Sweden, and Netherlands have started exploring the use of

BCT for digitizing their currency, and many more are converging to the idea.

From a technological perspective, we feel that BCT has matured enough and by increasing awareness among the stakeholders, appropriate time has come for initiating suitable efforts towards digitizing the Bangladeshi Taka through BCT. Government of Bangladesh can do this with the help of all stakeholders. BB may take necessary initiatives in this regard.

9.6 Awareness Development and Role of the Central Bank:

Perception of banks' top level executives (CEOs and MDs) about how blockchain will change the way of doing business in next 3 years is not very clear. About half of them (49%) think that this technology definitely change the business process, 27% believe the process will be more or less the same as before and 24% are not taking any sides of the two. Some respondents also think that blockchain technology is overhyped. CTOs about blockchain and associated components are not very aware. While measuring the awareness, in a scale out of 10, they achieved an average score of 3.5. Only 20% banks arranged training program on blockchain and took initiative to explore blockchain in the next 3 years, which is not encouraging at all. Also, only 15% banks have conducted an assessment about the effect of blockchain in banking industry. 75% respondents said that they do not find any proven case about the success of this technology, whereas 19% said intricate technology may pose a negative role in embracing blockchain.

It is evident from the findings that our banking industry is not ready yet to embrace this new technology. Though Bangladesh Bank has been closely monitoring developments related to blockchain technology, BB may take the initiative of exploring the applicability of blockchain to the Bangladeshi Banking and Financial Industry by conducting a series of workshops or seminars involving all the stakeholders such as the academicians, bankers, regulators and technology partners. In the process, the participants of the workshop may come together to bring out a White Paper detailing the

technology, concerns, global experiences and possible areas of adoption in the financial sector in Bangladesh. The white paper may highlight several advantages of blockchain technology regarding cost savings, efficiency, and transparency. BB may develop a guideline regarding the implementation of blockchain technology in the banking and financial sector of Bangladesh. The government may enact corresponding laws for this technology, and enterprises should be ready to embrace blockchain technologies.

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Appendix 1: Discussion Summary of the Roundtable on “Relevance of Blockchain for Banks in Bangladesh”

Bangladesh Institute of Bank Management (BIBM) organized a roundtable discussion on “Relevance of Blockchain for Banks in Bangladesh” on April 28, 2019. Mr. S. M. Moniruzzaman, the then Chairman, BIBM Executive Committee and Deputy Governor, Bangladesh Bank as well was present as the chief guest. The research team consisted of Mr. Md. Mahbubur Rahman Alam, Associate Professor, BIBM; Ms. Kaniz Rabbi, Assistant Professor, BIBM, Mr. Md. Ashraful Alam, Country Lead-Digital, United Nations Capital Development Fund (UNCDF); and Mr. Nurul Ahmed, Chief Executive Officer, Naztech Inc.

Professor Barkat-e-Khuda, Ph.D., Dr. Muzaffer Ahmad Chair Professor of BIBM, Mr. Helal Ahmed Chowdhury, the then Supernumerary Professor of BIBM, Mr. Yasin Ali, the then Supernumerary Professor of BIBM, and Mr. Shyamol Boran Das, Chief Digital Officer, BRAC Bank Ltd. were present as designated discussants. Mr. Md. Abdur Rahim, the then Director General, BIBM chaired the occasion. A good number of participants from different banks, media representatives and faculty members of BIBM attended the roundtable discussion.

Dr. Prashanta Kumar Banerjee, Professor and the then Director (Research, Development and Consultancy) of the BIBM, delivered the address of welcome. After the formal address of welcome, Mr. S. M. Moniruzzaman delivered his speech and inaugurated the program. On behalf of the team, Mr. Md. Mahbubur Rahman Alam, Associate

Professor of BIBM presented the paper. Other designated discussants commented on the paper after the presentation. Besides, the participants of the workshop raised a number of issues.

Mr. S. M. Moniruzzaman, the then Chairman, BIBM Executive Committee and Deputy Governor, Bangladesh Bank

He said that Bangladesh Bank closely monitors the worldwide recent development in blockchain. He added that more detailed study is needed to explore the applicability of BCT in Bangladeshi banking. BIBM can organize seminar, workshop and round table discussion involving all the stakeholders such as the academicians, bankers, regulators and technology partners. Through this process, the participants can come together to bring out detailing the technology, concerns, global experiences and possible areas of adoption in the financial sector in Bangladesh.

Professor Barkat-e-Khuda, Ph.D., Dr. Muzaffer Ahmad Chair Professor, BIBM

He said that Bangladesh Bank (BB) may take the initiative of exploring the applicability of blockchain to the Bangladeshi Banking and Financial Industry by conducting a series of workshops or seminars involving all the stakeholders such as the academicians, bankers, regulators and technology partners. He said that BIBM with the help of BBTA can jointly organize more seminars and workshops in this topic. In the process, the participants of the workshop may come together to bring out a White Paper detailing the technology, concerns, global experiences and possible areas of adoption in the financial sector in Bangladesh. The white paper may highlight several advantages of blockchain technology regarding cost savings, efficiency, and transparency. He added that senior management of the banks needs to have the mentality to accept new technologies.

Mr. Helal Ahmed Chowdhury, the then Supernumerary Professor, BIBM

He thanked the team for conducting a timely research in this contemporary topic. In his speech, he said that blockchain technology is secured than conventional technology and Bangladeshi banks can adopt

this technology in pilot basis. If this is successful then banking industry can implement blockchain in a wider range.

Mr. Yasin Ali, the then Supernumerary Professor, BIBM

He suggested that detailed study and research should be done on this technology to realize the full utilization of it. He also proposed that Bangladesh Bank should come forward in this regard for the benefit of banking industry. He recommended that all banks with the guidance of BB can develop a team jointly to reap the benefit of blockchain.

Mr. Shyamol Boran Das, Chief Digital Officer, BRAC Bank Ltd.

He proposed that online KYC can be accomplished through blockchain technology. Also database regarding customer information can be created by using this technology. According to him, blockchain technology is a big opportunity and at the same time poses great challenges for banks if proper security is not maintained. He suggested that more training, research and workshop should be arranged to overcome this challenge.

Comments/ Recommendations from the Participants:

- Bangladesh Bank should organize more seminar/workshop on blockchain technology for top level management and policy makers of different banks.
- Bangladesh Bank should develop a knowledge sharing platform among the bankers.
- IT security and governance must be ensured for next generation online banking in Bangladesh. Blockchain technology might have a great contribution in this regard.
- A careful analysis and study on pilot basis before scaling up, fine-tuning based on feedback, etc., are required before we adopt such innovations.
- Every bank may allocate certain portion of its annual profit for ICT budget for blockchain adoption.

Training is the key to develop the capability of employees. Top management should send employees for different trainings regarding blockchain technology in home and abroad.

Paper Two

Corporate Guarantee: Does it Work in Recovery of Loan?

Md. Mosharref Hossain, Ph.D.

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Assistant Professor, BIBM

Maksuda Khatun

Lecturer, BIBM

Reefat Zaman Shourov

Lecturer, BIBM

Mohammad Shahidul Islam

Senior Assistant Vice President, Dhaka Bank Limited

List of Abbreviations

AOA	Articles of Association
BB	Bangladesh Bank
BCBS	Basel Committee of Banking Supervision
BDT	Bangladeshi Taka
BFI	Banking Financial Institution
BL	Bad and Loss
BRPD	Banking Regulations and Policy Department
CEO	Chief Executive Officer
CG	Corporate Guarantee
CIB	Credit Information Bureau
CRM	Credit Risk Management
DF	Doubtful
ECAI	External Credit Assessment Institution
ICRRS	Internal Credit Risk Rating System
LTR	Loan against Trust Receipt
MOA	Memorandum of Association
NBFI	Non-Bank Financial Institution
NPL	Non-Performing Loan
OD	Overdraft
PSTN	Public Switch Telecommunication Network
RJSC	Registrar Joint Stock Companies and Firms
RWA	Risk-weighted Assets

Executive Summary

A corporation is owned by its shareholders who share profits and losses generated through the firm's operations. Guarantee means the assurance given by an entity (individual or institution) for ensuring that the liabilities of a debtor. The guarantee against loans in the banking system may take several forms as a tool of credit risk management. The credit risk is the probability that the borrower might not respect the contract with the bank, could not be able to or not be willing to pay back the money either in full or in part and thus, leading to a bank loss. Therefore, banks should be concerned about the risk in credit creation for ensuring their profitability, solvency and sustainability. In line with this, the credit risk is considered as a main source of risk of the banking business. In the banking sector, a substantial loss arises due to borrowers default on loan repayment, which even leads bankruptcy. Because, failure of the banking industry may emerge due to increase in Non-Performing Loan (NPL). The extent of NPLs in the banking system erodes investors' confidence and alarms its stakeholders. Subsequently, a high level of NPL reduces lending ability of the bank and possibly put it out of business. Similarly, low debt recovery hinders banks from extending further credit into the economy, which adversely affects the productivity.

The international standard of NPL is 2 (two) percent or below, but it is much higher in our country. Therefore, the NPL is one of the burning problems of the banking sector in Bangladesh. The better credit risk management has been amplified due to the increasing trend of the credit risk in banks. The management of the risk related to that credit affects the profitability of the banks. Moreover, poor credit risk management reduces bank profitability and leads to bank distress and/or failure. Therefore, banks should effectively manage their credit risk to support the viability and profitability, and also to contribute to the stockholders wealth.

Commercial banks consider both tangible and intangible securities for minimizing credit risk. With many other securities, giving a corporate guarantee to banks/lenders by a company, other than the borrower, is a usual practice in the normal course of trade and commerce across the

world. Under a guarantee, the guarantor enters into a contract by which it agrees to be liable for the present and future obligations of a principal debtor to a creditor, usually a lender.

On the above background, this study intends to explore the enforceability and effectiveness of corporate guarantee in recovery of loan in Bangladesh. The paper is based on primary and secondary data. Primary information has been collected through interview. The secondary data have collected from different publications of Bangladesh Bank and Bangladesh Institute of Bank Management.

It is observed that recovery becomes possible if there is due diligence and proper documentation. If the guarantor is not sufficiently solvent, it would not be possible to encash the guarantee. The guarantor itself may become bankrupt. Bank will not get legal support in case of procedural lapses in obtaining Corporate Guarantee (CG). Banks should check Memorandum of Association (MOA) and Articles of Association (AOA) of the company properly before accepting its CG. It is desirable that banks will do internal and external rating for the guarantors along with the borrower. Banks should also consider the relationship between guarantor and principal debtor. Through writ procedures, guarantors escape themselves with issuing ‘stay order’ from high court. Therefore, banks experiences a long time for the court decision. It is expected that a bank will accept CG as a measure of loan recovery, not only as a comfort.

Corporate Guarantee: Does it Work in Recovery of Loan?

1. Introduction

Commercial Banks play a pivotal role in the development of the country's economy by providing loan and advances for industry and trade. They act not only as the custodian of the wealth but also as resources which are necessary for ensuring economic and social stability and sustainable growth of the country. In this respect, credit creation is the most significant function of commercial banks, which mainly depends on the perceived risk of credit. The credit risk is the probability that the borrower might not respect the contract with the bank, could not be able to or not be willing to pay back the money either in full or in part and thus, leading to a bank loss. Therefore, banks should be concerned about the risk in credit creation for ensuring their profitability, solvency and sustainability.

The credit risk has been identified by Basel Committee of Banking Supervision (BCBS) as a main source of risk of the banking business. In the banking sector, a substantial loss arises due to borrowers default on loan repayment, which even leads bankruptcy. One important proxy for the credit risk is the Non-Performing Loan (NPL), which is regarded as the main obstacle to the development and growth of banks (Zhang *et al.*, 2016). The failure of the banking industry may emerge due to increase in NPL. The extent of NPLs in the banking system erodes investors' confidence and alarms its stakeholders (Nawaz *et al.*, 2012). Subsequently, a high level of NPL reduces lending ability of the bank and possibly put it out of business. Similarly, low debt recovery hinders banks from extending further credit into the economy, which adversely affects the productivity.

The growing trend of NPL in the banking industry in Bangladesh is a major concern for policymakers and the stakeholders. The NPL has adverse effect on the bank's day to day operations and profitability. Banks have to keep excess provision against defaulted loan which directly affects the net profit. Similarly, with increasing NPLs, Risk-

weighted Assets (RWA) would increase; which, in turn, would create pressure on maintaining the regulatory capital requirement.

The international standard of NPL is 2 percent or below, but it is much higher in our country (Chowdhury, 2018). Therefore, the NPL is one of the burning problems of the banking sector in Bangladesh. In fact, the gross NPL ratio in Bangladesh has increased from 9.31 percent in December 2017 to 10.30 percent in December 2018 (CEIC, 2019). Furthermore, the defaulted loans account has increased to 11.87 percent of total outstanding loans at the end of March 2019 (Uddin, 2019b). The ratio shows an upward trend in recent years mainly due to increase in total classified loans, defaulted outstanding and non-recovery of loans. The amount of Non-Performing Loan (NPL) stood at Tk. 93,911 crore at the end of 2018, up from Tk. 74,303 crore a year ago (Uddin, 2019a). However, defaulted loans soared to Tk. 110,874 crore as of March 2019, the highest ever in the country (Uddin, 2019b). It is therefore, very urgent to protect banks from the threat of NPL and an effective risk management should be practiced in this regard.

The better credit risk management has been amplified due to the increasing trend of the credit risk in banks. The management of the risk related to that credit affects the profitability of the banks (Li and Zou, 2014). Moreover, poor credit risk management reduces bank profitability and leads to bank distress and/or failure (Osuka and Amako, 2015). Therefore, banks should effectively manage their credit risk to support the viability and profitability and also to contribute to the stockholders wealth (Iwedi and Onuegbu, 2014).

As part of the credit risk management practices, banks usually accept securities in different forms to mitigate the potential credit risk. Obtaining of security for loans is one of the safeguards that banks exercise to secure their interests. Commercial banks consider both tangible and intangible securities in this respect. With many other securities, giving a corporate guarantee to banks/ lenders by a company, other than the borrower, is a usual practice in the normal course of trade and commerce across the world. In this regard, typically, a larger company (often a parent company or another related company) provides

the guarantee on behalf of a smaller company who may not be well known or have developed a relationship with the lender. Under a guarantee, the guarantor enters into a contract by which it agrees to be liable for the present and future obligations of a principal debtor to a creditor, usually a lender.

The guarantee may be a more easily accessible form of security especially when compared to the complexity that usually arises with the creation of other forms of security such as mortgages, etc. Nevertheless, it is very important that banks conduct the necessary due diligence for making the guarantee as an effective for recovery the loan. Otherwise, it might find itself downgraded to the status of an unsecured creditor. Guarantees, whether issued by individuals or corporates, form an essential feature of doing business and creating or receiving credit. Generally, banks ask for guarantees because they constitute one of the forms of consensual security available like other collaterals for the loan created. The questions may then be arisen, how enforceable the corporate guarantee is and whether the corporate guarantee is a viable form of security to recover loan amount?

On the above background, this study intends to explore the enforceability and effectiveness of corporate guarantee in recovery of loan in Bangladesh. This paper started with the background followed by the conceptual aspects of corporate guarantee. The next section highlights the regulatory framework for corporate guarantee in Bangladesh. In Section-4, current status of loans and advances in Bangladesh is documented. Besides, a summary of discussion outcome is reported in Section-5. In Section-6, some practical cases have been analyzed. Finally, Section-7 provides some issues and recommendations to ensure the effective implementation of corporate guarantee in recovery of loan in Bangladesh.

1.1 Objectives

The broad objective of the discussion is to identify whether corporate guarantee works for recovering loan in Bangladesh. To attain the major goal, the study also focuses on some specific objectives those are:

- i) to review the regulatory aspects of corporate guarantee;
- ii) to examine the status of loans and advances in Bangladesh; and
- iii) to analyze the implication of corporate guarantee for recovering loan in Bangladesh.

1.2 Methodology

The paper is based on primary and secondary data. Primary information has been collected through interview. In this regard, some higher officials of scheduled banks and NBFIs, academicians, industry experts and researchers were considered. The secondary data have collected from different publications of Bangladesh Bank and Bangladesh Institute of Bank Management. Extensive literature has been reviewed for developing the conceptual aspects. Relevant websites were visited and some research papers and books from home and abroad were also studied for completing the paper. Along with some tabular and pictorial presentation, analysis has been presented in descriptive way. The paper has been finalized by accommodating observations and suggestions of the roundtable discussion.

2. Conceptual Aspects of Corporate Guarantee

2.1 Definition of a Corporate

Firm that meets certain legal requirements to be recognized as having a legal existence, as an entity separate and distinct from its owners. A corporation is owned by its shareholders who share in profits and losses generated through the firm's operations. Generally, a corporate has three distinct characteristics – (i) legal existence, *an entity can (like a person) buy, sell, own, enter into a contract, and sue other persons and firms, and be sued by them,* (ii) limited liability, *a firm and its owners are limited in their liability to the creditors and other obligors only up to the resources of the firm, unless the owners give personal guaranties,* and (iii) continuity of existence, *a firm can live beyond the life spans and capacity of its owners, because its ownership can be transferred through a sale or gift of shares.*

2.2 Definition of Guarantee

In general, guarantee means the assurance given by an entity (individual or institution) for ensuring that the liabilities of a debtor. In other words, if a debtor fails to settle a debt, the entity will cover it. Similarly, a bank guarantee enables the customer, or debtor, to acquire goods, buy equipment or draw down a loan. For example, Company-A is a new restaurant that wants to buy some kitchen equipment for BDT 3 million. The equipment vendor requires Company-A to provide a bank guarantee to cover payments before they ship the equipment. The Company-A may request a financial institution to provide guarantee in favor of A to the vendor. On the other hand, a bank may ask a borrower to arrange a guarantee for ensuring the repayment of the debt in case of failure of the borrower. Guarantee must be given by an entity other than the principal debtor.

2.3 Types of Guarantee

The guarantee involves when an entity promises to cover a loss if a borrower defaults on a loan. Similarly, an entity often chooses guarantee for international and cross-border transactions. Therefore, guarantee enables the customer or debtor to acquire/buy goods/ equipment or to draw down a loan. Consequently, the guarantee may take several forms.

2.3.1 Personal Guarantee

A personal guarantee is a promise to repay liabilities that is made by an individual on behalf of another individual or organization. An executive or founder of a company may become a guarantor for the company to be eligible for obtaining a loan/ credit. By making a personal guarantee, an individual promises to repay the outstanding liability in case of default by the principal debtor. The personal assets the guarantor can be used to settle the loan/ credit.

2.3.2 Corporate Guarantee

A Corporate Guarantee (CG) is almost similar to personal guarantee. However, a corporate guarantee arises when an individual/institution borrows from another entity (predominantly bank) and another institutions provide guarantee for the loan. Typically, a larger company

(often a parent company, or another related company) provides guarantee on behalf of a smaller company, who may not be well known or have developed relationship with the lender. The corporate guarantee may also help bring down the interest rate. The guarantee benefits the debtor and the lender.

2.3.3 Bank Guarantee

A bank guarantee is a promise by a bank to cover the liabilities of a debtor in case of his failure to fulfill contractual obligations with another party. It is usually provided by the commercial banks to companies involved in transactions with unfamiliar parties or foreigners.

2.3.4. Financial Guarantee

A financial guarantee can be regarded as a form of a bank guarantee. Essentially, it is an obligation of a specialized insurance company to repay the remaining interest payments and the principal amount of a bond or similar financial instrument to the lender in case of the borrower's default. Note that the financial guarantee can be used in transactions that involve various financial instruments and structured products.

2.4 Parties in Corporate Guarantee Arrangement

A guarantee is an agreement in which one party takes on the payments or responsibilities of a debt if the debtor defaults on the loan. There are three main parties in a guarantee arrangement – (i) the guarantor, *an entity, other than the one who took a loan, agreeing to perform the financial obligation in case of default of the borrower*, (ii) the lender (bank), *who lent the money to the borrower*, and (iii) the principal debtor (borrower), *who borrows money from the lender*.

2.5 Nature of Guarantee

2.5.1 Limited Guarantee

In certain situations, a limited guarantee is used to limit the guarantor's obligation. For example, the guarantor might only have to pay back a certain amount of the debtor's loan instead of the full amount. In that case, the guarantee document must clearly state the amount of the liability. A limited guarantee is common in a mortgage agreement.

Instead of leveraging the full value of the property as a security measure, the guarantor would only be responsible for repaying part of the loan amount. In order for this agreement to be legally enforceable, the limits must be outlined in the loan agreement and signed by the guarantor.

2.5.2 Cross Guarantee

A cross guarantee refers to an arrangement between two or more related companies to provide a guarantee to each other's obligations. The guarantee is commonly among companies trading under the same group or between a parent company and its subsidiaries. A cross guarantee protects the company that incurred a liability (such as a loan) from losing its assets if it defaults on its obligations.

2.5.3 Validity Guarantee

This is a less comprehensive guarantee used by factoring companies. The promise here is that the invoices one turns over to a factor are valid, have not been pledged to another company, and are collectible. One also promises that if anyone receives payment on an invoice one has turned over to the factor (a "misdirected payment"), he or she will remit the fund to the factor. Unlike with a personal guarantee that some factors may require, with a validity guarantee one don't tie his or her personal assets to customer defaults.

2.6 Advantages of Guarantees

A guarantee serves as additional protection in a loan, making a loan more attractive to potential lenders. The lenders are more willing to provide guaranteed loans even to candidates with the poor credit profile, as the presence of a guarantor diminishes the probability of a lender of not being repaid. Besides, a guaranteed loan is a viable option for borrowers with a poor or no credit history. In such a case, the guarantor's promise may allow borrowers to obtain loans that would otherwise be inaccessible. The guarantee may be provided by an individual, company, or financial institution. A lender's position may be enhanced because of the wider pool of assets against which it may have a claim, for example, many lenders look to a parent company to stand behind the liabilities of the borrowing subsidiary. Additionally, through a guarantee, the

transformation of the nature of credit risk is possible whilst the direct recourse of the lender remains the same; a wider recourse is achieved through a guarantee. Moreover, it facilitates the reduction of the funding costs to a principal by increasing the lender's chances of repayment and thus, reducing the lender's risk, a lower interest rate might be possible for the principal, thereby reducing the cost of funding.

3. Regulatory Framework for Corporate Guarantee in Bangladesh

3.1 Rules and Regulations of Corporate Guarantee

There is no specific Act or regulation relating to loan against corporate guarantee sanctioned by banks or other financial institutions in Bangladesh. However, there are some indications in many laws and guidelines regarding loan against corporate guarantee including Contract Act 1872, Artha Rin Adalat Ain 2003, Bank Company Act 1991, Internal Credit Risk Rating System (ICRRS), The Credit Risk Management (CRM) Guidelines, etc. The following parts highlight the legal aspects of corporate guarantee.

According to Section 126 of Contract Act, 1872, “a contract of guarantee is a contract to perform the promise, or discharge the liability, of a third person in case of his default. The person who gives the guarantee is called the "surety": the person in respect of whose default the guarantee is given is called the "principal debtor", and the person to whom the guarantee is given is called the “creditor”. In respect of the aforementioned section, if the borrower fails to pay the loan, the bank may claim the amount to the Guarantor. However, if the Guarantor denies paying the claimed amount, there is no specific provision to forfeiture the property of the Guarantor. In that case, bank would not be able to take any prompt initiative for recovery of the loan. Even no schedule of moveable or immovable property is given in the Deed of Corporate Guarantee. So, the final destination for the bank for recovery of the loan is to go to the Court. However, the court procedure usually takes longer time which harms the interest of the bank badly.

According to the Section-6(5) of the Artha Rin Adalat Ain, 2003, the Guarantor either personal or corporate shall be one of the respondents of

money suit and any decree/order of the court shall be executed against corporate guarantor jointly and severally. According to the section, if the borrower/principal debtor fails to pay the loan, the corporate guarantor shall be liable to pay the default loan. However, there is a condition that in case of realizing claim through judgment, the court will liquidate firstly assets of the principal borrower, secondly that of third party mortgagor and lastly that of corporate guarantor.

In the definition of “Borrower” of *The Bank Company Act 1991*, a guarantor is considered like a borrower. However, if the guarantor sell or transfer all his properties before execution of the Guarantee clause or if the property goes to his successors or if he declares himself as insolvent, it shall be very complicated issue for a bank to recover the loan. A guarantor information is reported in the CIB report. For this reason, when principal borrower default with the bank, the guarantor’s CIB report will show DF/BL liabilities as per Section-5 “Gha Gha”. So the business of the Corporate Guarantor will be affected and therefore corporate guarantor will induce to pay guaranteed amount of loan.

There is maximum 1.5 score out of total 40 score of qualitative marks in Internal Credit Risk Rating System (ICRRS) against strong Corporate Guarantee. According to the ICRRS, Strong Corporate Guarantee means the credit rating of the guarantor should be at least 1 or 2 as per BB rating mapping mentioned in BRPD circular 18/2014 on Risk Based Capital Adequacy in line with Basel III. It also states that in case of rating substitution based on the corporate guarantor, the guarantee must be legally enforceable, irrevocable and unconditional.

The Credit Risk Management (CRM) guideline for banks circulated by the central bank states that banks may use different strategies such as collateral and guarantees etc. to mitigate their credit risks. However, the bank must understand that the credit risk on a loan is not eliminated by the existence of a third-party guarantee. The bank merely substitutes the credit risk of the guarantor for that of its own client. With regard to guarantees, banks should evaluate the level of coverage being provided in relation to the credit-quality and legal capacity of the guarantor.

According to the CRM guidelines, bank should focus the following while taking corporate guarantee:

- i. The corporate guarantee must be supported by a Memorandum of Association (MOA) and Articles of Association (AOA) of the company giving the corporate guarantee.
- ii. Additionally, the corporate guarantee to be approved in the board meeting of the corporate guarantor.
- iii. The guarantor company must be rated in any of the investment grade categories by at least one External Credit Assessment Institution (ECAI).
- iv. The balance sheet of the third party giving a corporate guarantee is to be analyzed. Net worth, total assets, profitability, existing credit lines, and security arrangements of the company giving the corporate guarantee to be analyzed to ensure that the company is not exposed to financial obligation beyond its capability.
- v. Once the financial stability of the corporate guarantor has deteriorated in terms of the above, the bank shall ask for remedial measures from the borrower (replacement/ new collateral).
- vi. Reciprocal guarantee arrangements between two banks will be disregarded. For example, if Bank A guarantees loans made by Bank B to certain client(s), and Bank B guarantees loans made by Bank A to certain client(s), only the difference between the two guaranteed amounts will be considered as a credit enhancement for the purposes of determining the overall level of credit risk at the bank whose borrowers benefitted from the higher amount.

3.2 The Degree of Enforceability of Corporate Guarantee

A corporate guarantee is a contract between a corporate entity or individual and a debtor. In this contract, the guarantor agrees to take responsibility for the debtor's obligations, such as repaying a debt. When a company guarantees repayment of a loan granted to one of its subsidiaries, if the subsidiary defaults on the loan, the person who signed the agreement guarantees that the loan will be repaid.

In the past, judges in court cases have maintained that when a guarantor takes responsibility for the liability of someone else, that agreement

becomes a legal, distinct, and enforceable contract between the creditor and the guarantor. Although it's easier to prove the legal creation and obligation contained in a personal guarantee, corporate guarantees may be harder to prove. In general, personal guarantees are easier to legally enforce, except in the case that one party alleges forgery, fraud, or coercion.

Corporate guarantees are more difficult to enforce because corporations have different structures with layers of people, including the board of directors, employees, and shareholders. Each of these individuals has a different role in the administration and management of company affairs, so the person signing might not have authorization to do so on behalf of the company. It is therefore important that before accepting a corporate guarantee from a borrower, the creditor must ensure that it was properly authorized and issued. Following documents are to be required for ensuring enforceability of corporate guarantee agreement:

- i. CIB report of Corporate Guarantor;
- ii. Memorandum of Association (MOA) and Articles of Association (AOA) of the company giving the corporate guarantee;
- iii. Resolution of the Board of the Guarantor Company (Memorandum of the Guarantor company must permit to do so);
- iv. The guarantor company must be rated in any of the investment grade categories by at least one ECAI;
- v. Financial Statements of the third party giving a corporate guarantee is to be analyzed. Net worth, total assets, profitability, cash flow position, existing credit lines, and security arrangements of the company giving the corporate guarantee to be analyzed to ensure that the company is not exposed to financial obligation beyond its capability.

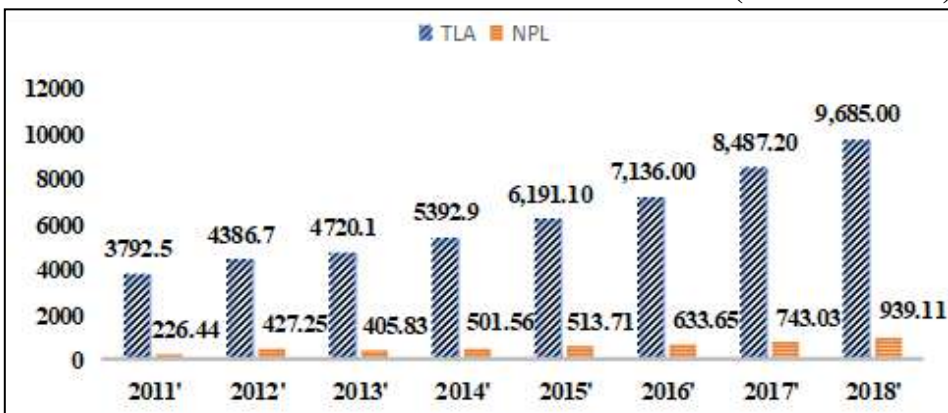
4. Current Status of Loans and Advances in Bangladesh

Lending quality credit for productive activities by the banking sector of a country will increase economic growth. In contrast, excessive credit for unproductive activities creates inflationary pressure. However, smooth recovery of such credit portfolio of banks is, therefore, a prerequisite for the safety and soundness of banks. As shown in Figure 1, the overall domestic credit consisting both Government Sector credit and Private Sector credit increased steadily over the last 8 financial years from 2011 to 2018. In 2018 the total loan and advances stood at BDT 9685 billion which is 14.11 percent higher than the previous year. With the increasing trend of loan amount, the volume of NPL also increased.

According to Figure-1, the default loans at banks went up by 26.38 percent or BDT 196.08 billion in 2018, the highest rise in seven years, exposing the unwarranted condition of the banking sector. The volume of NPLs rose to BDT 939.11 billion as of 2018 from BDT 743.03 billion as of December 2017 indicating the alarming scenario for the banking sector. Therefore, the concern authorities should properly address this burning issue, otherwise high levels of the NPLs could impede a pickup in investment if left unaddressed.

Figure 1: Total Loan and Advances and Default Loan in Bangladesh

(BDT in Billion)



Source: *Financial Stability Report*, Bangladesh Bank

Note: TLA = Total Loans and Advances, NPL= Non-Performing Loan

The NPL is a major threat to the financial health of the banking sector. It is important to note that in one side the trend of gross NPLs as a percentage of total outstanding loans is upward and the other is the growing size in value terms. Table-1 illustrates that the proportion of bad loans has been increasing since 2012 and remained above 77 percent of the gross NPL over the years. The Gross Non-Performing Loan (NPL) to total loans outstanding ratio of the banking sector shows the upward trend from 2013 to 2018. In 2018 this ratio increased significantly to 10.3 percent from 9.3 percent in 2017.

**Table 1: Banking Sector Gross NPL Ratio & Its Composition
(in percentage)**

Year	Gross NPL to Total Loans Outstanding	Sub-Standard Loans to Gross NPL	Doubtful Loans to Gross NPL	Bad Loans to Gross NPL
2011	6.2	14.7	11.5	73.8
2012	10	19.1	14.2	66.7
2013	8.9	11.2	10.1	78.7
2014	9.7	11	11.2	77.8
2015	8.8	8.9	6.5	84.6
2016	9.2	10.2	5.4	84.4
2017	9.3	7.5	5.5	87
2018	10.3	9.4	4.7	85.9

Source: *Financial Stability Report*, Bangladesh Bank

The size of gross NPL is calculated by adding up sub-standard, doubtful and bad loans. Therefore, Table-1 also shows the relative percentage of such categories of classified loans. In their categories, it is alarming that the relative size of the bad loans is too much higher with an increasing trend from 2013 to 2018. In 2018 the ratio of bad loans to gross NPL stood around 86 percent. Although, the percentage of bad loans to gross NPL declined to 85.9 percent in 2018 from 87.0 percent in 2017 due to some improvement over 2017, the high bad loan ratio indicates that major portion of the NPL has not been performing for a longer period of time which is not desirable. Higher bad loans adversely affect profitability and capital base of the banks as banks were required to maintain 100 percent provision against such classified loans. Since the long-term viability of a sound banking system depends on keeping a tight

lid on gross NPLs, reasonable care should be taken for the long-term financial health and sustainability of the banking sector.

From Table-2, it is observed that 64.18 percent of the advances of all banks in 2018 were secured by real estate followed by guarantee, financial obligations, merchandise, machinery and fixed assets. The proportion of real estate as a security against advances increased to 64.18 percent in 2018 from 54.57 percent in 2013. Such increasing trend was also observed in the past. About 5.70 percent of the advances of banks in 2018 were secured by the merchandise slightly higher than the year 2017. It is also observed that shares and securities are the least preferred form of security acceptable to banks in all years. The proportion of unsecured advances of all banks in 2018 was 1.01 percent. It is interesting to note that guarantee includes the personal and corporate guarantee. Therefore, it is quite difficult to identify the portion of loan against corporate guarantee. Even the loan against which banks do not have any other form of securities is reported under the guarantee. However, in 2018 all banks provide 12.50 percent of advances of its total advances against the personal and corporate guarantees which was slightly lower than 2013. The choice of security is also important for banks for mitigating risk associated with loans. Real estate is considered as the sensitive security that may suffer from price volatility leaving loans partly unsecured and may lead to strategic default.

Table 2: Advances by Security (in percentage)

Type of Security	2013	2014	2015	2016	2017	2018
Shares and Securities	0.42	0.63	0.64	0.53	0.47	0.43
Merchandise	7.23	7.85	6.62	6.21	5.56	5.70
Machinery and Fixed Assets	7.58	6.69	6.75	5.02	3.96	4.18
Real Estate	54.57	55.50	58.30	59.27	61.34	64.18
Financial Obligations	7.67	7.40	7.11	7.47	7.98	6.38
Guarantee	14.92	12.39	13.47	13.89	13.90	12.50
Miscellaneous	6.72	8.42	6.18	6.59	5.83	5.62
Unsecured	0.89	1.13	0.92	1.01	0.96	1.01
Total	100	100	100	100	100	100

Source: Authors' Calculation

5. Summary of Discussion Outcome

For the purpose of in-depth study, the study team members visited different banks and financial institutions and exchanged views with executives of these institutions. The team has collected opinions of Managing Director/ CEO (former and present), deputy managing directors (former and present), executives working in risk management department, credit risk management department, internal control and compliance department and branch managers of different financial institutions. Based on an unstructured questionnaire, interviews have been conducted. A summary of discussion is presented below:

5.1 Factors to be Considered for Accepting Corporate Guarantee (CG)

As per opinions of the respondents, a guarantee is considered as a form of security of a loan granted to a borrower in case of borrower's default. The lender may fail to recover the loan from the borrower due to his inability or unwillingness to repay. Therefore, a guarantor should be an entity who has the capacity to motivate, influence and create pressure on the principal debtor in case of non-repayment. Moreover, the entity should have ability to bear financial liability for the loan in case of financial distress of the principal debtor.

5.2 Practice of CG in Bangladesh

It is discovered from the interaction that there are some banks who ask for CG, in addition to other securities, in most of the lending. On the contrary, there are some banks who ask for CG very seldom. In very few cases, banks allow for lending in against of CG solely. Moreover, there are divergence in maintaining database regarding lending against CG.

5.3 Effective in Small Enterprise Financing

Most of the respondents opine that the CG is effective in case of small enterprise financing. They are witnessed of recovery from the guarantor in case of default of the principal debtor, who was a small enterprise. As small enterprises do not have influential power over the financial institutions and capacity to fight in the legal procedures, small entrepreneurs try to settle the matter in regular process. On the contrary,

bankers expressed their dissatisfaction for recovery of default loan from the big corporate guarantors.

5.4 Lack of Proper CIB Reporting by Banks

It is perceived that all of the banks are not equally sincere in reporting in Credit Information Bureau (CIB). Sometimes banks update CIB for the principal debtor but not for guarantor. Therefore, other banks do not get actual picture regarding the guarantor's liability to assess the credibility of the guarantor.

5.5 Procedural Lapses in CG

Some of the executives working in internal audit unit/department of the banks observed that there are some procedural lapses in documentation regarding the CG. It is essential that memorandum of association (MOA) and articles of association (AOA) of the corporate guarantor should allow to provide guarantee. More on that, board's resolution in this regard is also mandatory. Furthermore, guarantee-agreement must be signed by the authorized person. Besides, a floating charge with RJSC (Registrar Joint Stock Companies and Firms) may be created against the guarantor company. However, procedural lapses have been found in some cases.

5.6 Inconsistency between Net-worth of Guarantor and Guaranteed Liability

It is also evidenced in some cases that a corporate provides guarantees for the loan amount higher than the net worth of the guarantor, as was articulated by the bank-officials. It is also found that an inoperative or a losing concern is providing CG. In this situation, recovery of loan from the guarantor will not be possible in case of default of the principal debtor. Some the bank-executives disclose that accounting reporting of the guarantor is not satisfactory in all the cases. Therefore, it is not possible for banks to determine global liability of the guarantor for assessing actual net-worth of the firm.

5.7 General Perception about CG

In most of the cases, it deems that banks ask for CG as an additional security. They do not think about encashment of CG while taking credit decision. As it gets the least importance in lending decision, through

appraisal of the guarantor for assessing credibility is not conducted by the lender initially. Therefore, banks are not accomplishing expected outcome from the guarantors in encashment when needed.

5.8 Relationship between Principal Debtor and Guarantor

Different types of relationship are observed between principal debtor and the guarantor. Sometimes, a parent provide guarantee on behalf of its subsidiaries. Similarly, one firm gives guarantee for the loan of another firm under a single group. Besides, a guarantor may be a third party without having common ownership. Likewise, government agency may provide guarantee for the development work. As per observation of the respondents, having common ownership between principal debtor and the guarantor may not be very effective in recovery of credit in case of willful default. Providing mutual guarantee to each other is not exception in the banking industry of Bangladesh.

5.9 Big Firms with Good Reputation are not Interested to Provide Guarantee

It is expressed by the interviewee that some big firms with good market reputation do not provide guarantee for its associate companies. On the contrary, banks are offered corporate guarantee for a loan by a small sized private limited company. In case of default of the principal debtor, the guarantor restarts its business with new name. In this situation, banks face problem to recovery loan from the guarantor. Besides, CIB reporting may not have any implication, in that case, on the guarantor. The respondents also state that banks are not very successful in recovery of a default loan from the big corporate as a borrower and guarantor having bad intention.

5.10 Problem in Encashment of CG

Most of the respondents believe that banks are not getting full benefit from the corporate guarantee arrangement in recovery of loan due to suitable regulatory environment of the country. They believe that there is not lacking of regulation however, there are some problems in enforcement of regulations against the unethical guarantor. In most of the cases, guarantors get favor from the court in name of fundamental rights. Sometimes, legal process of settlement become too lengthy. It is

perceived that banks could not hire and deploy a senior and efficient lawyer as compare to the client's lawyer.

6. Analysis of Some Real-Life Cases

6.1 Recovery of Loan under Corporate Guarantee

ABC Telecom Ltd. was established in 2006 under company act 1994. It is a Public Switch Telecommunication Network (PSTN). Initially total project cost was Tk. 1,000.00 million and financing was done under 65:35 debt-equity ratio for 6 years including 1 year grace period. After 3 years, the company was incurring loss due to severe competition in the market and decline of revenue. At last, it became bankrupt after incurring huge loss. Corporate Guarantee of Telecommunication Infrastructure Ltd, a sister concern of ABC Telecom Ltd along with other securities was executed against the project Term Loans.

The Board of Directors of the Bank approved full and final settlement of existing Classified 02(two) Term loan outstanding totaling Tk.344.00 million (Term Loan-1: Tk.230.00 million & Term Loan-2: Tk.114.00 million as on 30.06.2019) on account of ABC Telecom Ltd (ATL). Finally, all classified loans were recovered through claiming of corporate guarantee of Telecommunication Infrastructure Ltd.

Final Messages

- i) Corporate guarantee is obtained after proper due diligence;
- ii) Documentation was completed perfectly;
- iii) The corporate guarantee was legally enforced;
- iv) Finally, bank could able to recover total classified amount of loan.

6.2 Inability of Corporate Guarantor to Serve Debt Payment

Power Shell (PS), a project company, has been incorporated under the Companies Act, 1994 on 28 January 2010. It has signed two separate power supply contracts on rental basis with BPDB on 04 February 2010 for a term of 3 years and 5 years respectively. Under the 3-year power supply agreement, PS has to build, own and operate the 110 MW HSD based electricity generation facility and under the 5-year power supply contract PS has to build, own and operate the 105 MW HFO based electricity generation facility. Electricity produced from both these plants

should be sold to BPDB. The HSD based power plant project was supposed to go into commercial operation on 04 June 2010 whereas it was started commercial operation from 1 November 2010.

The cost of the projects was Tk. 7629.9 million including power plant-1 Tk. 3931.9 million and power plant-2 Tk. 3698.0 million. Total debt of the project was Tk. 5330.0 million (power plant-1 Tk. 2750.0 million and power plant-2 Tk. 2580.0 million) and the equity was Tk. 2299.9 million (power plant-1 Tk. 1181.9 million and power plant-2 Tk. 1118.0 million) indicating the debt equity ratio of 70:30 for both the plants. Both the power plants were financed by 15 banks and financial Institutions for Tk.5330 Million for 3 and 5 years including 1 year moratorium period respectively.

Power Shell provided different securities to all the banks namely i) first priority fixed charge over all fixed assets of the Project Company on pari passu basis between ABC Bank Ltd. and other lenders to be registered with RJSC; ii) first priority floating charge over all movable assets of the Project Company on pari passu basis between ABC Bank Ltd. and other lenders to be registered with RJSC; iii) Equity support agreement by the key sponsors ensuring delivery of additional funds should the project experience cost overrun and to ensure timely commissioning of the proposed plant; iv) Assignment of all interest of the borrower under all its supply contract of the project and power supply contract; v) lien on all shares of the Project Company; vi) lien over escrow accounts in favour of the lenders; vii) lenders to be made co-payee under all project insurances; along with the Corporate Guarantee of parent company with net worth of Tk. 818.78 million on that time.

However, both power plants of PS were not able to generate required electricity as per agreement with the BPDB resulting to pay huge liquidity damages and were unable to serve debt payment. Although financing of both power plants of PS was backed by corporate guarantee of parent company, debt servicing was not be possible by parent company in case of default of Power Shell as parent company was also badly affected due to loss from the project company.

Final Messages

- i) Project/ Company failed to generate required amount of electricity
- ii) Company's earning was not sufficient to repay fixed obligation
- iii) Lenders failed to recover required amount from sale of securities
- iv) Corporate guarantee was not functioned due to the inability of parent company.

6.3 Corporate Guarantor was Bankrupt

Moonlight Fashion Ltd. is a 100 percent export oriented knit garments industry incorporated as a private limited company in 1995. The company is one of the allied concerns of Sunlight Group which has wide range of reputation at home and abroad. They have been exporting knit garments for long time in association with its sister concerns mainly to European countries and U.S.A.

Mr. Manirul Islam, Chairman of the company, is the key person regarding financial, operational and marketing issues. He is an experienced & renowned businessman in Narayanganj. Mr. Islam is the founder chairman of BKMEA. They are the pioneer of knit Garments exporters.

This company is availing funded facilities of Tk. 330.00 million in the form of OD and LTR and non- funded facilities of Tk. 340.00 million in the form of BBLC and sight LC from Diganto Bank Ltd. Corporate Guarantee of Sunlight Company Ltd. (whose net worth was Tk.500.00 million while the above facilities were allowed) was one of all securities/ collaterals held against the above facilities. Sunlight Company Ltd. was one of the largest knitwear garments in Bangladesh.

However, after 2 years of disbursement, Moonlight Fashion Ltd. was failed to pay its financial obligations. When the bank was attempting to liquidate corporate guarantee, corporate guarantor also declared itself as bankrupt. So, classified loans were not recovered through corporate guarantee while corporate guarantor became bankrupt.

Final Messages

- i) Borrower took loan against securities/collaterals along with corporate guarantee of parent company
- ii) The company failed to pay its financial obligations
- iii) Corporate guarantor also declared itself as bankrupt
- iv) Classified loans were not recovered through corporate guarantee

6.4 Procedural Lapses in Obtaining CG

Shefa Healthcare Company Ltd. was incorporated in 2001 under the company act 1994 to provide world-class healthcare service in Bangladesh. Initially total project cost was Tk. 5000.00 million and financing was done under 50: 50 debt-equity ratio for 7 years including 1 year moratorium period.

After inception, the company was struggling to generate revenue as projected. After 1 year, when repayment of term loan of Tk.2700.00 million was due, the company was unable to pay debt payment on regular basis due to low revenue generation. Lending Bank has extended moratorium period for further 6 months for smooth operation of the company. Even though, the company was failed to pay back debt after the expiry of moratorium period. As a result, company became bankrupt after 5 years of operation.

Corporate Guarantee of Shefa Pharmaceutical Company Ltd, a parent company of Shefa Healthcare Company Ltd was executed against the project loan along with other securities.

However, classified loans were not recovered through claiming of corporate guarantee of Shefa Pharmaceutical Company Ltd as proper due diligence was not conducted while taking Corporate Guarantee of parent company i.e. there is no clause in the Memorandum of Association of Corporate Guarantor that the company can provide corporate guarantee in favor of its sister concern against bank loan although it was supported by duly adopted Board Resolution of Shefa Pharmaceutical Company Ltd.

In the above case, it has been demonstrated that if corporate guarantee is obtained before proper due diligence and documentation, it will not

legally enforceable to recover loan in case of financial distress of principal borrower.

Final Messages

- i) Project Loan was given against securities/ collaterals along with corporate guarantee of parent company
- ii) The project company failed to pay its financial obligations
- iii) Corporate guarantee was taken without proper due diligence and documentation
- iv) Classified loans were not recovered through corporate guarantee as corporate guarantee was not legally enforceable.

6.5 Accepting Corporate Guarantee without Proper Assessment

An amount of Tk. 60.00 crore for XYZ (Industrial) investment has been disbursed to MN Power Limited against Corporate Guarantee of ABC Limited according to the sanction letter. But, Personal Guarantee of directors has not been obtained as per sanction advice. The present outstanding loan (investment) and re-payment capabilities of Corporate Guarantor (ABC Limited) have not been properly assessed before sanction. Also, the Charge creation formalities (book debt) of the company (Guarantor) with RJSC have not been completed. The loan is currently running. However, the business of the guarantor is inoperative.

Final Messages

- i) Loan sanction against corporate guarantee of the parent company
- ii) Re-payment capabilities of Corporate Guarantor have not been properly assessed
- iii) Charge creation formalities (book debt) of the Guarantor with RJSC have not been completed
- iv) The business of the guarantor is inoperative
- v) The corporate guarantee will not work at all in case of default

6.6 Accepting Corporate Guarantee without Support of MOA and AOA

Balaka Bank has disbursed a sum of Tk. 80.00 crore for XYZ (Machinery) investment to Meghna Health Services Limited against Corporate Guarantee of Jamuna Hospital Limited. There is no clause regarding Corporate Guarantee in Memorandum of Association (MOA)

and Articles of Association (AOA) of Jamuna Hospital Limited. The loan is currently running. However, the business of the guarantor is inoperative.

Final Messages

- i) Bank sanctioned loan against corporate guarantee of parent company
- ii) There is no clause regarding Corporate Guarantee in MOA and AOA
- iii) The business of the guarantor is inoperative
- iv) The corporate guarantee will not work at all in case of default due to the absence of clause in MOA and AOA

7. Issues and Recommendations

i) Credibility of Guarantor

Guarantee is considered as an important form of security of a loan for ensuring recovery. However, proper assessment by the bank before accepting the guarantee is crucial. Banks should accept the guarantee provided by a credible and solvent entity only. In absence of these, the guarantee will not be an effective in recovery of loan in case of non-repayment by the principal borrower.

ii) Due Diligence in Documentation

Proper documentation is essential while the loan become classified. Sometimes, banks do not complete documentation process with due diligence. Consequently, they do not get proper support in litigation process against the guarantor. It is witnessed that there are some negligence related with guarantee agreement weighing lesser importance for ensuring recovery of loan. In this regard, for effective enforcement of corporate guarantee, bankers should perform due diligence in documentation of CG.

iii) Internal and External Rating of Guarantor

As per Bangladesh Bank guidelines, banks are now conducting ICRR for the borrower and asking for external rating. These internal and external ratings of the borrower help banks in credit decision process. It is also desirable that banks will do similar type of exercise for the guarantors along with the borrower. However, there are some instances that rating of

guarantor was not considered while accepting corporate guarantee. Consequently, the probability of recovery will reduce in case of default. Therefore, banks should emphasize on guarantors rating.

iv) Relationship between Guarantor and Principal Debtor

It is observed that there are different types of relationship between principal debtor and the guarantor. In case of willful default, having common ownership between principal debtor and the guarantor may not be very effective in recovery of credit. Nevertheless, the mutual guarantee to each other is also create problem in recovery of loan. Bankers should be more cautious about mutual guarantee.

v) Ensure Proper Accounting and Disclosure of Contingent Liabilities of the Guarantor

It is also evidenced in some cases that a corporate provides guarantees for the loan amount higher than the net worth of the guarantor. It is also found that an inoperative or a losing concern is providing CG. Even the accounting reporting of the guarantor is not satisfactory in all the cases. Also the guarantors do not disclose the contingent liabilities. Therefore, it is not possible for banks to determine global liability of the guarantor for assessing actual net-worth of the firm. Concerned regulators of the company may take initiative for ensuring accuracy of disclosure.

vi) Rules and Regulation Regarding Corporate Guarantee

Although there is no separate law or policy for corporate guarantee, some sections of different laws and guidelines including Contract Act, Bank Company Act, Money Loan Court Act, CRM Guideline, ICRRS, etc. have mentioned the procedures of corporate guarantee. A special regulation or section in the concerned Act may be helpful for the bankers in liquidating CG.

vii) Procedures of Corporate Guarantee

It is essential that MOA and AOA of the corporate guarantor should allow providing guarantee along with the board's resolution. Furthermore, guarantee-agreement must be signed by the authorized person. Besides, a floating charge with RJSC (Registrar Joint Stock Companies and Firms) may be created against the guarantor company. However, in some cases procedural lapses have been found. Proper

training, appropriate placement and assigning rational load of the executive help in this regard.

viii) Legal Framework

In case of borrower default, banks have the right to sue in the court against the guarantor like the regular borrower. However, through the writ procedures, guarantors escape themselves with issuing ‘stay order’ from high court. Therefore, banks experience a long time for the court decision. Even the decision is in favor of banks, it is quite difficult for banks to liquidate their assets for loan recovery. Moreover, there are some problems in enforcement of regulations against the unethical guarantor. In this regard, banks need to have support from Government and judicial system of the country.

ix) CG for Loan Recovery or Banks Comfort

It is observed that banks are not getting full benefit from the corporate guarantee arrangement in recovery of loan due to different problems including regulatory issues, guarantors’ strength, accounting disclosures, cumbersome process, long processing of court procedures, etc. Still banks are accepting corporate guarantee for the borrowers. It is expected that a bank will accept CG as a measure of loan recovery, not only as a comfort.

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Appendix 1: Summary of the Roundtable Discussion on “Corporate Guarantee: Does it Work in Recovery of Loan?”

Bangladesh Institute of Bank Management (BIBM) organized a Roundtable on “Corporate Guarantee: Does it Work in Recovery of Loan?” on July 17, 2019. Mr. S. M. Moniruzzaman, the then Chairman, BIBM Executive Committee and Deputy Governor, Bangladesh Bank as well graced the occasion as the chief guest. Professor Dr. Barkat-e-Khuda, Dr. Muzaffer Ahmad Chair Professor, BIBM; Mr. Helal Ahmed Chowdhury, the then Supernumerary Professor, BIBM; and Mr. Md. Yasin Ali, the then Supernumerary Professors of BIBM took part in the discussion. Mr. Md. Nazimuddin, the then Executive Director, Bangladesh Bank and the then Director General, BIBM chaired the session. A large number of participants from different banks, Non-Bank Financial Institutions, academics, faculty members and students of

BIBM, and media representatives participated in the roundtable discussion.

Dr. Md. Mosharref Hossain, Associate Professor, BIBM presented the keynote paper. Other members of the team were Dr. Md. Mahabbat Hossain, Assistant Professor, BIBM; Ms. Maksuda Khatun, Lecturer BIBM; Mr. Reefat Zaman Shourov, Lecturer, BIBM; and Mr. Mohammad Shahidul Islam, Senior Assistant Vice President, Dhaka Bank Limited. Discussions, observations and relevant suggestions offered by the chief guest, learned discussants and other participants in the session are summarized below.

Mr. S. M. Moniruzzaman, the then Chairman, BIBM Executive Committee and Deputy Governor, Bangladesh Bank

Mr. S. M. Moniruzzaman said that banks usually accept securities in different forms to mitigate the potential credit risk. He opined that obtaining of security for loans is one of the safeguards that banks exercise to secure their interests. He expressed that giving a corporate guarantee to lenders by a company, other than the borrower, is a usual practice in the normal course of trade and commerce across the world. He thinks that a larger company provides the guarantee on behalf of a smaller company who may not be well known or have developed a relationship with the lender. He stressed the importance of due diligence for making the guarantee as an effective for recovery the loan. Otherwise, as per his opinion, it might find itself downgraded to the status of an unsecured creditor.

Mr. Barkat-e-Khuda, Ph.D., Dr. Muzaffer Ahmad Chair Professor, BIBM

Mr. Barkat-e-Khuda, Ph.D. offered thanks to the team and appreciated the suggestions, inputs, and comments articulated by the learned participants. He pinpointed the unhealthy alliance among borrower, bankers and board of directors. He provided suggestions to the team for considering other country experience in this context. He also recommended to present methodology in extended way.

Mr. Helal Ahmed Chowdhury, the then Supernumerary Professor, BIBM

Mr. Helal Ahmed Chowdhury opined that corporate guarantee is considered as an intangible collateral. As per his observation corporate guarantee is an effective mechanism for recovery of credit in some cases. However, he made some suggestions for the bank management. Checking single borrower exposure limit for the guarantor is also required, he said. Enactment of specific regulation in this context may also help banking community.

Mr. Md. Yasin Ali, the then Supernumerary Professor, BIBM

Mr. Md. Yasin Ali started his discussion by saying that corporate guarantee is a powerful mechanism for recovery of credit in developed countries. He raised questions that corporate and group are defined in any Act? Mr. Ali referred Section-5(cc) of the Bank Companies Act 1991 to include guarantor as defaulter in case of default by the principal debtor. To expedite recovery of non-performing loan, he expects more cooperation from the Government and judicial system of our country.

Some Observations Conveyed by the Audiences

- i. Proper reporting of corporate guarantee (CG) by banks to BB.
- ii. CG should be supported by personal guarantee of the directors and executives.
- iii. Generally, CG is misused and therefore, it should be limited for selected credit-worthy client.
- iv. There are some group of companies in Bangladesh without having any registration.
- v. We may follow the framework of developed counties in this regard.
- vi. When a big corporate becomes bankrupt then the corporate guarantor becomes bankrupt.
- vii. Without due diligence, CG may become a chronic problem for the banking industry in future.
- viii. CG may lead to name-lending by the bank.
- ix. There is a problem in accounting data provided by the borrower for proper assessment.

- x. Banks should evaluate net worth of the guarantor considering obligation from guarantee.
- xi. Guarantor and the principal debtor should simultaneously be charged.
- xii. Government may consider to set-up special bench at the Supreme Court and High Court for BFIs and NBFIs.
- xiii. Bank may ask for declaration of all assets and liabilities of the guarantor.

Mr. Md. Nazimuddin, the then Executive Director, Bangladesh Bank and the then Director General, BIBM

Mr. Md. Nazimuddin made his concluding remarks as the chair of the program. Mr. Nazimuddin offered thanks to the team for the study as a first in type in Bangladesh. He emphasized on due diligence and proper assessment of the project, principal debtor and the guarantor. He also accentuated on the ethical values of the borrower and the guarantor. Executives and bank-management should know how to handle and adjust the pressure from different stakeholders. Finally, he offered appreciations to all for making the discussion effective.

Paper Three

Interest Rate and Expansion of Bank Credit

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List of Abbreviations

AMC	Asset Management Company
BB	Bangladesh Bank
BDT	Bangladeshi Taka
BIS	Bank for International Settlement
COC	Cost of Capital
COF	Cost of Fund
COO	Cost of Operation
CRR	Cash Reserve Requirement
FCB	Foreign Commercial Bank
GDP	Gross Domestic Product
MPS	Monetary Policy Statement
NPL	Non-Performing Loan
NSD	National Savings Directorate
PCB	Private Commercial Bank
RBI	Reserve Bank of India
RP	Risk Premium
SB	Specialized Bank
SOCB	State-Owned Commercial Bank
SPV	Special Purpose Vehicle

Executive Summary

An efficient and vibrant commercial banking and financial system are essential ingredients for any market economy to becoming successful. It is expected to provide the lifeblood to the efficient and effective functioning of an economy. Commercial banks mobilize savings by offering various types of deposit products to savers and channel such savings as loans and advances to borrowers and investors. This process of collecting deposits and providing loans takes place at a cost in the form of interest to the depositor as well as to the borrower. The interest rate is one of the important terms in the lending decision process of commercial banks. Thus, the determination of the appropriate lending rates usually becomes a major issue in the banking industry. The lending interest rate of commercial banks may be influenced by several factors: cost of fund, operating cost, and profitability. Besides, the risk premium is another important determinant of the lending interest rate. The risk premium is the price for different types of risks and choices about growth strategies in different markets.

Bangladesh is a growing economy and has made substantial progress in terms of achieving economic development, lifting people out of poverty, and improving the quality of lives of the people. To ensure robust and sustainable economic growth, it is very important to ensure a congenial business environment so that private sector credit can be increased. From the empirical literature, it is evident that there exists a relationship between the lending interest rate and credit growth. The experience varies from country to country. The popular opinion is that a high-interest rate is detrimental to attract investment. That's why the interest rate is also a primary concern for Bangladeshi investors to take their investment decision. Considering the importance of higher investment for faster economic growth to reach upper-middle-income country status, the Government has urged all the concerned parties to take necessary initiatives for reducing the lending interest rate at a reasonable level. In this backdrop, it is very important to understand the impact of interest rate and the expansion of bank credit in the banking industry of Bangladesh. The objective of this study is to examine the effect of

interest rate on credit growth in the commercial banks of Bangladesh. The scope of the study is limited only to the private sector bank credit.

The empirical literature determines the bank's interest rate-setting behavior depending upon a host of factors as per conventional theories and practices. Studies observed that credit growth is inversely related to the interest rate. But the interest rate is affected by several factors. Among them, some of the factors directly affect the interest rate either positively or negatively. These are operating costs, asset quality, inflation, liquidity, etc. But other factors such as the demand for loans, the supply of loans, market intervention, incentive structure, etc. have a remarkable influence on the nature of the relationship between the interest rate and credit growth.

The major cost associated with the determination of lending rate is the cost of fund, cost of operation, cost of capital, and cost of bad debt (risk premium). From the study, it is reasonable to conclude that out of the four factors, the risk premium is one of the major factors where banks should concentrate. It has already been discussed that higher NPL leads to an increase in the risk premium which eventually affects the lending rate. To reduce the interest rate, improving the quality of the asset portfolio of the banks is a must. As high NPL levels are preceded by a decline in credit quality, it may in some cases be appropriate to assess the options for loan restructuring at the level of individual borrowers. But once credit quality has deteriorated on a broader scale, it is necessary to consider the strategies that work at an aggregate level, focusing on the banks. A large number of policy instruments are practiced globally to curb the NPL for reducing the interest rate. One of the important global initiatives is the formation of the Asset Management Company. AMCs are companies to which problem banks can transfer their bad assets. The AMCs can be privately or publicly owned, centralized, or bank-specific. All of these options have been put into practice, with the choice made by each country depending on the nature and extent of the financial crisis at the time their AMCs were set up.

From the demand side perspective, a high-interest rate on loan is considered as one of the major obstacles because it creates an extra

burden to the business by adversely affecting the cash flow, profitability, and repayment capacity. Moreover, a high-interest rate increases the product cost, which negatively affects the competitiveness of the export-oriented firms. So, the lending rate should be reduced to a reasonable level. Initiatives may be undertaken to reduce the lending rate to a tolerable level. Moreover, risk-based loan pricing may help in this case.

The cost of the deposit is a key factor for the banks to determine the lending rate. To reduce the existing lending rate, most of the banks reduce their deposit rate. But the reduction of the deposit rate may not be a feasible solution as it hurts the savers especially when the rate reaches below the level of inflation. A low level of deposit rate will discourage the depositors from saving which eventually affects the supply of loanable funds. As such the banks need to focus on reducing their spread so that the lending rate can be reduced for expanding bank credit. The bank should also develop new and innovative deposit products for attracting new depositors so that the weighted average deposit rate can be rationalized. The cost of operation is also a key concern for the banks as it has an impact on the interest rate and profitability. Adoption of modern technology in the banking operation will not only reduce the operating cost through increased efficiency but also enhance customer satisfaction through quick delivery of services. So, an increased level of automation along with a centralized banking operational system might be considered to control the operating cost as well as to ensure better monitoring of the business activities.

Nowadays, only 'funded business' is no longer considered as the most attractive business and modern banking has adopted the ancillary business activities (non-interest income) as one of the important strategies to improve profitability considering the less risky character of the same. One day, banks may even find that their major source of income is not in their traditional business of taking deposits and making loans, but in the newer ancillary business services. Ancillary services (non-interest income) are, therefore, of great importance to the future of banking. In this context, the bank should increase its focus on non-

interest income so that the interest rate can be reduced without compromising the profitability of the bank.

The management of classified loans is emerging as a big challenge for the banks as it increases the lending rate. As provisioning requirement is positively correlated with NPL, so present NPL scenario prompts bank management to maintain a high level of provision which ultimately affects the profitability of the banks. Therefore, the bank management needs to ensure prudent borrower selection to promote bank credit quality and sound credit practices, which may eventually help to reduce the lending rate. Credit concentration is another feature of the banking industry of Bangladesh. Such concentrations have a major impact on the quality of bank credit. To bring down the level of credit concentration risk to a tolerable level, banks might consider setting sectoral credit limits for ensuring the quality of the asset portfolio. Banks may also focus on other untapped areas to reduce their credit concentration as well as to enhance their credit portfolio for achieving the greater economic benefit of the country.

In the last few years, the owners' expectation for profit has increased manifold. As such, bank owners set an unrealistic profit target for bank management. Subsequently, management ran after the targeted profit by not considering or compromising the credit quality of banks. Unrealistic profit target should be rationalized by tapping it with macroeconomic indicators. As a result, the bank will be able to maintain good quality credit which will ultimately ensure sustainable profitability. The provision of loan classification norms of the country does not make a distinction between willful and other forms of defaults; and there is no requirement to report to the central bank about willful defaulters. Other than the credit-related scams, credit default is hardly considered as a criminal offense. Willful defaults should be separated from other categories of default and should be considered as a financial crime. As such willful defaulter may be barred from taking a further loan from the banking system. Bangladesh Bank may undertake necessary initiatives for formulating regulations in this regard to reduce NPL.

The government is trying to reduce the lending rate to enhance the credit flow to the private sector for achieving higher economic growth. The government has also undertaken some initiatives such as reduction of CRR, increase the deposit ceiling of the state-owned organization to the private sector banks, reduction of the corporate tax rate for the banking sector, etc. But these initiatives may not serve the purpose of reducing the lending rate as evident from reality. In this case, government/banks may think of designing financial and non-financial incentive structures for their good clients such as special tax benefits to banks, interest rate rebates to the good borrower, etc. These initiatives may help the banks to lower the interest rate, which will ultimately boost the credit growth for achieving higher economic growth.

It is very important to understand that with the existing amount of NPL, it will be very difficult for most of the banks to reduce their lending rate as the cost of bad debt is very high. From the global experience, it is observed that Asset Management Companies (AMCs) were formed for the disposal of NPLs. The initiatives were successful in different countries around the world. In this context, the Government can think of the formation of AMCs in Bangladesh to acquire all the bad assets from the banks. This will help the bank to clean its balance sheet so that it can reduce its lending rate for enhancing good quality credit. Strong policy support and coordination is a must in this regard, otherwise the objectives of the AMCs will not be attained.

Interest Rate and Expansion of Bank Credit

1. Introduction

An efficient and vibrant commercial banking and financial system are essential ingredients for any market economy to become successful. It is expected to provide the lifeblood to the efficient and effective functioning of an economy. Commercial banks mobilize savings by offering various types of deposit products to savers and channel such savings as loans and advances to borrowers and investors. This process of collecting deposits and providing loans takes place at a cost in the form of interest to the depositor as well as to the borrower (Bandaranayake, 2014). The interest rate is one of the important terms in the lending decision process of commercial banks. Thus, the determination of the appropriate lending rates usually becomes a major issue in the banking industry. Moreover, the factors that determine the level of commercial banks' lending rates are important concerns not only for specific banks but also to policy-makers, the banking industry, and the public at large.

The lending interest rate of commercial banks may be influenced by several factors. Banks may set their lending rate according to a certain "mark-up" relative to the deposit rate (Thompson, 2006). Accordingly, one of the important factors determining the lending interest rate may be considered as the cost of funds. The lending interest rate of commercial banks may also be influenced by operating costs and profitability. Besides, the risk premium is another important determinant of the lending interest rate. The risk premium is the price for different types of risk (such as the credit risk associated with the loan and the liquidity risk involved in funding long-term assets with short-term liabilities) and choices about growth strategies in different markets.

The rate of interest that is offered by banks affects peoples' decisions on whether to save or spend their money. The consumption and investment decisions by savers and borrowers ultimately affect aggregate demand and overall economic activity. The benefit of having high or low-interest rates depends on the state of the economy. At times it is good to have

low-interest rates. This is usually the case when the economy is weak. This encourages businesses to raise production and sales, supporting more jobs and economic expansion. However, high-interest rates are necessary at other times. Higher interest rates can help the economy by discouraging people from excessive spending, which would help cool the economy and bring it back to normalcy. Therefore, the economic condition and its prospect should be an important factor to determine the level of the interest rate of the country.

Bangladesh is a growing economy and has made substantial progress in terms of achieving economic development, lifting people out of poverty, and improving the quality of lives of the people. Employment has increased, access to health and education has enhanced, and basic infrastructure has improved. Economic growth in Bangladesh has averaged 5.7 percent per year since the mid-1990s. The rate is approaching 8 percent in recent years. Bangladesh is now working to reach upper-middle-income country status by 2021. For attaining the above status, the acceleration of growth is needed in every sphere in the economy. To ensure robust and sustainable economic growth, it is very important to ensure a congenial business environment so that private sector credit can be increased.

From the empirical literature, it is evident that there exists a relationship between the lending interest rate and credit growth. The experience varies from country to country. The popular opinion is that a high-interest rate is detrimental to attract investment. That's why the interest rate is also a primary concern for Bangladeshi investors to take their investment decision. Considering the importance of higher investment for faster economic growth to reach upper-middle-income country status, the Government has urged all the concerned parties to take necessary initiatives for reducing the lending interest rate at a reasonable level. As part of it, Bangladesh Bank has already reduced the CRR from 6.5 percent to 5.5 percent for commercial banks on a bi-weekly average basis to ease the liquidity condition in the money market. The Government has also decided to allow the state agencies to deposit 50 percent of their

funds to private banks (earlier the ceiling was 25 percent), to tackle any liquidity stress in the banking sector.

In this backdrop, it is very important to understand the impact of interest rate and the expansion of bank credit in the banking industry of Bangladesh. The objective of this study is to examine the effect of interest rate on credit growth in the commercial banks of Bangladesh. The scope of the study is limited only to the private sector bank credit. The first section of this paper introduces the issue. Section two presents the conceptual framework of theories of the interest rate. Section three discusses the literature related to factors affecting the interest rate and credit growth. Section four describes the current scenario of interest rate and bank credit. A hypothetical estimation of the lending interest rate in Bangladesh is given in section five. Global initiatives to curb NPL are summarized in section six. Finally, several challenges have been placed for discussion in section seven to reduce the lending rate for the expansion of bank credit.

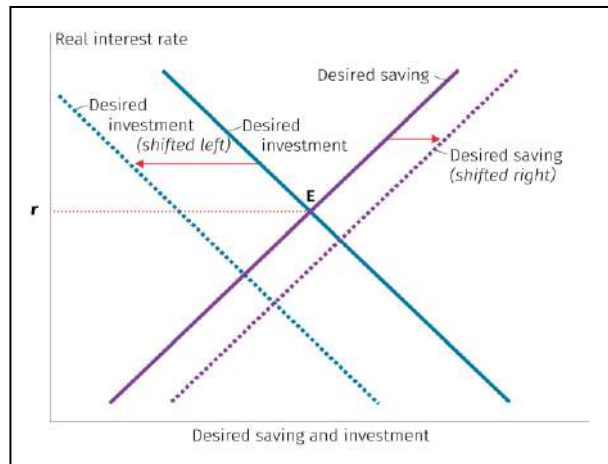
2. Theories of Interest Rate - Conceptual Framework

This section reviews theories of the interest rate. The specific theories reviewed are the real model of interest rate, monetary loanable funds model, liquidity preference theory, Bohm-Bawerk's theory of interest, and Fisher's theory of interest.

2.1 Real Model of Interest Rate

This theory was authored by Inayat (1993). In the classical economic theory, saving and investment out of a full-employment level of income are regarded as a function of the interest rate alone and interest is the primary force of an economic system. In the real model of interest rate, its determinants are the real forces of investment and saving.

Figure 1: A Simple Saving-Investment Framework



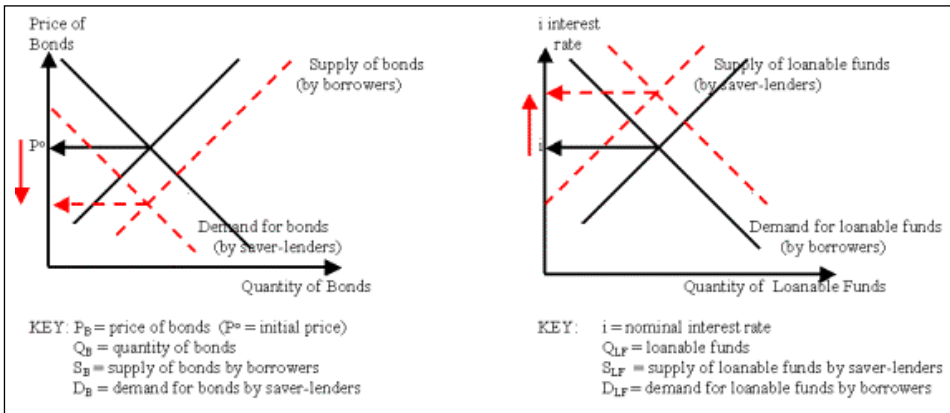
The demand and supply of new bonds are functions of planned saving and planned investment alone. There are two specific features of the real theory interest: the supply of bonds being related to a firm's desire to invest; and the demand for and supply of new bonds rather than the existing stock of bonds. The first feature means that a fall in interest rates will lead to an increase in the supply of bonds. The second feature provides a supply and demand function and the equilibrium interest rate is determined by the equality of planned saving and planned investment (Inayat, 1993).

2.2 Monetary Loanable-Funds Model

Early writers as Thornton (1802), the ones from the Swedish school such as Wicksell (1936) and Ohlin (1937), of the English school such as Robertson (1937) considered the role of monetary factors and incorporated the demand for and supply of money in the theory of interest. They were the early proponents of this theory.

The model is formulated in terms of the flow demand for and supply of loanable funds, i.e., new bonds. The flow demand for bonds constitutes a planned saving plus increase in the stock of money over time. The demand for loanable funds, or flow supply of bonds, is subject to a demand for investment in capital goods plus a demand for loans from ones wishing to build up a stock of money balances. The equilibrium interest is where investment and saving are equal (Inayat, 1993).

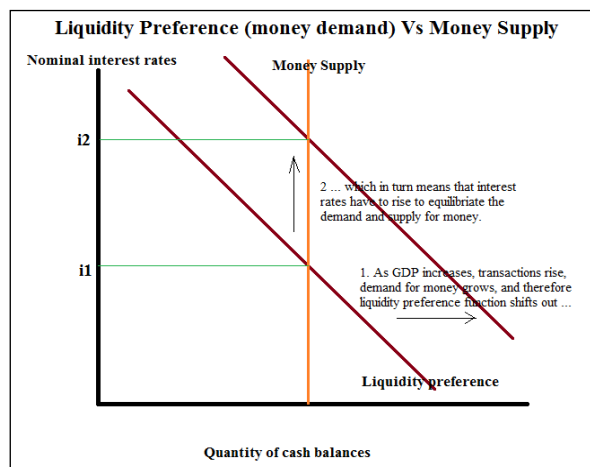
Figure 2: Bond and Loanable Funds Market



2.3 Liquidity Preference Theory

This theory was proposed by Keynes (1936). The liquidity preference theory stems from the Keynesian analysis of the determinant of the interest rate in the money market. This assertion and the contention that the loanable fund theory is expressed in terms of flow and liquidity preference theory in terms of stock forms the basis of the two substantial differences between the theories.

Figure 3: Liquidity Preference Theory



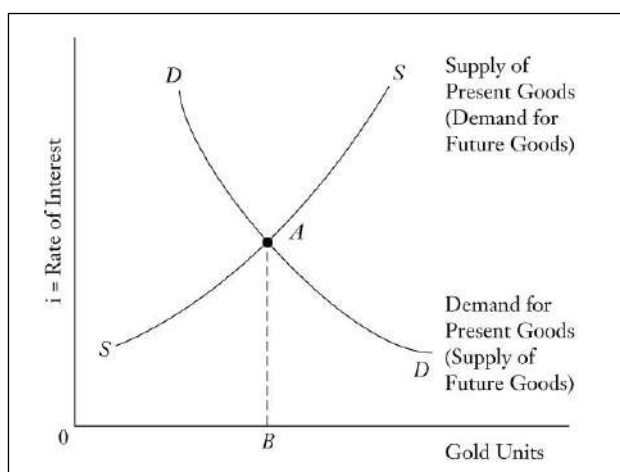
Liquidity theory postulates that the interest rate changes if there is excess demand or supply in the money market irrespective of the situation in the bond market (Inayat, 1993). Keynes assumed that the excess demand for

money always equals the excess demand for bonds, therefore, envisaging an equilibrium in the money and bond market. Another major assumption in the model refers to supplies of money and bonds as exogenous. The liquidity preference theory is formulated in terms of the demand for money as a desired stock of money and the supply of money being the existing stock of money.

2.4 Bohm Bawerk’s Theory of Interest

Bohm-Bawerk (1959) is the chief exponent of time preference theory which is generally known as the Austrian theory of capital and interest. The classification of both land and labor as original factors of production with their supply fixed and capital as a produced factor that supplies a function of economic decision and dependent on land and labor is fundamental to Bohm-Bawerk’s theory of interest.

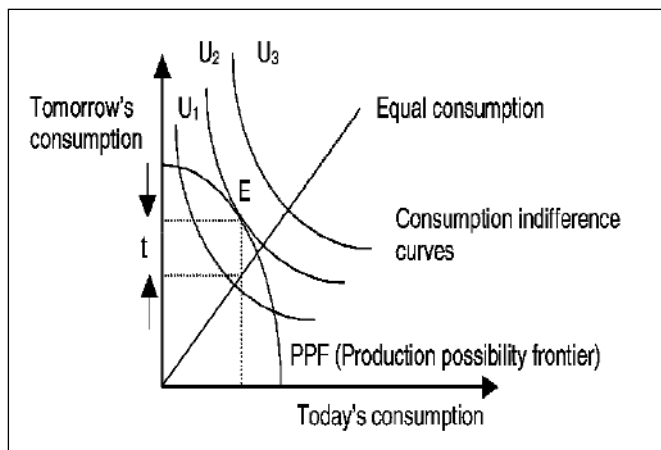
Figure 4: Aggregate Time Market Curve



2.5 Fisher’s Theory of Interest

Fisher (1930) proposed this theory. The theory, by employing the concept of opportunity line and willingness line, reaches on the result of the discount factor of which is analogous to Bohm-Bawerk’s three famous causes of interest discussed above. It is, in his theory, the interaction of willingness and opportunity which determines the rate of interest.

Figure 5: Fisher's Time Preference Theory of Interest



Fisher's real rate of interest framework is essential for the inflation-targeting framework. It provides a rationale for the idea that monetary policy should be concerned mainly (if not only) with managing inflation expectations to keep real interest rates at a stable level that promotes saving and investment. Some post-Keynesians, like Smithin (2003) or Cottrell (1994), have also promoted the use of this concept, even if the former claimed that it only represents a definition and does not have anything to do with Fisher.

3. Factors Affecting the Interest Rate and Bank Credit Expansion: Literature Review

In economics and finance, several theories try to describe how interest rate affects economic activities and is used to forecast future changes. The empirical literature determines the bank's interest rate-setting behavior depending upon a host of factors as per conventional theories and practices.

Calcagnini *et al.* (2012a) studied the link among loans, interest rates, and guarantees and found that loan size was negatively related to bank interest rate spread. Calcagnini *et al.* (2012b) examined the impact of the financial crisis on bank loan interest rates and guarantees and revealed that interest rate spread was negatively influenced by loan size. Moore & Craigwell (2013) observed the relationship between interest rates and

loan sizes in Barbados and found that the interest rate was positively related to the size of bank loans.

Further, Yusoff *et al.* (2001) studied the relationship between interest and loan supply of Islamic and conventional banking systems in Malaysia and found a positive relationship between bank loan growth and interest rates. Akinlo and Owoyemi (2012) examined the determinants of interest rate spreads in Nigeria and found a positive relationship between interest rate spread and loan size. On the other hand, Steffen (2008) examined how lending relationships affect loan rate smoothing in the UK and found a negative but insignificant effect of loan size on interest rate spread.

Cihak (2004) investigates the determinants of lending rates and interest rate spreads in Croatia between 1999 and 2003. Based on the results of the panel estimation, the author finds an inverse relationship between lending rates and interest rate spreads. Besides, the author also finds that market share, non-performing loans, deposit rates, and money market rates have a positive effect on lending rates and interest rate spreads. However, capital adequacy has a different effect on lending rates. According to the author, banks with higher capital adequacy have lower lending rates, but they have even lower deposit rates so that their spreads are higher than in banks with lower capital adequacy.

Georgievska *et al.* (2011) have examined the determinants of lending rates and interest rate spread in Greece. Panel estimation methods were used to analyze the data for the period 2001 to 2009. The results indicate that lending rates are mostly influenced by bank size and share and to a lesser extent by deposit rates and non-performing loans. Bader and Malawi (2010) observed the effect of interest rate on investment in Jordan, by using cointegration analysis. The results indicated that investment was negatively affected by the real interest rate. The results highlighted that a one percent increase in the rate of interest reduced the investment by 44 percent, while income level affects investment positively.

Khawaja and Din (2007) investigated the factors that affect the interest rate spreads in Pakistan by analyzing the data of 29 banks from 1998 to 2005. They considered real output, inflation, real interest rate, deposit

inelasticity with firm-level variables, asset quality, market share, administrative costs, and liquidity. They concluded that macroeconomic and firm-specific variables better clarify the interest rate spread in different banks. Kim and Shi (2018) considered the determinants of two key benchmark interest rates in China using ordered Probit models for quarterly frequency data from 1987 to 2013. They observed that both lending and deposit rates setting behavior are well explained by the changes in inflation and money growth rate. However, output gaps and the exchange rate appreciation play negligible and insignificant roles in determining revision decisions on these two interest rates.

Non-performing loan largely affects the efficiency of banks. It leads to inefficiency in the banking sector as found by Altunbas *et al.* (2000), Fan and Shaffer (2004), and Girardone *et al.* (2004). This is because efficient banks are better at managing their credit risk as highlighted by Berger and DeYoung (1997). It is argued that it will have a detrimental effect since such banks will exert additional managerial effort and give additional expense dealing with these problem loans. These extra operating costs include, but are not limited to, a) additional monitoring of the delinquent borrowers and the value of their collateral, b) the expense of analyzing and negotiating possible workout arrangements, c) the cost of seizing, maintaining, and eventually disposing of collateral if default later occurs, and d) the diversion of senior management attention away from solving other operational problems (Karim *et al.*, 2010).

From the view of management accounting, bank asset quality, and operating performance are positively related. If a bank's asset quality is inadequate, the bank will have to increase its bad debt losses as well as spend more resources on the collection of non-performing loans. When banks list the loan amount for collection, banks incur extra operating costs from non-value-added activities to handle and supervise the collection process.

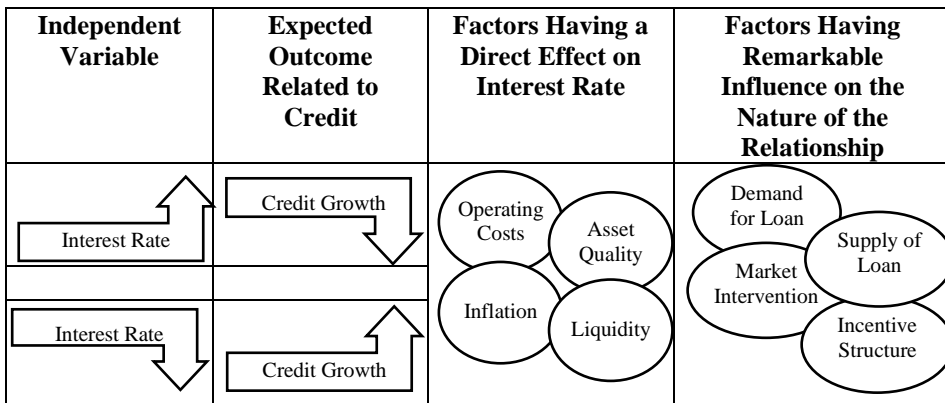
Mujeri and Younus (2009) tried to identify the determinant of the lending rate in Bangladesh. They found that deposit rates, inflation, non-performing loans, and both 3 & 5-year NSD certificate rates are significantly influencing the lending rate whereas private sector credit

and policy rate does not have any effect on the lending rate in Bangladesh.

Apart from these some recent literature (Villalpando and Guerrero (2007); Gambacorta (2008); Fungacova and Poghosyan (2011); Apergis and Christou (2015)) have given the important focus on bank-specific features such as bank size, bank liquidity, excess capital, intermediation costs, management efficiency, NPL rate to analyze the bank's interest rates setting behavior.

Based on the above discussion it is evident that the lending interest rate is determined by a variety of factors. Considering the above factors, a framework of lending interest rate and bank credit expansion is developed which is given below:

The Framework of Interest Rate and Credit Growth



Source: Authors' Compilation

Studies observed that credit growth is inversely related to the interest rate. But the interest rate is affected by several factors. Among them, some of the factors directly affect the interest rate either positively or negatively. These are operating costs, asset quality, inflation, liquidity, etc. But other factors such as demand for a loan, supply of loan, market intervention, incentive structure, etc. have a remarkable influence on the nature of the relationship between the interest rate and credit growth. Some of these factors are discussed below:

Asset Quality: Non-performing Loans to Total Loans Ratio (NPLR) is used as an indicator of credit risk or quality of loans. An increase in the

provision for loan losses implies a higher cost of bad debt write-offs (Were and Wambua, 2013). Given the risk-averse behavior, banks facing higher credit risk are likely to pass the risk premium to the borrowers, leading to higher spreads.

Operating Costs: This is usually computed as a ratio of operating costs to total operating income. Banks incur costs of financial intermediation such as screening loan applicants to assess the risk profile of borrowers and monitor the projects for which loans are advanced. An increase in operating costs is expected to have a positive influence on interest rate spreads (Were and Wambua, 2013). High operating costs are likely to include costs due to inefficiency leading to higher spreads and hence this variable is commonly used as an indicator of operational inefficiency. A higher cost of financial intermediation will drive up interest rates on loans while depressing interest rates on deposits.

Liquidity Risk: Liquidity risk is usually computed as the ratio of a bank's liquid assets to total assets. The degree to which banks are exposed to liquidity risk varies across banks. A bank with higher liquidity faces lower liquidity risk hence is likely to be associated with lower spreads due to a lower liquidity premium charged on loans (Were and Wambua, 2013). Banks with high risk tend to borrow emergency funds at high costs and thus charge liquidity premiums leading to higher spreads (Ahokpossi 2013).

Demand for Loan: The interest rate on loans depends positively on real GDP and inflation. Better economic conditions increase the number of projects becoming profitable in terms of expected net present value and hence increase the demand for credit (Kashyap *et al.*, 1995). An increase in the money market rate raises the opportunity cost of other forms of financing (i.e. bonds), making lending more attractive. This mechanism also boosts loan demand and increases the interest rate on loans (Gambacorta, 2004).

Market Intervention: The essence of the market economy is that everything will be determined based on market parameters. The presence of market intervention distorts the fundamental relationship between the interest rate and credit growth. But such intervention is sometimes

unavoidable and it has a significant impact on the nature of the relationship between the interest rate and credit growth.

Incentive Structure: Sometimes it is essential to develop a special type of incentive structure to promote credit growth for achieving the overall economic benefit of the country. Although the relationship with the interest rate is not direct one cannot ignore the importance of developing such a kind incentive structure.

4. Current Scenario of Interest Rate and Bank Credit

From the literature review, it is already understood that the expansion of bank credit is related to the changes in the interest rate. On the other hand interest rate depends on several factors such as deposit rate, operating cost, asset quality, profitability, etc. The following section discusses the current trends of some of the above-mentioned factors and their impact on bank credit.

4.1 Deposit Rate, Lending Rate, and Spread

Table-1 presents the weighted average deposit rate, lending rate, and spread of all categories of banks from 2009 to 2018. The trend of deposit rate was mixed during the period. The highest rate was observed in 2013 for all categories of banks. Afterward, the deposit rate started to decline and reached 5.26 percent in 2018. The deposit rate varies within different bank groups. PCBs, offer the highest rate whereas the rate of FCBs is the lowest.

Table 1: Deposit Rate, Lending and Spread by Type of Banks (%)

Bank Groups	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Weighted Average Deposit Rate (%)										
SOCBs	5.04	5.01	5.89	7.23	7.98	7.05	6.38	4.83	4.36	4.37
SBs	7.50	6.81	7.80	7.91	9.57	8.23	7.84	6.46	5.90	5.77
PCBs	7.14	6.80	8.53	9.13	8.53	7.55	6.26	5.24	5.29	5.82
FCBs	3.81	3.01	4.49	5.59	5.10	3.62	2.59	1.78	1.67	2.30
All	6.35	6.07	7.55	8.37	8.49	7.25	6.34	5.01	4.91	5.26
Weighted Average Lending Rate by (%)										
SOCBs	8.51	9.18	10.90	11.22	10.94	11.24	10.08	8.57	8.38	6.75
SBs	10.20	9.12	9.98	11.19	12.10	10.52	9.62	8.86	8.72	7.56
PCBs	12.43	12.02	13.93	14.90	14.40	12.99	11.65	10.31	9.67	10.27
FCBs	13.07	11.84	13.38	14.43	13.89	11.46	9.74	8.32	8.19	8.90
All	11.49	11.19	13.01	13.85	13.58	12.46	11.18	9.86	9.35	9.49

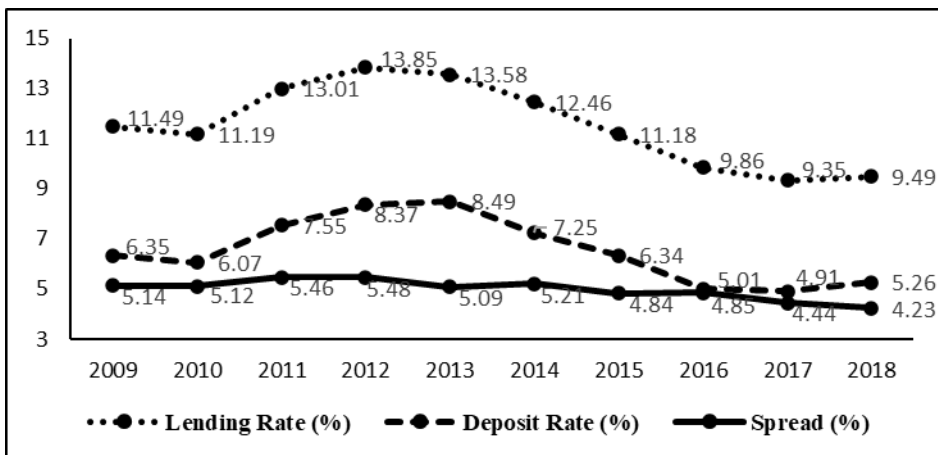
Bank Groups	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Spread (%)										
SOCBs	3.47	4.17	5.01	3.99	2.96	4.19	3.7	3.74	4.02	2.38
SBs	2.7	2.31	2.18	3.28	2.53	2.29	1.78	2.4	2.82	1.79
PCBs	5.29	5.22	5.4	5.77	5.87	5.44	5.39	5.07	4.38	4.45
FCBs	9.26	8.83	8.89	8.84	8.79	7.84	7.15	6.54	6.52	6.60
All	5.14	5.12	5.46	5.48	5.09	5.21	4.84	4.85	4.44	4.23

Source: Bangladesh Bank Quarterly

The same scenario is observed in the case of a lending rate for different bank groups. The highest lending rate was 13.85 percent in 2012 and then the rate continuously declined up to 2017. In 2018, the lending rate slightly increased but remained below 10 percent. Our entrepreneurs were demanding to reduce the lending rate to a single digit, and finally, it is observed in the last couple of years. This might work as a positive stimulus for the economy by increasing higher consumption and investment.

One of the important determinants of the profitability of the banking sector is the spread, i.e. the difference between the lending rate and the deposit rate. The Table-1 also shows the spread of different bank groups during the period. It is very interesting to note that the variations of the spread among different bank groups are significant, which not only affects the performance of the different bank groups but also affects the performance of the entire banking industry.

Figure 6: Trends of Lending Rate, Deposit Rate, and Spread



Source: Authors' Calculation Based on BB Data

Figure-6 shows that the spread between the lending and deposit rates started to decline in recent years. The spread varies from 2 to 6 percent for different bank groups although the aggregate figure is 4.23 percent in 2018. Provisioning requirements associated with classified/bad loans always significantly affect the interest rate spread which is high in Bangladesh relative to other countries. In a well-managed and relatively efficient banking system, the level of spread should be below 3 percent. The spread could have been reduced within the global limit if classified loans and the associated provisioning requirements could be reduced to a reasonable level.

4.2 Lending Rate and Bank Credit to Private Sector

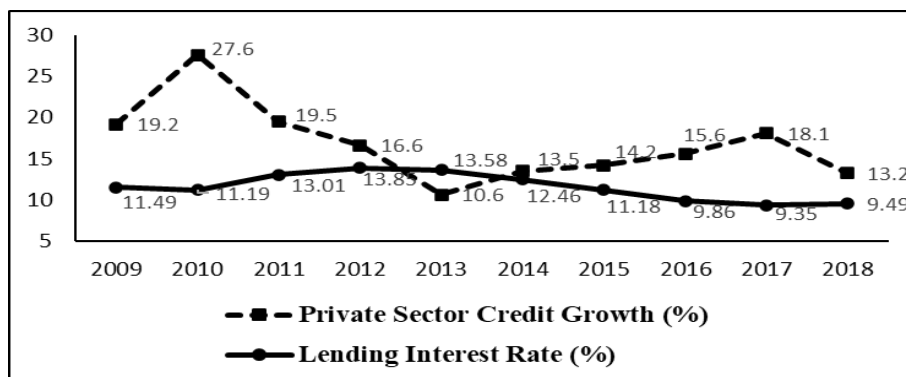
The outstanding amount of bank credit to the private sector and credit growth are summarized in Table-2. Bank credit to the private sector declined to 13.2 percent in 2018 compared to 18.1 percent in 2017. The growth was well below the Monetary Policy Statement (MPS) target of 16.8 percent in 2018. This growth includes both local and foreign currency loans through on-shore and off-shore respectively, but it does not include foreign currency loans directly sourced from abroad.

Table 2: Trends of Bank Credit to the Private Sector

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Outstanding (Billion Taka)	2437.1	3109.2	3871.2	4328.9	4787.7	5434.1	6205.1	7170.2	8470.2	9588.0
Growth (in Percent)	19.2	27.6	19.5	16.6	10.6	13.5	14.2	15.6	18.1	13.2

Source: Bangladesh Bank Quarterly

Figure 7: Trends of Lending Rate and Private Sector Credit Growth



Source: Authors' Calculation Based on BB Data

According to the various empirical literature, a higher interest rate is detrimental to the credit growth of an economy. Figure-7 supports the above argument in the case of Bangladesh. From the figure, it is evident that increasing interest rates from 2009 to 2012 causes a decline the credit growth (except 2010 because of abnormal growth of the stock market). Then declining interest rate from 2013 to 2018 induces the credit growth (except 2013 because of political turmoil). So, the banking sector needs to maintain the lending rate at a reasonable level to increase its credit portfolio for achieving targeted economic development of the country.

4.3 Impact of Asset Quality on Profitability and Credit Growth

The performance of a bank depends on how effectively they manage the balance sheet. From an asset management point of view, one of the most important indicators of the health of the banking sector is their asset quality, i.e. Non-performing Loans (NPLs). The gross NPL ratio for the last few years is increasing and reaches a record high of 10.3 percent in 2018 (Table-3). The scenario is not at all congenial for the banking sector as it increases the cost of bad debt. This is a double sword situation for the bank. On one side, high NPL reduces profitability as the bank has to maintain the required amount of provision from its income against the bad debt. On the other side, the bank ultimately passes the cost of bad debt to the borrowing customer by increasing the lending rate, which eventually reduces the credit growth.

Table 3: Gross NPL Ratio by Type of Banks (%)

Bank Groups	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SOCBs	21.4	15.7	11.3	23.9	19.7	22.2	21.5	25.0	26.5	30.0
SBs	25.9	24.2	24.6	26.8	26.8	32.8	23.2	26.0	23.4	19.5
PCBs	3.9	3.2	3.0	4.6	4.5	5.0	4.9	4.6	4.9	5.5
FCBs	2.3	3.0	3.0	3.5	5.5	7.3	7.8	9.6	7.0	6.5
All Banks	9.2	7.3	6.1	10.1	8.9	9.7	8.8	9.2	9.3	10.3

Source: Bangladesh Bank Quarterly

Banks are required to maintain a certain amount of their pre-tax profit in the form of provision against their classified loan. Banks have maintained cumulative provisions amounting to BDT 504.3 billion in 2018, which is BDT 66.1 billion lower than the required level (Table-4). The provisioning shortfall is gradually increasing over the years. This should

be a cause of concern for the regulator as provisioning shortfall implies the regulatory non-compliance, which eventually weakens the financial stability of the banking sector. Moreover, the profitability of the banking sector would have been worse if the banks are to fulfil the shortfall immediately.

Table 4: Provision Maintenance Ratio

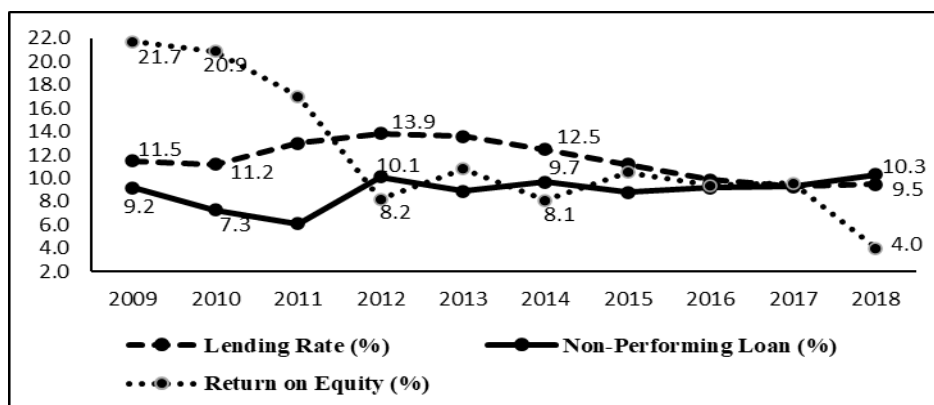
(In billion BDT)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Required Provision	134.7	150.8	139.3	242.4	252.6	289.6	308.9	362.1	443.0	570.4
Provision Maintained	137.8	146.8	148.9	189.8	249.8	281.6	266.1	307.4	375.3	504.3
Surplus/ (Shortfall)	3.1	(3.9)	9.6	(52.6)	(2.6)	(8.0)	(42.8)	(54.7)	(67.7)	(66.1)
Maintenance Ratio	102.3	97.3	106.9	78.3	98.9	97.2	86.1	84.9	84.7	88.4

Source: Financial Stability Report, BB

The effect of asset quality on lending rate and profitability is described in Figure-8. The increasing trend of NPL is affecting the profitability of the banks as measured by return on equity, which has declined significantly in the last 10 years. To adjust the cost of high NPL, the lending rate is supposed to be increased further. But the reality is the opposite as the lending rate is declining gradually. This is the outcome of the regulatory intervention to reduce the lending rate for boosting the loan demand. The whole scenario is not conducive to the overall economic growth of the country in general and the financial stability of the banking sector in particular.

Figure 8: Trends of Lending Rate, NPL Rate, and ROE

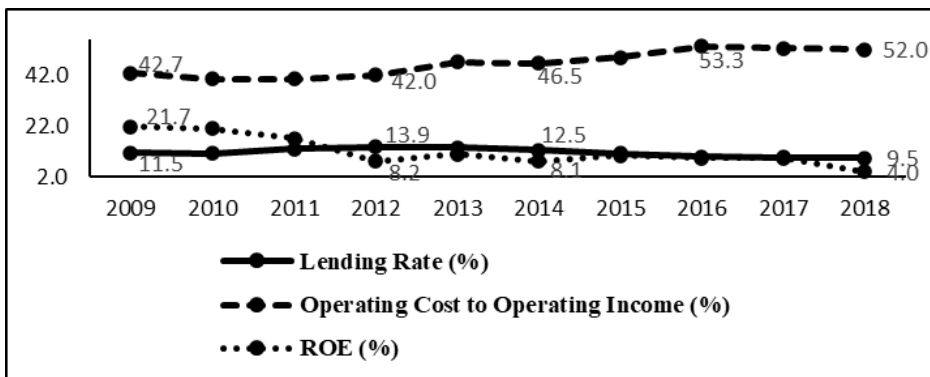


Source: Authors' Calculation Based on BB Data

4.4 Impact of Operating Cost on Profitability and Interest Rate

Operating cost is one of the major factors that influence the interest rate significantly. An increase in operating costs is expected to increase the interest rate. But in the presence of regulatory restriction banks cannot adjust this additional cost with the interest rate which eventually affects the profitability of the bank. Figure-9 shows the trends of operating cost to operating income ratio, lending rate, and profitability. From the figure, it is evident that operating cost is increasing over the years but that additional cost is not adjusted with the lending rate, which is ultimately affecting the profitability. From the global experience, it is observed that the bank increases the level of automation in different banking activities to reduce the operating cost. In this context, technology-based banking operations need to be increased otherwise the bank will lose its competitiveness in the market.

Figure 9: Trends of Operating Cost, Lending Rate and Profitability



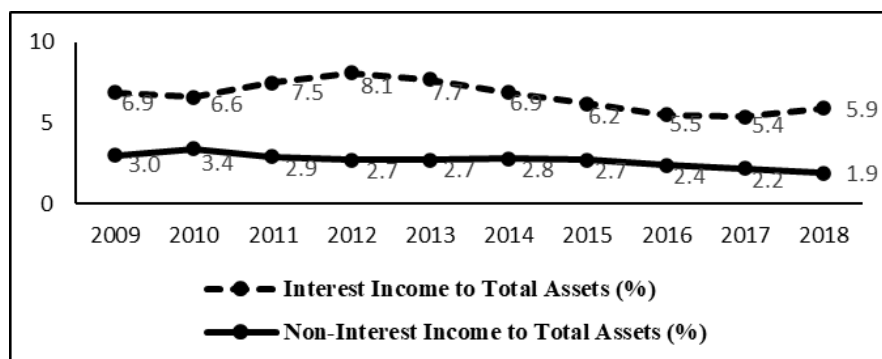
Source: Authors' Calculation Based on BB Data

4.5 Interest Income vs. Non-Interest Income

After the financial sector liberalization, non-interest income has transformed from a supportive role into a major contributor to bank earnings in Bangladesh for the last two decades. The introduction of new products has provided added boost to non-interest income which helps the bank to maximize the profit without incurring a significant level of risk. Figure-10 shows the trends of interest income and non-interest income. It is observed from the figure that the volatility of the non-interest income is less compared to that of the interest income. Banks can

undertake this opportunity by providing value-added services for increasing non-interest income. This will not only increase the total income of the bank but also helps the bank to reduce the lending rate, which will eventually attract more credit and enhance the interest income.

Figure 10: Trends of Interest Income and Non-Interest Income



Source: Authors' Calculation Based on BB Data

5. Lending Interest Rate in Bangladesh: Hypothetical Estimation

In determining the lending rate, bank management must consider the cost of raising loanable funds and the operating costs of running the bank. This means that banks know what their costs are to consistently make profitable, correctly priced loans of any type. The simplest loan-pricing model assumes that the rate of interest charged on any loan includes four components

- Cost of Fund (COF): the cost to the bank for raising adequate funds to lend.
- Cost of Operation (COO): the bank's non-fund operating costs (including wages and salaries of loan personnel and the cost of materials and physical facilities used in granting and administering a loan).
- Cost of Capital (COC): Return on capital or the rate of return investors would expect to receive from their investment in a bank or cost of capital is the desired profit margin on each loan that provides the bank's stockholders with an adequate return on their capital.

- Risk Premium (RP): necessary compensation paid to the bank for the degree of default risk inherent in a loan request. The price a borrower must pay to the bank for assessing and accepting the risk is called the risk premium.
- Thus, Lending Rate = COF + COO + COC + Risk Premium.

Table 5: Hypothetical Estimation of Lending Rate in Bangladesh

Bank Groups	COF (%)	COO (%)	COC (%)	Risk Premium (%)	Lending Rate (%)
SOCBs	3.0	2.5	1.5	4.0	11.0
PCBs	4.7	2.8	2.0	2.5	12.0
FCBs	2.0	2.0	1.5	1.5	7.0

Source: Authors' Calculation Based on Various Data

The major cost associated with the determination of lending rate is the cost of fund, cost of operation, cost of capital, and cost of bad debt (risk premium). From table-5, it is reasonable to conclude that out of the four factors, the risk premium is one of the major factors where banks should concentrate. It has already been discussed that higher NPL leads to an increase in the risk premium which eventually affects the lending rate. To reduce the interest rate, improving the quality of the asset portfolio of the banks is a must. Several efforts need to be undertaken in this regard.

6. Initiatives to Curb NPL for Reducing Interest Rate: Global Experience

As high NPL levels are preceded by a decline in credit quality, it may in some cases be appropriate to assess the options for loan restructuring at the level of individual borrowers. But once credit quality has deteriorated on a broader scale, it is necessary to consider the strategies that work at an aggregate level, focusing on the banks. A large number of policy instruments are applicable to banks, and authorities can promote their usage. The range of available global solutions to tackle NPL problems are summarized in Table-6.

Table 6: Policy Instruments to Resolve Systemic NPLs

Policy Instruments	How it Works
Write-off	Loans are written off from banks' balance sheets
Direct Sale	Banks or AMCs sell NPLs in dedicated markets
Securitization	Banks, SPVs or AMCs pool and tranche loans and sell the securitized products in dedicated markets
Asset Protection Schemes	State-backed entities offer insurance on loss on NPLs to restart banks' credit provision
Centralized Asset Management Company (AMC)	Dedicated companies buy bad assets from the problem bank(s)

Source: Financial Stability Institute, BIS, 2017

Asset Management Companies (AMCs) have been set up in various ways according to countries' needs to solve the NPL problems. AMCs are companies to which problem banks can transfer their bad assets. The AMCs can be privately or publicly owned, centralized, or bank-specific. All of these options have been put into practice, with the choice made by each country depending on the nature and extent of the financial crisis at the time their AMCs were set up. Box-1 summarizes the main features of AMCs established in different countries across the world for the disposal of NPLs (BIS, 2017).

Box 1: Examples of NPL Disposal via Asset Management Companies (AMCs)

RTC (United States)

The RTC was established in 1989, assuming responsibility for and resolving 747 thrifts with assets of USD 402.6 billion by 1995. It was reliant on taxpayer funding to cover both permanent losses and working capital. Disposal methods included not only the traditional ones, such as regional and national auctions, and large-scale sealed bid and bulk sales, but also more sophisticated methods, such as securitization and equity partnership arrangements.

Securum (Sweden)

Securum was established in 1993, as a government-owned company, to work out the NPLs of the state-owned bank Nordbanken. At the start, 20% of Nordbanken's loan portfolio was transferred to Securum. By 1996, the AMC

had disposed of 98% of its assets. Properties were sold on an individual basis, grouped together in packages, or as whole property companies. The preferred disposal method was a sale by private contracts through negotiations with selected buyers. Entire property companies were sold through IPOs. Although the lifetime of Securum was initially expected to be 10 to 15 years, it was closed down as soon as 1997.

KAMCO (Korea)

KAMCO was initially established in 1962 (and expanded in 1997) with a mandate focused on the acquisition, management, and disposal of NPLs. It is government-funded, via government-guaranteed bonds, but it has also funded itself by retaining USD 15 billion of recovered funds. During the Asian crisis, it purchased NPLs for a face value of over USD 90 billion, representing 9% of Korea's financial sector assets. It used the following methods of asset disposal: debtor's repayment (36.1%), ABS (11.8%), direct sale (11.1%), court process for insolvency process (7.3%), auction abroad (3.3%), put-back (26.3%).

Danaharta (Malaysia)

Danaharta was established in 1998 to address rapidly growing NPLs on contagion from the Asian crisis in 1997. Danaharta was a state-owned company and it purchased USD 15 billion of NPLs. Danaharta was granted special powers to allow crucial activities to be conducted outside the court process. It succeeded in halting the increase in NPLs, and it repaid all the bonds it issued by 2005. The main method of asset disposal, counting for 54% of the total, was corporate (33%) and debt (21%) restructuring.

NAMA (Ireland)

NAMA was set up in 2009 by the government. NAMA created special purpose vehicles controlled by NAMA but with a majority of the shares held by private investors, so NAMA's ownership is a private/public hybrid. NAMA's objectives are, among others, acquiring impaired assets from financial institutions, and dealing expeditiously with the assets. NAMA acquired EUR 31.8 billion of NPLs from the banks. Based on data up to 2014, disposal via property sales accounts for about 58% of NAMA's portfolio.

SAREB (Spain)

SAREB was established in 2012 as a private for-profit company with a public mandate. The majority of the shares are privately owned (55%), while 45% are owned by the public Fund for Orderly Bank Restructuring (FROB), which was established in 2009 to manage the restructuring and resolution of credit institutions. SAREB's mandate is to acquire, manage, and dispose of the assets that are transferred by credit institutions. SAREB acquired EUR 106 billion of NPLs from the banks.

Source: Financial Stability Institute, BIS, 2017

In recent times, the Reserve Bank of India (RBI) has framed rules defining willful default, and process to be followed by banks for declaring borrower as 'willful defaulter'. The Indian Parliamentary Standing Committee on Finance in its report presented in February 2016 recommended that as a measure of public accountability, each bank must make names of 'willful defaulters' public, and the relevant laws and regulations should be amended. It will act as a deterrent for other promoters against willful defaults. It would also enable banks to withstand pressure and interference in dealing with the promoters for recoveries or sanctioning further loans (Lele, 2016). The government is planning changes in laws that will let banks take strong punitive action, including the pressing of criminal charges, on such defaulters (Venkatesh, 2016). The initiatives of RBI for addressing willful default is summarized in Box-2.

Box 2: Addressing Willful Default by RBI

According to the RBI, a willful default is deemed to have occurred in any of the following four circumstances: *One*, when there is a default in repayment obligations by the unit (company/individual) to the lender even when it can honor the said obligations. There is a deliberate intention of not repaying the loan. *Two*, the funds are not utilized for the specific purpose for which finance was availed but have been diverted for other purposes. *Three*, When the funds have been siphoned off and not been utilized for the purpose for which it was availed. *Four*, when the assets bought by the lenders' funds have been sold off without the knowledge of the bank/lender. *Further*, in cases where a letter of comfort or guarantee furnished by group companies of willfully defaulting units are not honored when they are invoked by the lender, then such group companies are also considered to be willful defaulters.

Banks and institutions are required to submit the list of suit-filed accounts of willful defaulters at the end of every quarter to the Credit Information Bureau (India) Ltd. A willful defaulter is not permitted to float any new business for five years from the date of being declared. Very importantly, banks and institutions have been given the right to change the management of a willfully defaulting company.

Source: Lele, 2016

7. Lending Rate for Expansion of Bank Credit and Challenges Ahead

Based on the above discussion, the paper came up with the following observations and recommendations:

7.1 Lending Rate and Demand for Loan

From the demand side perspective, a high interest rate on loan is considered as one of the major obstacles because it creates an extra burden to the business by adversely affecting the cash flow, profitability, and repayment capacity. Moreover, a high interest rate increases the product cost, which negatively affects the competitiveness of the export-oriented firms. So, the lending rate should be reduced to a reasonable level. Initiatives may be undertaken to reduce the lending rate to a tolerable level. Moreover, risk-based loan pricing may help in this case.

7.2 Deposit Rate, Lending Rate, and Spread

The cost of the deposit is a key factor for the banks to determine the lending rate. To reduce the existing lending rate, most of the banks reduce their deposit rate. But the reduction of the deposit rate may not be a feasible solution as it hurts the savers especially when the rate reaches below the level of inflation. A low level of deposit rate will discourage the depositors from saving which eventually affects the supply of loanable funds. As such the banks need to focus on reducing their spread so that the lending rate can be reduced for expanding bank credit. The bank should also develop new and innovative deposit products for attracting new depositors so that the weighted average deposit rate can be rationalized.

7.3 Reducing Cost of Operation through Increased Automation and Centralized Banking

The cost of operation is a key concern for the banks as it has an impact on the interest rate and profitability. Adoption of modern technology in the banking operation will not only reduce the operating cost through increased efficiency but also enhance customer satisfaction through quick delivery of services. Some of the banks have started to shift from the traditional decentralized system to a modern centralized platform for

providing all business activities. Banks are even reducing their branches in some cases to make the bank more cost-effective and profitable. So an increased level of automation along with a centralized banking operational system might be considered to control the operating cost as well as to ensure better monitoring of the business activities.

7.4 Increasing Focus on Non-interest Income

Nowadays, only ‘funded business’ is no longer considered as the most attractive business and modern banking has adopted the ancillary business activities (non-interest income) as one of the important strategies to improve profitability considering the less risky character of the same. One day, banks may even find that their major source of income is not in their traditional business of taking deposits and making loans, but in the newer ancillary business services. Ancillary services (non-interest income) are, therefore, of great importance to the future of banking. In this context, the bank should increase its focus on non-interest income so that the interest rate can be reduced without compromising the profitability of the bank.

7.5 Declining Asset Quality and High Lending Rate

It is well known that NPL is a critical challenge for the banking sector of Bangladesh, and some banks are struggling to address the situation. The ratio of the classified loan was 10.3 percent in 2018, which is much higher than the globally accepted level. Therefore, the management of classified loans is emerging as a big challenge for the banks as it increases the lending rate. As provisioning requirement is positively correlated with NPL, so present NPL scenario prompts bank management to maintain a high level of provision which ultimately affects the profitability of the banks. The whole situation is against the reduction of the lending rate. Therefore, the bank management needs to ensure prudent borrower selection to promote bank credit quality and sound credit practices, which may eventually help to reduce the lending rate.

7.6 Reducing the Credit Concentration

From the various study, it is observed that the credit portfolio of banks is concentrated in different aspects in the context of Bangladesh (Banerjee

et. al. 2018). Among them large loan concentration and trade credit concentration are critical. Such concentrations have a major impact on the quality of bank credit. To bring down the level of credit concentration risk to a tolerable level, banks might consider setting sectoral credit limits for ensuring the quality of the asset portfolio. Banks may also focus on other untapped areas to reduce their credit concentration as well as to enhance their credit portfolio for achieving the greater economic benefit of the country.

7.7 Setting Realistic Profit Target for Maintaining Asset Quality

In the last few years, the owners' expectation for profit has increased manifolds. As such, bank owners set an unrealistic profit target for bank management ignoring the economic, political, and infrastructural reality of the country. Subsequently, management ran after the unrealistic profit target by not considering or compromising the credit quality of banks; and by involving in unhealthy competition. Unrealistic profit target should be rationalized by tapping it with macroeconomic indicators. As a result, the bank will be able to maintain good quality credit which will ultimately ensure sustainable profitability.

7.8 Policy Formulation for Identifying Willful Defaulter to Reduce NPL

The provision of loan classification norms of the country does not make a distinction between willful and other forms of defaults; and there is no requirement to report to the central bank about willful defaulters. Other than the credit-related scams, credit default is hardly considered as a criminal offense. Willful defaults should be separated from other categories of default and should be considered as a financial crime. As such willful defaulter may be barred from taking a further loan from the banking system. Bangladesh Bank may undertake necessary initiatives for formulating regulations in this regard to reduce NPL.

7.9 Designing Incentive Structure

The government is trying to reduce the lending rate to enhance the credit flow to the private sector for achieving higher economic growth. The government has also undertaken some initiatives such as reduction of CRR, increase the deposit ceiling of the state-owned organization to the

private sector banks, reduction of the corporate tax rate for the banking sector, etc. But these initiatives may not serve the purpose of reducing the lending rate as evident from reality. In this case, government/banks may think of designing financial and non-financial incentive structures for their good clients such as special tax benefits to banks, interest rate rebates to the good borrower, etc. These initiatives may help the banks to lower the interest rate, which will ultimately boost the credit growth for achieving higher economic growth.

7.10 Formation of Asset Management Companies (AMCs) to Curb NPL

It is very important to understand that with the existing amount of NPL, it will be very difficult for most of the banks to reduce their lending rate as the cost of bad debt is very high. From the global experience, it is observed that Asset Management Companies (AMCs) were formed for the disposal of NPLs. The initiatives were successful in different countries around the world. In this context, the Government can think of the formation of AMCs in Bangladesh to acquire all the bad assets from the banks. This will help the bank to clean its balance sheet so that it can reduce its lending rate for enhancing good quality credit. Strong policy support and coordination is a must in this regard, otherwise the objectives of the AMCs will not be attained.

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Appendix 1: Discussion Summary of Roundtable Discussion on “Interest Rate and Expansion of Bank Credit”

Bangladesh Institute of Bank Management (BIBM) organized a roundtable discussion on “Interest Rate and Expansion of Bank Credit” on August 27, 2019. Dr. Prashanta Kumar Banerjee, Professor and the then Director (Research, Development & Consultancy), BIBM delivered his welcome address. Mr. S. M. Moniruzzaman, the then Chairman, BIBM Executive Committee, and Deputy Governor, Bangladesh Bank as well was supposed to present in the program as the Chief Guest. However, due to unavoidable circumstances, he was unable to attend the program. Mr. Md. Nazimuddin, the then Executive Director, Bangladesh Bank and Director General, BIBM as well gave the inaugural speech. The program was chaired by Dr. Barkat-e-Khuda, Dr. Muzaffer Ahmad Chair Professor, BIBM.

A keynote paper was presented by Mr. Md. Nehal Ahmed, Professor and Director (Dhaka School of Bank Management), BIBM in the roundtable discussion. Other members of the research team were Mr. Mohammed Sohail Mustafa, Associate Professor and Director (Training), BIBM and Ms. Rexona Yesmin, Assistant Professor, BIBM. A large number of participants including senior executives, high officials of different banks, media representatives, and faculty members of BIBM joined in the program. Several issues were raised by the participants regarding interest rate, credit growth, and related issues. Discussions, observations, and relevant suggestions offered by the distinguished audience of the roundtable discussion are summarized below:

Mr. Md. Nazimuddin, the then Executive Director, Bangladesh Bank and Director General, BIBM

In his inaugural speech, Mr. Md. Nazimuddin explained the significance of the topic of the roundtable discussion in the context of the banking industry. He also highlighted the relationship between the lending rate and credit growth and its effect on the economic growth of the country. He expressed deep concern about the cost of deposit as it is a key factor to determine the lending rate which ultimately affects the supply of funds.

Mr. Helal Ahmed Chowdhury, Former Supernumerary Professor, BIBM

He opined that one of the major reasons for the decrease in interest rate is liquidity management. There is surplus liquidity in the market but some banks are facing liquidity crisis meaning that as a whole there is no liquidity crisis in banks. He emphasized to change the target based unhealthy competition of deposits. Quality is compromised in case of fulfilling the target. Ultimately the loans become classified.

Mr. Yasin Ali, Former Supernumerary Professor, BIBM

He mentioned some ways to manage the interest rate. One way is to reduce administrative costs by increasing productivity while the other one is to keep provision for bad debt. Besides, he opined that the banking sector needs to reduce NPL. If we can reduce NPL then we can decrease the interest rate. If there is no NPL then the borrowers who can repay they will take it. If we have a default culture then nothing can be managed. Additionally, owners of the bank can think of lowering profit expectations. He also stated that “The services that are being offered by SOCBs, in favor of the government, can be priced.”

Dr. Barkat-e-Khuda, Dr. Muzaffer Ahmad Chair Professor, BIBM

Dr. Barkat-e-Khuda thanked BIBM for undertaking a timely paper on the burning issue. He discussed various empirical theories related to interest rate and credit expansion. He also mentioned that theories incorporated in the paper need to be related to the banking market of Bangladesh to get

the true essence of the relationship between the interest rate and credit expansion.

Comments from the Participants

- There is surplus liquidity in the market though some banks especially, PCBs are facing a liquidity crisis. This situation is further distorted by the higher rate of Sanchayapatra. If it is not addressed then it will be difficult to manage the market liquidity as people think Sanchayapatra as the most secured as well as high return investment in the country.
- Bank fix the deposit rate to attract depositors for achieving their deposit target. Therefore, unhealthy competition arises among different banks. Banks can think of developing new and innovative products for the smooth growth of deposits. Otherwise, the long-term vision of banks will be affected.
- Classified loans are adversely affecting the interest rate as the cost of bad debt increases the lending interest rate. In the case of selecting borrowers, bank executives should be very careful. This cautious step can minimize the culture of default loans. Besides, after sanctioning the loan strong supervision and monitoring are highly needed to keep track of the fund. Banks are also moving against the defaulted borrowers legally but it needs time to solve the cases. Speedy legal actions can help the industry through the reduction of classified loans which will ultimately reduce the lending interest rate.

Paper Four

Supply Chain Finance in Bangladesh

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List of Abbreviations

ADB	Asian Development Bank
APG	Advance Payment Guarantee
B2B	Business to Business
BG	Bid-Bond Guarantee
BSCMS	Bangladesh Supply Chain Management System
EBRD	European Bank for Reconstruction and Development
FGD	Focus Group Discussion
GTFP	Global Trade Finance Corporation
IFC	International Finance Corporation
MNCs	Multinational Corporations
NWC	Networking Capital
OD	Work Order/ Supply Order
PG	Performance Guarantee
RMG	Ready-Made Garment
RMG	Retention Money Guarantee
SC	Supply Chain
SCF	Supply Chain Financing
SEDF	South Asia Enterprise Development Facility
STL	Short-Term Lending
TSP	Technology Service Provider
NBFIs	Non-Bank Financial Institutions

Executive Summary

Small and Medium Enterprises (SMEs) lack access to the credit and liquidity they require for their daily working capital needs. Supply Chain Financing (SCF) links small vendors to the large corporates enabling SMEs to access credit at a lower cost with minimal documentation and lesser collateral. Particularly, credit provided by a lender is explicitly linked to the value of a supplier's accounts receivable rather than supplier's overall creditworthiness. Supply chain finance is a customized product and it requires technology supports and strong MIS. Strong platforms and network provide easy facilitation of this product to customer with fast solution.

SCF has been used for a long to finance suppliers. A group of factors that are expected to affect the acceptance of supply chain finance amongst firms in the supply chain got attention of many researchers. The most widely discussed factors in the literature are collaboration, the automation of trade process level of digitalization, trust, reputation, bargaining power, workforce, financing cost, financial attractiveness, supply chain integration, and joint decision making.

Over the years, financial service providers have developed new SCF solutions and innovations to support open account trade under the various terms of factoring, reverse factoring, working capital solutions. At present, regular suppliers, service providers of Multinational Corporations (MNCs) and large local companies are availing of SCF.

There are wide variations in supply chain financing figure worldwide reflecting differences in market maturity, legislation and cash focus based on the survey of PwC. The most notable thing is that Asia is continuing to represent the highest slice of the pie. Around 8600 companies are enjoying SCF in Asia. This is followed by Europe, USA & Canada, etc.

In Bangladesh, the key products under Supply Chain Financing mode are of domestic factoring reverse factoring, dealer financing and work order financing. Domestic factoring means purchase, funding, management and collection of short-term accounts receivable arising from supply of goods and services to domestic buyers. In reverse factoring, the buyer sells the

accounts payables and works together with the supplier and the banks to optimize the flow of funds. Dealer financing is a type of loan that is originated by a dealer to its buyers. The dealer collects information from customers and forwards that information to lenders. Anchor/ producer can also be involved in SCF process by giving guarantee or receiving money from the lenders. Work Order financing is a set of funded and non-funded financing modes allowed to the contractors to participate in tenders of different authorities and to execute their awarded works. Several other financial services such as Revolving Short-Term Lending (STL), Assignment Based Finance are also applied by banks and financial institutions in Bangladesh as SCF modes of financing.

Both primary and secondary data have been used for the research based keynote paper. A semi structured questionnaire was prepared for collecting primary data. To know the field level practices and challenges in Supply Chain Financing, a Focus Group Discussion (FGD) was conducted comprising heads of the SCF departments of 18 banks and NBFIs. In addition to that, some secondary data were also collected from different publications of banks and NBFIs. The main objective of the study was to see the position of SCF for creating further scope of expanding this financial service in Bangladesh.

In Bangladesh, as a pioneer of introducing innovative financial products, IDLC Finance Limited launched supply chain finance in 1999. Following the footsteps of IDLC Finance Limited, United Finance Limited and Lanka Bangla Finance Limited started offering the facility in 2006. In 2007, IPDC Finance Ltd. and Eastern Bank Ltd. (EBL) came into market with this product. The City Bank Limited and BRAC Bank Limited came into the scenario of SCF. During 2017-2018, some more banks like Bank Asia Limited, Mutual Trust Bank Limited, First Security Islami Bank limited are preparing to enter the SCF market soon. On contrary, several banks and NBFIs were trying to exit from the SCF market due to inconvenience of operation. SCF is not a widely used product in Bangladesh. As mentioned above, NBFIs and few banks provide this service to a small segment of customers. The portfolio size of SCF by banks and NBFIs was about Tk. 866.35 crore as on July 2019.

Of the total portfolio, around 90 percent of the market share was captured by NBFIs (About Tk. 780 Crore) and remaining portion went to banks' portfolio. Among the providers of SCF, IPDC held the top position securing 27.46 percent of the total market portfolio followed by United Finance limited (25.7 percent) and LankBangla Finance Limited (16.7 percent). From the survey data it was found that factoring is the most frequently used products by the clients with 57 percent of total market share followed by distributor finance 22 percent.

Banks and NBFIs use both manual based and software based platforms to facilitate SCF to their customers. Manual platforms are less costly and easy to operate whereas software based platforms are costly and a little bit complicated but comfortable for big customers with multiple credit lines to use with no hassle. Clients prefer the SCF platforms based on their service requirement. Comparing to the historical evolution of SCF in Bangladesh, the volume and growth of SCF is not that satisfactory due to presence of some major obstacles. The paper identified some key challenges in offering SCF products to their clients. The major challenges are the lack of awareness about SCF products, absence of regulatory framework for SCF products, and lack of uniformity in the practice of SCF products. Moreover, performance and credit risk, fake bill of supplier, paper-based and software-based solutions, consent letter and acceptance of assignment, less numbers of reputed buyers lack of training for bankers and financial executives are other concerns in SCF market.

To overcome the lack of awareness in the products, a collective initiative of Bangladesh Supply Chain Management Society (BSCMS), Banks, NBFIs and different chambers and SME Foundation is required with a strong alliance to raise awareness particularly among anchors/ corporate houses about the necessity and benefits of Supply Chain Financing. For regulatory framework, BB may take an initiative to prepare a comprehensive guideline for SCF. In 2005, BB gave a policy guideline on domestic factoring. Afterwards, little progress has been observed. A crucial part of the process is to acquire assignments/ consent letter from corporate houses.

To bring uniformity in the practice of SCF, an appropriate procedural guideline on SCF will be able to create a consistent and common understanding about Supply Chain Finance (SCF). Areas such as standard definitions for techniques of SCF, benefits therefrom, list of documents required for a transition; risk factor, accounting and regulatory treatment, pricing, etc. can be covered in the procedural guideline.

To face performance and credit Risk of suppliers and credit risk of anchors and suppliers, banks and financial institutions must have a well mechanism to determine the degree of risks associated with SCF. It is more important at the initial stage of transaction. Additionally, a proper format of reporting specified by Bangladesh Bank is required to be given to banks and financial institutions for SCF with a view to close off-site supervision.

To avoid fake bill of supplier, financiers need to have a proper checklist of documents along with an effective vetting process to verify the accuracy of submitted documents/ bills. However, applying a software based proper platform will reduce this problem.

To remove paper-based and to get benefit from Software-Based Solutions, as digital platform acts to track, validate and authorize each step of the supply chain finance with full document visibility and any payment option from cash to cards and loans and connects a range of counterparties in the supply chain like banks, corporate customers, suppliers, credit insurers, logistics companies, and payment providers for exchanging trade data and assets and seeking financing more easily, all financiers need to utilize platform based SCF mechanism.

To avoid the hassle of Consent Letter and Acceptance of Assignment from anchors, awareness about the products and benefits therefrom are necessary to be understood by anchors. Buyers can confirm uninterrupted supply of raw materials, reduce time and costs by reducing number of tiny payments and finally may avail of discount facilities because of SCF arrangements. Banks and Financial institutions may convince buyers to give consent letter by communicating aforesaid benefits.

With a view to expanding the market, banks and financial institutions may target Tier-II and Tier-III buyers by considering their previous track record of banking behavior. Apart from this, they may approach different sectors such as corporations, services sectors, and defense organizations, etc. Finally, banks and financial institutions that are offering or going to offer SCF need to prepare manpower with proper training at home and abroad. Additionally, practicing organizations or people of SCF may form an association. This type of association can address different issues required for making this financial service successful in financing numerous suppliers of this country smartly.

Supply Chain Finance in Bangladesh

1.1. Introduction

Are there greater potentials for banks and NBFIs in Bangladesh to enter into Supply Chain Financing (SCF)¹ programs? Given the mushrooming manufacturing and trading sector in Bangladesh, growing economic relationship with different countries, necessity of having uninterrupted supply chain to sustain operation, burgeoning credit transactions, lack of ability of SMEs to give collateral security for getting loan, it is plausible to anticipate the existence of an immense opportunity for banks and NBFIs of Bangladesh to offer this financial services. Bancelhon *et al.* (2018) find that supply chain finance offers a unique solution to global buyers to achieve sustainable sourcing goals, increase security of supply, and improve relationships with suppliers by rewarding and incentivizing sustainable behaviors in the supply chain, at reasonable direct cost to the company, if any.

Small and Medium Enterprises (SMEs) lack access to the credit and liquidity they require for their daily working capital needs. SCF links small vendors to the large corporates, which enables SMEs to access credit at a lower cost with minimal documentation and lesser collateral. Particularly, credit provided by a lender is explicitly linked to the value of a supplier's accounts receivable rather than supplier's overall creditworthiness. Therefore, it allows high-risk suppliers to transfer their credit risk to their high-quality buyers.

¹According to the Global SCF Forum's Standard Definitions for Techniques of Supply Chain Finance, "Open Account refers to trade transactions between a seller and a buyer where transactions are not supported by any banking or documentary trade instrument issued on behalf of the buyer or seller. The buyer is directly responsible for meeting the payment obligation in relation to the underlying transaction. Where trading parties supply and buy goods and services on the basis of open account terms, an invoice is usually raised and the buyer pays within an agreed time frame. SCF provides solution to bridge the gap between the needs of money of supplier, who wants to be paid as early as possible and the buyer, who generally wants to delay payment to improve cash flow.

Sometimes banks and NBFIs are often hesitant to provide SCF to SMEs in certain emerging markets. International Development Banks have stepped in to fill this gap by providing several solutions that aim to facilitate SMEs' access to SCF. For example, the International Finance Corporation (IFC), the European Bank for Reconstruction and Development (EBRD), and the Asian Development Bank (ADB) facilitates SCF through providing guarantees to confirming banks to cover commercial payment risks or political risks in designated emerging markets. For example, the IFC's Global Trade Finance Program (GTFP) has already covered more than 54,000 trade transactions and supported over US\$60 billion in emerging market trade.

In the past 15 years, financial service providers have developed new SCF solutions and innovations to support open account trade under the various terms of factoring, reverse factoring, working capital solutions, etc. (ICC, 2016). There are US\$2 trillion in financeable highly secure payables globally (McKinsey, 2015) and an estimated SCF gap of US\$1.5 trillion (ADB, 2017).

In 2005, South Asia Enterprise Development Facility (SEDF), IFC, World Bank Group, has taken a project called 'Domestic Factoring Development in Bangladesh' and disseminated a report/ manual for introducing Domestic Factoring. Aftermath, a number of NBFIs offered Domestic factoring, a method of SCF. Meanwhile, few top-notch banks introduced this facility and created small portfolio of their own. The most popular form of supplier financing in Bangladesh is traditional and reverse factoring.

At present, regular suppliers, service providers of multinational corporations (MNCs) and large local companies are availing of SCF. There are scopes to provide SCF to suppliers to chain stores, five store hotels, hospital, Ready-Made Garment (RMG) sector, pharmaceuticals, SME sector, agricultural products, contact growers, cottage industries, etc.

In the empirics of SCF, a large body of international literature has grown significantly since the recent financial crisis (Milne, 2009; Seifert and Seifert, 2011; Pezza, 2011). According to a broad survey of executives

(Aberdeen, 2011), the impact of demand volatility on available cash is a key factor behind these developments. Indeed, as demand volatility calls on one hand for more safety stock investment but on the other hand induces a desire to hold more precautionary cash, balancing these concerns may become a challenge. Through interdisciplinary and inter-firm cooperation, SCF concepts and applications claim to offer integrated solutions to such problems. Nevertheless, the Supply Chain Management discipline itself is often surprisingly little involved in these solutions. Aberdeen (2006) indicates that the Supply Chain discipline is not involved in almost 50 percent of SCF programs surveyed.

In Bangladesh, empirical evidence is very tiny in the area of SCF. Except a number of generic writings in the newspaper, we did not get any research based articles in the perspective of Bangladesh. In this exploratory research, we argue that greater attention is necessity from academicians and practitioners to make SCF is a very instrumental financial service for banks and financial institutions to finance SMEs.

1.2. Literature Review

SCF have been used for a long time to finance suppliers. A group of factors that are expected to affect the acceptance of supply chain finance amongst firms in the supply chain got attention of many researchers. The most widely discussed factors in the literature are collaboration, the automation of trade process/ level of digitalization, trust, reputation, bargaining power, workforce, financing cost, financial attractiveness, supply chain integration, and joint decision making. An endeavor has been taken here to review few articles focusing on Factors influencing the acceptance of SCF.

Collaboration: SCF is a collaborative form of financing, and thus, collaboration as a factor plays an important role in its use and successful adoption. Not only inter-firm collaboration, but intra-firm collaboration as well, i.e., between departments of the organization, is found to be essential for SCF (Wandfluh *et al.*, 2016; Caniato *et al.*, 2016).

Automation: Technology Service Provider (TSP) may act as a bridge between the funders and buyers, as well as the sellers. Due to the significance of technologies and vast opportunities arising out of it, Fintech is starting to get involved in SCF (Tsai and Peng, 2017). For innovative SCF solutions, a higher level of automation is required. The visibility of information across the trade process and the Supply Chain (SC) is desirable. In supply chain financing, the same is desired (Silvestro and Lustrato, 2014; Jiang *et al.*, 2016), and the level of automation can increase the visibility.

Trust: Several researchers have stressed that trust is an integral part of supply chain financing, (Randall and Farris, 2009; Wuttke *et al.*, 2013; Liebl *et al.*, 2016; Martin and Hofmann, 2017; Blackman and Holland, 2006; Karyani *et al.*, 2016; Ta *et al.*, 2018). The parties involved in the supply chain need to maintain trustworthiness, and Ta *et al.* (2018) mentioned that changes in the trustworthiness can play a crucial role in maintaining a relationship. It is important for the SC partners to maintain openness (Randall and Farris, 2009) and fairness (Chen and Wen, 2017).

Reputation: Chen (2016), while working on the supply chain financing and the function and role of logistics enterprises, pointed out the need for the focal company to have a good reputation. Zheng and Zhang (2017) viewed the SCF for Business to Business (B2B) cross-border e-commerce business, and demonstrated that reputation is essential. The higher the reputation, image, or track record, the better the trustworthiness and facilitation of SCF will be.

Bargaining Power: The ability of one firm to influence the actions and intentions of another plays a role in SCF (Maloni and Benton, 2000; Martin and Hofmann, 2017). In the literature, power has been mostly associated with the bargaining power of the buyer, as the buyer has been assumed to be a larger enterprise to their supplier. Caniato *et al.* (2016) used a term called “financial attractiveness” to refer to the bargaining power of the focal company to the financial institutions, which help in offering SCF solutions to their supplier, as in the case of reverse factoring. If the bargaining power of the focal firm, which is the buying firm in this case, is high, the buyer tends to reduce the purchase prices,

whereas if it is low, then the buyer will try to improve the relationship with key suppliers.

Talent, Skill, and Expertise: Jiang *et al.* (2016) input it in a factor called ‘basic condition’, which consisted of personnel quality, and other factors similar to this concept include innovation ability, technical ability, quality, and financial condition. Yan and Sun (2013) performed several analytical methodologies such as the Stackelberg game, coordination analysis, and numerical analysis, and showed that an “appropriate financing scheme/ solution” matters, and influences the retailer’s decision to order.

Frequency and Volume of Transactions: The frequency and volume of transactions matter in supply chain finance, as the transactions need to be financially attractive, especially for the financial service provider. However, the same may hold true for the buyer as well (Pellegrino *et al.*, 2018; Hofmann and Zumsteg, 2015; Iacono *et al.*, 2015).

Integration: Wuttke *et al.* (2013) considered integration as an umbrella that includes the joint decision, joint investment, real-time sharing of operational information, regular meetings, engagement in collaborative planning, and sharing cost information, among others.

Financing Costs: The studies of Yan and Sun (2013) and Martin and Hofmann (2017) highlighted that the financing cost affects the supply chain partners’ participation in SCF, and the easier accessibility of financing may reduce the costs of SCF.

1.3. Research Methodology

The research-based concept paper started with an extensive desk research that included review of different local and international publications, policies and related materials available online. Both primary and secondary data have been used. A semi structured questionnaire has been administered for collecting primary data. Although the questionnaires were sent to all banks, a few banks responded. The reason behind the low response could be the involvement of a few banks in offering SCF. However, we conducted a Focus Group Discussion (FGD) where the heads of the SCF department of 18 banks and NBFIs appeared. They

contributed meritoriously in the discussion process. The outcome of the FGD has been presented in the findings and analysis section. In addition to that, some secondary data were collected from different publications of banks and NBFIs. This study is mostly a qualitative study since the data of SCF by the different commercial banks and NBFIs are not readily available and reliable. Tabulation and graphical approaches are also applied for streamlining collected data.

1.4. Objective of the Study

The main objective of the study is to see the position of SCF for creating further scope of expanding this financial service in Bangladesh. To achieve the prime objective, following specific objectives are set.

- I. To show conceptual issues on different aspects of SCF.
- II. To examine the current status of SCF in Bangladesh.
- III. To show a brief picture of SCF in different parts of the world.
- IV. To dig out the challenges to spread SCF in Bangladesh.

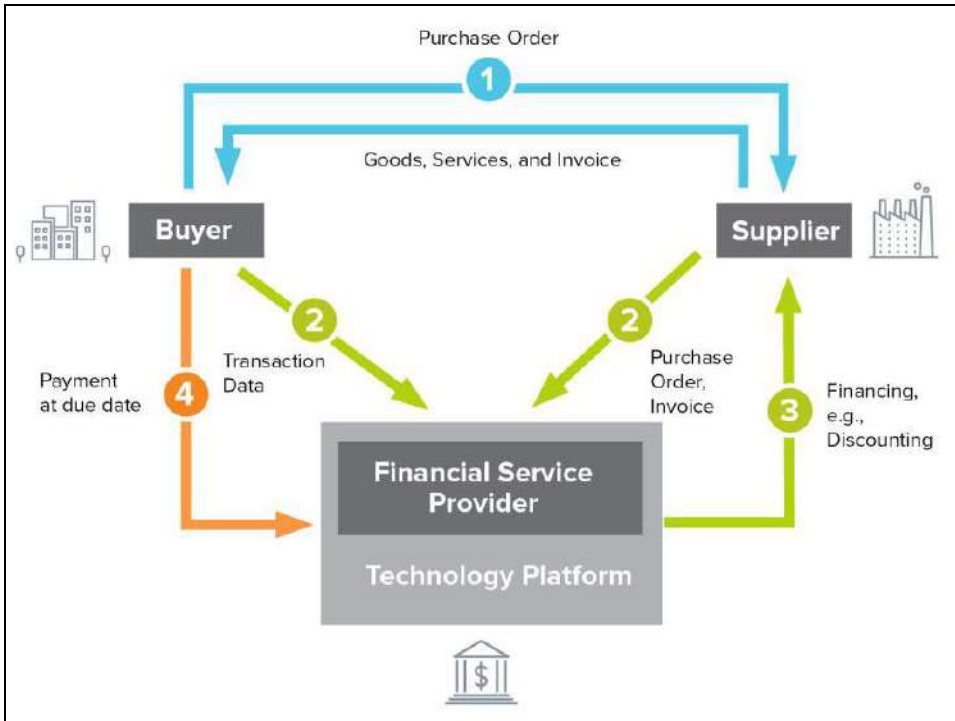
2. Supply Chain Financing: A Conceptual Discussion

2.1. Supply Chain Finance: Mechanics

Supply chain finance is one type of working capital funding method. This method depends on open account trade² meaning that goods and services are delivered by suppliers before the buyers' payment. The credit period can be 30, 60, 90 days and may be more. Supply chain finance closes this financing gap and provides funds to suppliers for the credit period.

² Open account trade is advantageous to the buyer while the supplier of the good or service takes on most of the risk and needs to bridge its financing needs until getting paid by the buyer.

Figure 2.1: The Mechanics of SCF



Although there are various forms to structure such financing, SCF usually involve following parties.

Table 2.1: Parties Involved with SCF and Their Functions

Parties Involved with SCF	Functions
Suppliers	The Supplier can reach out directly to banks or financial institutions and take up short-term financing, typically in the form of selling its invoices. Alternatively, the buyer has arranged a supplier-financing program that the supplier can access.
Buyers	The Buyer provides the payment at due date. Depending on the structure of the program, the payment will be made either directly to the financial service provider to reimburse the financing taken up by the supplier or is made to the supplier.

Parties Involves with SCF	Functions
Banks and Financial Institutions	Banks and Financial Institutions make available “bridge financing” to the supplier either upon the supplier’s direct request or via the buyer’s SCF program, taking a small fee, and utilizing the buyers’ credit rating.
Platform	The Technology Platform is an IT system that brings together the supplier, the buyer, and the financial service provider. They replace formerly paper-based processes and increase the efficiency of transactions by bringing down the error level almost at zero level.

Source: Researchers’ Observations

2.2. Supply Chain Finance (SCF): Products and Solutions

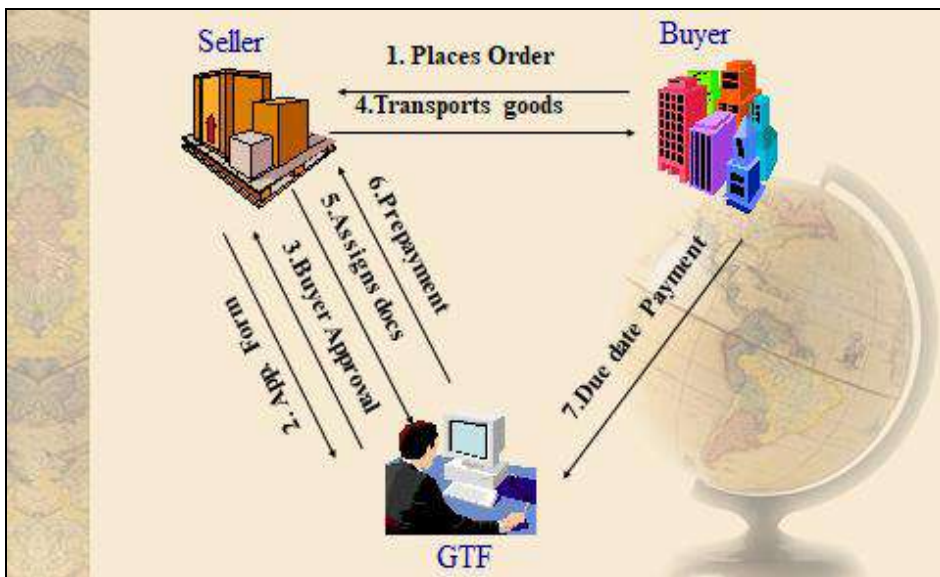
Supply chain finance is not a single solution-based mode of financing. As it is a medium to optimize the flow of funds and cover the supply chain, various solutions or instruments make up the SCF solutions.

2.2.1. SCF: Products and Solutions Available in Bangladesh

2.2.1.1. Domestic Factoring

Domestic factoring means purchase, funding, management and collection of short-term accounts receivable arising from supply of goods and services to domestic buyers. Goods are delivered on open account credit terms usually up to 180 days. Domestic Factoring can be offered under both recourse and non-recourse basis. If it is recourse basis, when account receivable is not paid on due date, it is reassigned to the supplier, however bank/ NBFI cannot ask suppliers to pay the money even after accounts receivable is not paid, if it is without resource.

Figure 2.2: Domestic Factoring Process

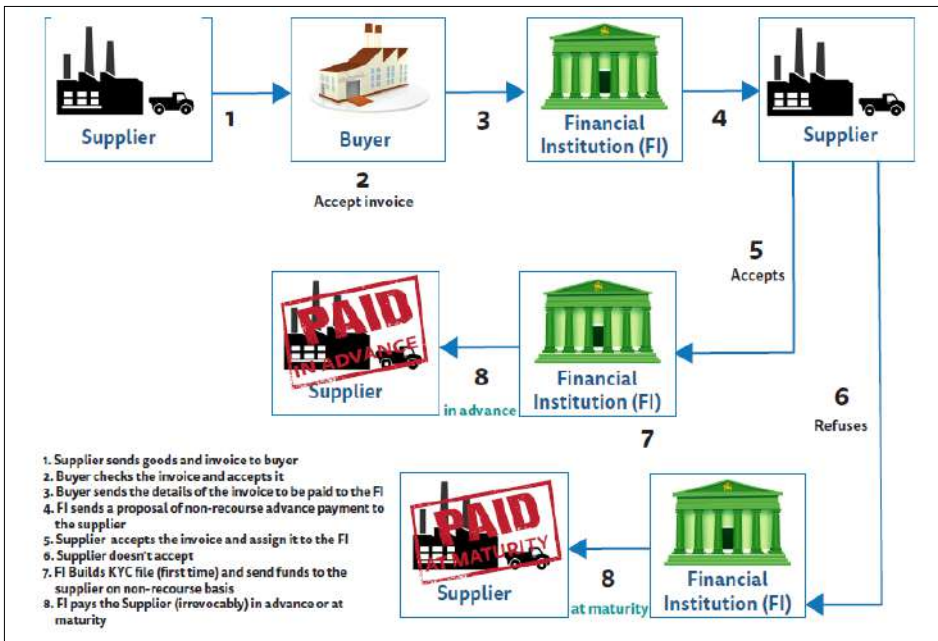


Source: Bangladesh Bank (2005), *Policy and Procedural Guideline on Domestic Factoring*

2.2.1.2. Reverse Factoring

In reverse factoring, the buyer sells the accounts payables and works together with the supplier and the banks to optimize the flow of funds. In details, it is usually the large buyers that start the process of choosing invoices that it will allow to be paid earlier by the bank/ financial institutions and then, the supplier will himself choose which of these invoices he will need to be paid by the factor. Fiat, as of the 1980s', first used this kind of financing process for its suppliers in order to realize a better margin. A study initiated by the Bank of England concludes that reverse factoring offers significant opportunities to expand lending to SMEs (Association of Corporate Treasurers, 2010).

Figure 2.3: Process of Reverse Factoring



Source: Adopted by FCI, Facilitating Open Account – Receivable Finance

2.2.1.3. Dealer Financing

Dealer financing is a type of loan that is originated by a dealer to its buyers. The dealer collects information from customers and forwards that information to lenders. Anchor/ producer can also be involved in SCF process by giving guarantee or receiving money from the lenders. If the lender(s) chooses to finance, they may quote an interest rate to finance the loan, which is called “buy rate.” The interest rate that a customer needs to pay to the dealer may be higher than the “buy rate” because it may include an amount that compensates the dealer for handling the financing. As with this financing system, dealer may be able to secure the sale of a vehicle or other goods more readily than waiting for potential buyers to arrange financing on their own, and customers can reduce the time and effort it takes to do so, banks and financial intuitions have huge potentials in Bangladesh to finance numerous dealers located in different parts of the country.

2.2.1.4. Work Order Financing

Work Order financing is a set of funded and non-funded financing modes allowed to the contractors to participate in tenders of different authorities and to execute their awarded works. The financing modes are Advance Payment Guarantee (APG), Bid-Bond Guarantee (BG), Performance Guarantee (PG), OD [Work Order/ Supply Order], SOD (Earnest Money), OD [Work Order/ Supply Order] and Retention Money Guarantee.

2.2.1.5. Other Financial Services of SCF

Several other financial services like Revolving Short-Term Lending (STL), Assignment Based Finance are also applied by banks and financial institutions in Bangladesh as SCF modes of financing.

2.2.2. SCF: Products and Solutions Available in Other Countries

Apart from aforesaid financial services, many other services used for SCF worldwide are placed below referring authors' writing with a view to adopting suitable financial services in Bangladesh market too.

Table 2.2: Some of the Widely Discussed Solutions in the Literature

Financial Services/ Solutions	Definition	Source
Purchase Order Financing	“Purchase order financing allows banks to offer loans to suppliers by considering the value of purchase orders issued by reputable buyers, and assessing the risk of the supplier delivering the order successfully.”	Babich and Kouvelis (2018)
Agricultural Supply Chain Finance	A supply chain financing generally of pre-harvest, trade services financing, and post-harvest, which is applied in the agriculture sector.	Suayb Gundogdu (2010); Li <i>et al.</i> (2011); Karyani <i>et al.</i> (2016)
Inventory Financing	A short-term loan from a financial institution to finance inventories.	Caniato <i>et al.</i> (2016)

Financial Services/ Solutions	Definition	Source
Warehousing Financing	Warehouse financing means that co-operators mortgage their goods in warehouses for pledge loans.	Jiang <i>et al.</i> (2016)
Buyer Direct Financing	In buyer direct financing, the buyer (manufacturer) issues both sourcing contracts and loans directly to the suppliers.	Babich and Kouvelis (2018)
Vendor-Managed Inventory	“The supplier is given the freedom to plan its own production and decide upon the replenishment schedule as long as the agreed customer service levels are met. This enables suppliers to stabilize their production and to optimize the transportation cost”	Waller <i>et al.</i> (1999); Claassen <i>et al.</i> (2008)
Raw Material Financing	It is a part of inventory financing whereby the funds are given to finance raw materials.	Basu and Nair (2012); More and Basu (2013)
Third Party Logistics Financing	A logistics service provider buys goods from a manufacturer and obtains an interim legal ownership before selling them to the manufacturers’ customers after a certain time.	Caniato <i>et al.</i> (2016); Song <i>et al.</i> (2016)
Dynamic Discounting	“Dynamic Discounting (DD) utilizes trade process visibility granted by an Information and Communication Technology (ICT) platform to allow the dynamic settlement of invoices in a buyer–supplier relationship.”	Gelsomino <i>et al.</i> (2016)
Early Payment Discount Program	A programme in which the supplier offers a cash discount to encourage the buyer to pay quickly.	Ho <i>et al.</i> (2008)

Financial Services/ Solutions	Definition	Source
Buy Back Guarantee	“It refers to a kind of supply chain financing in which the bank helps the capital-constrained retailer settle the payment, based on the core supplier’s buyback guarantee.”	Chen and Wen (2017)
Credit Guarantee	“A credit guarantee where the deep-pocket manufacturer represents a promise of timely payment for the retailer with high default risks in the supply chain.”	Yan <i>et al.</i> (2014, 2017)
Bank Guarantee	A bank guarantee is a promise from the debtor’s bank that the liabilities of the debtor will be met in the event of failure to repay.	Martin and Hofmann (2017)
Manufacturer Collateral	“The manufacturer assumed to be the core enterprise of a chain, provides her retailer with collateral to help him borrow from the bank at a low-interest rate.”	Bi <i>et al.</i> (2018)
Supplier’s Subsidy	The supplier allows the retailer a delay in payment, and provides a subsidy contract to alleviate its problems if it is profitable.	Bi <i>et al.</i> (2018)
Pre-selling	In a preselling program, firms offer to sell their products, possibly at a discounted wholesale price, long before the selling season.	Xiao and Zhang (2018)
Trade Credit	Trade credit is a short-term loan between firms that are tied in both timing and value to the exchange of goods between them. It occurs when there is a delay between the delivery of goods or the provision of services by a supplier and their payment.	Ferris (1981); and García-Teruel and Martínez-Solano (2010)

Source: Marak and Pillai (2018)

3. Results and Discussion

3.1. Supply Chain Financing (SCF): Local Position

3.1.1. Supply Chain Finance: Historical Development in Bangladesh

As a pioneer of introducing innovative financial products, IDLC Finance Limited launched supply chain finance in 1999 (Table-3.1). At that time SCF was an unchartered financing domain for the financial institutions. Following the footsteps of IDLC Finance Limited, United Finance Limited and LankaBangla Finance Limited started offering the facility in 2006. In 2007, IPDC Finance Ltd. and Eastern Bank Ltd. (EBL) came into market with this product. But after a short period, IPDC discontinued with the supplier finance. Among the NBFIs, BD Finance and Investment Limited added SCF in their portfolio in 2013. Later on, as part of their drive to increase their portfolio, The City Bank Limited and BRAC Bank Limited came into the scenario of SCF. During 2017-2018, IPDC Finance and EBL came back strongly with supply chain finance with a view to capturing the lion's share of the market. In addition, few top-notch banks introduced this facility and created small portfolio of their own. Some more banks like Bank Asia Limited, Mutual Trust Bank Limited, First Security Islami Bank limited are preparing to enter the SCF market soon. On contrary, several banks and NBFIs are trying to exit from the SCF market due to inconvenience of operation.

Table 3.1: Historical Sketch of Supply Chain Finance in Bangladesh

Period	Launching SCF
1999	IDLC Finance Limited launched supply chain finance for the first time in Bangladesh
2006	United Finance Limited started offering SCF and LankaBangla Finance Limited followed the queue to serve the small-scale suppliers with this innovative product
2007	IPDC and EBL launched this product in the market with limited scale as a test basis. At the initial stage, IPDC finance had a small portfolio of SCF and it discontinued this product after some time of operation.
2013	BD Finance and Investment Limited and Prime Finance and Investment Limited added SCF in their portfolio. But Prime

Period	Launching SCF
	Finance and Investment Limited is in quit mode from the SCF market.
2016	The City Bank Limited, BRAC Bank Limited, Meghna Bank limited and Meridian Finance limited came into the scenario. But Meghna Bank and Meridian Finance are in quit mode from the SCF market.
2017-2018	As a newcomer, National Finance Limited started SCF. Meanwhile, IPDC and EBL returned to the SCF market with strong planning and latest platforms.
2019	Dhaka Bank Limited, Bank Asia Limited, Mutual Trust Bank Limited, First Security Islami Bank limited etc., are also in the market.

Source: Authors' Compilation

3.1.2. Supply Chain Finance: Major Market Players, Size of Portfolio and Number of Employees in SCF Department

SCF is not a widely used product in Bangladesh. As mentioned above, NBFIs and few banks provide this service to a small segment of customers. The portfolio size of SCF by banks and NBFIs is about Tk. 866.35 crore. Of the total portfolio, around 90 percent of the market share is captured by NBFIs (About Tk. 780 Crore) and remaining portion goes to banks' portfolio. Among the providers of SCF, IPDC holds the top position securing 27.46 percent of the total market portfolio followed by United Finance limited (25.73%) and LankBangla Finance limited (16.75%). Although IDLC is the pioneer in offering SCF in the country, its current position in terms of market share is fifth (9.23%). It is worthwhile to mention that five NBFIs (IPDC, UFL, Lankabangla, BD Finance and IDLC) capture 88.46 percent of the total SCF market. Among the banks, EBL has about 5.43 percent market share of SCF followed by The City Bank Limited (4.27%). Around 119 officials from banks and NBFIs are involved in SCF business. In terms of number of employees involved in SCF, IPDC ranks in the first position (38) followed by LankaBangla (22), United Finance (20) and IDLC (10), respectively. Table-3.2 shows the major market players, size of market portfolio and human resource positions of the SCF providers in Bangladesh.

Table 3.2: Supply Chain Finance: Major Market Players, Size of Portfolio and Number of Employees in SCF Department (Upto August, 2019)

Name of Institutions	Size of Portfolio (Tk. Crore)	% of Total Market Size	No. of Employees in SCF Dept.
IPDC Finance Limited	237.87	27.46%	38
United Finance Limited	222.92	25.73%	20
LankaBangla Finance	145.14	16.75%	22
BD Finance and Investment Ltd.	80.43	9.28%	10
IDLC Finance Limited	80.00	9.23%	8
Eastern Bank Limited	47.00	5.43%	6
The City Bank limited	37.00	4.27%	4
National Finance and Investment	6.00	0.69%	3
Others (Meghna Bank, Prime Finance, Meridian Finance, etc.)	10	1.15%	8
Total	866.35	100.00%	119

Source: Survey Data

3.1.3. Supply Chain Finance: Product-Wise Financing and Percentage of Shares of Banks/ NBFIs

There are a wide range of SCF products for the clients. But only few products are frequently used by the factors for providing clients' financial solution. From the survey data it is found that factoring is the most frequently used products by the clients with an amount of Tk. 491.89 crore portfolios. Distributor finance capture the second position in terms of volume (Tk. 188.05 crore). Reverse factoring is relatively new product which has only Tk. 48.8 crore of total portfolios. But reverse factoring is getting popularity day by day. Other SCF products including work order finance, Corporate Guarantee backed Dealer Financing, revolving short term loan etc., are used less frequently with an aggregate portfolio of

Tk. 127.62 crore. In case of factoring product, IPDC obtains the top position (Tk. 192.52 crore) followed by United Finance (Tk. 137.61 crore) whereas in case of distributor finance, United finance secured the top position (Tk. 82.43 crore) followed by BD Finance (Tk. 51.49 crore). In case of reverse factoring, The City bank captured the highest position (Tk. 31 crore) followed by IDLC finance (Tk. 10 crore). In case of other SCF products, LankaBangla Finance captured the top position (Tk. 68.68 crore) followed by EBL (Tk. 44 crore). It is also noticed that IPDC has the largest share of factoring finance (39.14%) among all the banks/NBFIs. The City bank is the market leader of reverse factoring product with a share of 63.52 percent of the total market portfolio. United Finance dominates in distributor finance with a share of 43.83 percent of total market portfolio. With a share of 53.82 percent Lankabangla dominates in other SCF product market (Table-3.3).

Table 3.3: Supply Chain Finance: Product-Wise Financing and Percentage of Shares of Banks/ NBFIs

Banks/ NBFIs	Factoring		Reverse Factoring		Distributor Finance		Others	
	Amount (Tk. Cr.)	% of Total	Amount (Tk. Cr.)	% of Total	Amount (Tk. Cr.)	% of Total	Amount (Tk. Cr.)	% of Total
IPDC	192.52	39.14	0	0.00	45.35	24.12	0.00	0.00
UFL	137.61	27.98	0	0.00	82.43	43.83	2.88	2.26
Lanka Bangla	73.88	15.02	0	0.00	2.58	1.37	68.68	53.82
BD Finance	14.88	3.03	5	10.25	51.49	27.38	9.06	7.10
IDLC	65.00	13.21	10	20.49	2.00	1.06	3.00	2.35
EBL	0.00	0.00	2.8	5.74	0.20	0.11	44.00	34.48
The City	2.00	0.41	31	63.52	4.00	2.13	0.00	0.00
National Finance	6.00	1.22	0	0.00	0.00	0.00	0.00	0.00
Total	491.89	100	48.8	100	188.05	100	127.62	100
% of Total SCF	57.44		5.70		21.96		14.90	

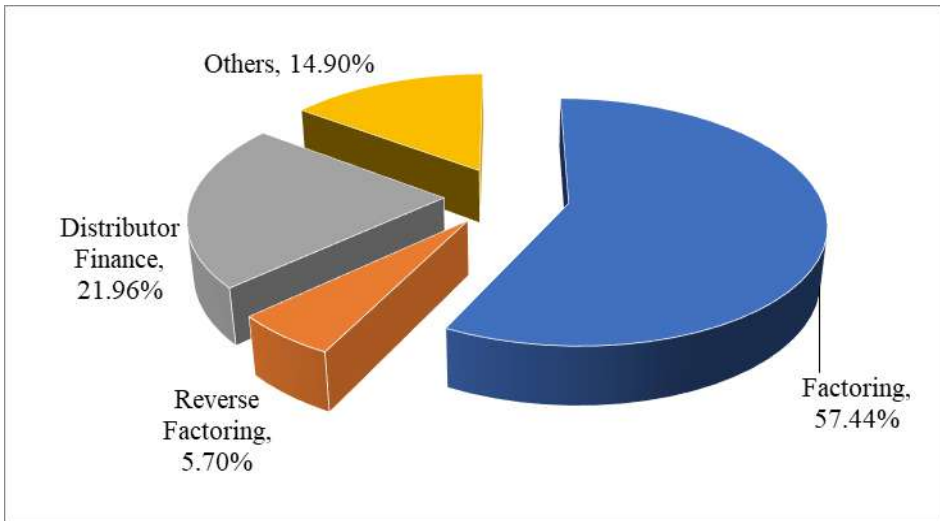
Source: Survey Data

3.1.4. Supply Chain Finance: Market Share of SCF Products as of August, 2019

Figure-3.1 shows the composition of market share of all SCF products. It is documented that factoring captures more than half of the total SCF market (57.44%). Distributor finance has gained popularity recently with a share of 21.96 percent of the total SCF product market. In terms of

market share, reverse factoring captures the third position (5.70%). Other SCF products have an aggregate market share of 14.90 percent.

Figure 3.1: Supply Chain Finance: Market Share of SCF Products as of August, 2019



Source: Survey Data

3.1.5. Supply Chain Finance: Advantages and Disadvantages of Major SCF Products

Products under SCF range from traditional factoring to reverse factoring (both manual and online based), distributor finance. Every product under SCF has some advantages and disadvantages depending on customer base, nature of customer business, platforms used, security, etc. Major advantages of SCF products are provision of immediate liquidity and better access to working capital for suppliers, low payment risk for factors, non-requirement of extra security, product diversification, improved customer service, longer payment option for distributors, etc. (Table-3.4). Some disadvantages of SCF products are debtor's reluctance to give consent letter or assign receivables to factors, no collateral arrangement by clients, excess dependency of clients on the factors, etc. Table-3.4 summarizes the major advantages and disadvantages of widely used SCF products.

Table 3.4: Supply Chain Finance: Advantages and Disadvantages of Major SCF Products

Products	Advantages	Disadvantages
Factoring Finance	<ul style="list-style-type: none"> - Perfect Fund utilization. - Low payment risk as disbursement is given to client after debtors' payment is assigned to factor - Scope of administration of sales ledger - Smooth cash flow - Improved customer service - Product diversification - Non-requirement of extra security - Financing based on performance of Accounts Receivable rather than balance sheet strength. - Raising more working capital than traditional lending approaches 	<ul style="list-style-type: none"> - Debtor not convincing to give consent/ assignment to FIs - Non-cooperation from debtor in case of payment overdue - Non-cooperation from debtor to verify the bill receivable. - No collateral - Less possibility of getting guarantee from credit worthy person - Excess Dependency
Reverse Factoring	<ul style="list-style-type: none"> - No time wasted on comprehensive loan applications - Providing a financial lifeline - Small supplier receiving payment against invoices in a quicker time. - Less expensive than traditional factoring arrangements - Buyer having longer payment terms - Better cash flow and quicker access to working capital - Better financial standing, credit worthiness, and solvency - No material insurance - Easier to finance seasonal production 	<ul style="list-style-type: none"> - No collateral - Excess Dependency
Distributor Finance	<ul style="list-style-type: none"> - Optimization of working capital for the distributors to bridge the liquidity gap between the purchase of inventory and payments received from its customers 	<ul style="list-style-type: none"> - Dealership cancellation - Lack of asset commitment. - Sales force turnover - More receivables

Products	Advantages	Disadvantages
	<ul style="list-style-type: none"> - Increased credit for distributors (especially distributors with limited credit availability from the traditional banking sources) based on the existence of actual financial or commercial support from the large manufacturer - Payment period linking to the payment obligation to the Principal - Lower interest rate for distributors' traditional banking sources - Allows quicker, smaller, 'just-in-time' purchases/ lifting products. - Higher sales volume - the company can fulfill market demand 	<ul style="list-style-type: none"> - Dealer brand switching effect - Product substitution effect - Excess Dependency

Source: Summary

3.1.6. Supply Chain Finance: Modes or Platforms used by Banks/ NBFIs in Facilitating Customers under SCF

Supply chain finance is a customized product and it requires technology supports and strong MIS. Strong platforms and network provide easy facilitation of this product to customer with fast solution. Banks and NBFIs use both manual based and software based platforms to facilitate SCF to their customers. Manual platforms are less costly and easy to operate whereas software based platforms are costly and a little bit complicated but comfortable for big customers with multiple credit lines to use with no hassle. Clients prefer the SCF platforms based on their service requirement. Table-3.5 highlights various platforms used in SCF along with their relative advantages and customers' preferences.

Table 3.5: Supply Chain Finance: Modes or Platforms Used by Banks/ NBFIs in Facilitating Customers under SCF

Modes or Platform	Software Used (if any)	Advantages/ Benefits for Using the Platforms	Clients' Preference for Using one Platforms/ System over Others
Manual Based		✓ Traditional System Easy to operate	✓ Manual Based system is preferred by the clients
Software Based	✓ Veefin ✓ SAP, DNS, ERP (Bankultimus)	✓ Hastle free ✓ Less time consuming ✓ Less paperwork ✓ Online is very structure and secured for finance but it is difficult to reach favoring all anchors and suppliers ✓ Faster and authenticated transaction as well as instant payment	✓ Online system seems complicated to the clients ✓ Some Suppliers/ Anchors are very interest but some are not like to use the technology base transaction
Mixed (Manual and Software)	✓ IISAF (CAPEX); DF (Own Developed) ✓ Mobile Apps (Own Developed); ✓ IISAF (internal developed software)	✓ Software platform more suitable for smooth operations. However, software platform welcomed by very nominal number of Anchor ✓ Internally developed software is low cost and customized as per the requirement	✓ Software Platform
CAPEX	✓ CAPEX and own		
OPEX	✓ Veefin	✓ Cost per transaction	

Source: Authors' Compilation from Sample Survey

3.2. Supply Chain Financing (SCF): Worldwide

There are wide variations in supply chain financing figure worldwide reflecting differences in market maturity, legislation and cash focus (Table-3.6). Based on the survey of PwC, what is most notable is that Asia is continuing to represent the highest slice of the pie. Around 8600 companies are enjoying SCF in Asia. This is followed by Europe, USA & Canada, etc. In terms of Networking Capital (NWC), Middle East has the highest number of days (76) for NWC but Asia has the second highest with 56 days. It reveals that cycle of NWC capital is more in Middle East and Asia as compared to other parts of the world. Other indicators of continent wise working capital financing show variations which are discussed below.

Table 3.6: SCF around the World: 2017-2018

Region	Asia	Europe	USA & Canada	Latin America	Africa	Australasia	Middle East
No. of Companies	8,600	2,417	2,273	487	266	316	335
Revenues (in €)	15,039,667	9,556,817	10,882,408	1,036,232	274,461	472,418	319,258
NWC (days)	56	41	34	35	39	29	76
DSO (days)	63	48	40	47	45	34	86
DIO (days)	64	60	48	51	60	47	69
DPO (days)	73	72	57	64	68	54	84

Source: Navigating Uncertainty: PwC's Annual Global Working Capital Study, 2018-2019

Notes: NWC=Net Working Capital; DSO=Days Sales Outstanding; DIO=Days Inventory on Hand; DPO=Days Payables Outstanding.

Europe

Europe was commonly characterized by lengthening DSO, DIO and DPO. This tide appears have slightly turned in 2017, with a reduction in all working capital ratios as companies placed greater focus on receivables and inventory. For example, DSO in days is 48 in Europe which is still more than USA & Canada, Latin America, Africa and Australasia. As a result, European companies need to focus on stimulating investment by optimizing working capital performance.

USA and Canada

A total number of 2,273 companies are availing of SCF in USA and Canada. All ratios used for working capital financing show that USA and Canada are cycling its working capital financing more quickly as

compared to other continents except Australasia. As per the report of PwCs, the USA has seen an increase in its asset days from the previous year in 2017 – in particular a 1.8 day increase in DSO – it has been able to maintain NWCD by stretching suppliers.

Latin America

On average, Latin American companies have seen a moderate performance in NWCD in 2017. The Days Payable Outstanding (DPO) is 64 Days which is only more than USA & Canada and Australasia. It is found that the region has continued to grow its revenues, which increased by 7 percent on an average. However, companies must focus on improving their working capital management if they're to release sufficient cash to invest in their future growth.

Middle East

The Middle East is the region with the highest NWCD position. There is a clear need for companies in the region to do much more to release additional cash for investment, in order to continue to support innovation and stimulate growth. Here only 335 companies are under the umbrella of SCF. All parameters indicate that Middle East is having highest number of days (Table-3.6) compared to all other parts of the world meaning suppliers are getting money after many days for buyers.

Asia

Companies in Asia have more NWCD over companies of other continents except Middle East. In one sense, it is good that SCF has huge space for penetration. Banks, and Financial Institutions can move forwards to fill up this gap by expanding SCF so that companies can gradually improve their working capital performance in this region. Now seems to be the perfect time for businesses in Asia to focus on releasing cash to reverse the current declines in Capital expenditure.

Australasia

Australasia has the best NWC performance globally in 2017-2018 (Table3.6). The companies must put their eye on the ball if they want to maintain their position as global leaders.

Africa

African companies on an average have shown a reduction in working capital management level. Only 266 companies are utilizing SCF. Maintaining the momentum towards reducing the average NWCD is the best approach for continuing to get rid of debt, while also maintaining investment and improving returns.

4. Prerequisites of Implementing Effective Supply Chain Financing in Bangladesh

Based on literature review, result of the primary survey, and focus group discussion, we found the following prerequisites/ factors to contrivance supply chain financing effectively in Bangladesh. Although, SCF has been in practice for the last 25 years, but most of these factors are not in effective mode in Bangladesh. For these reasons, as compared to the age of SCF in Bangladesh, the volume and growth of SCF is not that significant.

Table 4.1: Prerequisites/ Factors of Implementing Effective Supply Chain Financing in Bangladesh

Prerequisites/ Factors	Ranking³
A complete set of laws and regulations	1
Sophisticated technology	2
High level coordination	3
Strength of banks and financial institutions	4
High risk prevention capability of banks and financial institutions	5
Trading closely between suppliers and buyers	6

Source: Survey

5. Issues Raised for Discussion with Possible Solutions

As we previously mentioned, comparing to the historical evolution of SCF in Bangladesh, the volume and growth of SCF is not that satisfactory due to presence of some major obstacles. Based on the result of survey and focus group discussion, the following challenges along with possible solutions are placed for discussion.

³ Ranking ranging from 1 to 6 represents order of importance sequentially.

Lack of Awareness about SCF

The concept of SCF is relatively new in Bangladesh. Most of the buyers and suppliers are still preferring to exercise the traditional banks' services namely Letter of Credit, Working Capital Financing, LATR, LIM, in procuring raw materials. Commercial banks are reluctant to launch commonly used products like Factoring, Reverse Factoring, Distributor Financing, Work order financing, etc. So, it is high time for all the related parties to be aware of the process and benefits of SCF to compete with the internal market and making the financing method as simple as possible.

A collective initiative of Bangladesh Supply Chain Management Society (BSCMS), Banks, NBFIs and different chambers and SME Foundation can create awareness about this financial product. They can form a strong alliance to raise awareness particularly among anchors/corporate houses about the necessity and benefits of Supply Chain Financing. Arranging supplier conferences, promoting best cases of supply chain finance, and acknowledging the contributions of people and organizations can be very helpful in awareness creation. Additionally, inclusion of SCM and SCF in the syllabus of universities might contribute in building awareness among the business and financial leader of the country.

Absence of Regulatory Framework for SCF

To date, there is no regulation for SCF in Bangladesh. BB may take an initiative to prepare a comprehensive guideline for SCF. In 2005, BB gave a policy guideline on domestic factoring. Afterwards, no progress we have observed. A crucial part of the process is to acquire assignments/consent letter from corporate houses, which proves to be difficult in most of the times.

Supply Chain financing services are technical in nature and require smooth procedures and monitoring on a regular basis. A sound regulatory guideline from Bangladesh Bank covering mechanics of SCF, assignments procedures, necessary documents, detecting procedures of fraud and forgeries will not only reserve the rights of the banks/ FIs but

will also ensure the best possible interest of mass suppliers in the country. Many countries like China and India have regulatory guidelines on SCF to facilitate this financial service among users.

Lack of Uniformity in the Practice of SCF

There is a lack of uniformity in the definition and process of SCF among the involved institutions in Bangladesh. It had already created some degree of confusions among the related parties to get involved with this facility. Survey result and FGD identified that some of the commercial banks have already planned to launch this product long ago but their management is in disinclination regarding the process or application of this product. Some banks have been offering SCF for the last few years (2017-2018) but the definition of their product in some extent differs from the original essence of SCF. Example: one of the popular SCF solution known as ‘Reverse Factoring’ has been used by some banks as ‘Payables Financing’.

An appropriate procedural guideline on SCF will be able to create a consistent and common understanding about Supply Chain Finance (SCF). Areas like standard definitions for techniques of SCF, benefits therefrom, list of documents required for a transition; risk factor, accounting and regulatory treatment, pricing, etc. can be covered in the procedural guideline.

Performance and Credit Risk

In SCF, consideration of performance risk of suppliers and credit risk of anchors and suppliers thoroughly is important. The financing is made by assessing the length and quality of relationship between buyer and supplier, and creditworthiness of buyer/ anchor primarily.

Banks and financial institutions must have a well mechanism to determine the degree of risks associated with SCF. It is more important at the initial stage of transaction. Additionally, a proper format of reporting from Bangladesh Bank is required to be given to banks and financial institutions for SCF with a view to close off- site supervision.

Fake Bill of Supplier

A common problem is found in the investigation that the submission of fake bill by the clients to the banks and NBFIs particularly in paper-based solution. As a result, a substantial number of fake bills had already been financed by different banks which ultimately caused the NPL.

Financiers need to have a proper checklist of documents along with an effective vetting process to verify the accuracy of submitted documents/bills. However, applying a software based proper platform will reduce this problem.

Paper-Based and Software-Based Solutions

Excepting a few banks and financial institutions, all SCF providers in Bangladesh follow paper-based transaction. Although there is a annual maintenance costs and a fee per transaction needed to pay to the platform provider, but it is saving time, ensures accuracy of a large number of transactions, provides electronic payment system and disseminates information among clients.

SCF is moving worldwide towards a paperless digitized mode. As digital platform acts to track, validate and authorize each step of the supply chain finance with full document visibility and any payment option from cash to cards and loans and connects a range of counterparties in the supply chain like banks, corporate customers, suppliers, credit insurers, logistics companies, and payment providers for exchanging trade data and assets and seeking financing more easily, all financiers need to utilize platform based SCF mechanism. For Example, in 2018, IPDC Finance Limited, Bangladesh's launched the country's first digital supply chain finance platform with 'Blockchain' technology to offer easy and low-cost credit to Micro and Small Enterprises (MSEs).

Consent Letter and Acceptance of Assignment

Anchors in many cases are not interested to give consent letter mentioning they will pay the money to banks and financial institutors in place of paying money to the suppliers. Additionally, large corporates are sometimes reluctant to honor the assignment given by the suppliers in favor of banks and financial institutions.

Awareness about the products and benefits therefrom are necessary to be understood by anchors. Buyers can confirm uninterrupted supply of raw materials, reduce time and costs by reducing number of tiny payments and finally may avail of discount facilities because of SCF arrangements. Banks and Financial institutions may convince buyers to give consent letter by communicating aforesaid benefits.

Less Numbers of Reputed Buyers

It is true that large numbers of reputed buyers are not huge in Bangladesh. As SCF facilitates to pass on credit risk from small suppliers to reputed buyers, if we consider only large number of buyers the size of market will not be expanded.

With a view to expansion of market, Banks and financial institutions may target Tier-II and Tier-III buyers by considering their previous track record of banking behavior. Apart from these, they may approach different sector corporations, services sectors, and defense organizations, etc.

Lack of Common Vision

Common vision of parties to progress with all is necessary for the growth of SCF, which is lacking here. Nowhere is this recognition more apparent than in a supply chain. It is necessary to be recognized that if a supplier does well, benefit goes to buyers and vice versa. Of course, altogether benefits of macro economy cannot be overlooked.

Our corporate world needs to change their mindset. We should believe in horizontal development in place of vertical development. Supply chain finance collaboration helps drive improved financial performance of all associated with SCF. As a result, the performance of each participant is gradually increased by availing of this financial service.

Training for Bankers and Financial Executives

It was found that only 119 people are working with SCF in Bangladesh. These numbers are not at all sufficient to penetrate the upcoming vast market of SCF. Additionally, current manpower possibly is not well equipped with the knowledge of SCF. Expertise in IT is also crucial here.

Banks and financial institutions who are offering or going to offer SCF need to prepare manpower with proper training at home and abroad. Additionally, practicing organizations or people of SCF may form an association. This type of association can address different issues necessary for making this financial service successful in financing numerous suppliers of this country smartly.

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Appendix 1: Discussion Summary of the Roundtable Discussion on “Supply Chain Finance in Bangladesh”

Bangladesh Institute of Bank Management (BIBM) arranged a roundtable discussion on “Supply Chain Finance in Bangladesh” on September 19, 2019. Mr. S. M. Moniruzzaman, the then Chairman, BIBM Executive Committee and Deputy Governor, Bangladesh Bank was present in the discussion as the chief guest, and also inaugurated the roundtable discussion. Professor Barkat-e-Khuda, *Ph.D.*, Dr. Muzaffer Ahmad Chair Professor, BIBM chaired the roundtable discussion. Dr. Prashanta Kumar Banerjee, Professor and the then Director (Research, Development & Consultancy), BIBM delivered his welcome address and presented the keynote paper on behalf of the team members. Other members of the research team are: Mr. Mohammed Sohail Mustafa, *CFA*, Associate Professor and Director (Training), BIBM; Mr. Md. Ruhul Amin, Assistant Professor, BIBM; and Mr. Tofayel Ahmed, Assistant Professor, BIBM. A total number of 70 senior executives of different banks and NBFIs, and faculties of BIBM participated in the roundtable. The summary of roundtable discussion is as follows:

Comment of the Chief Guest

Mr. S. M. Moniruzzaman, the then Chairman, BIBM Executive Committee and Deputy Governor, Bangladesh Bank as well drew the importance of Supply Chain Finance in Bangladesh. Particularly, he emphasized the need of this sort of financing in Small and Medium Enterprises (SMEs) for their daily working capital. He praised the involvement of some banks and Non-Bank Financial Institutions (NBFIs) in offering Supply Chain Finance to their clients through different mechanism. He said that, through Supply Chain Financing products, banks and NBFIs could shift credit risk of high-risk suppliers to their high-quality buyers. In this regard, he also drew the support of the Bangladesh Bank in launching new financial services for the benefits of the financial sector. However, he suggested banks and NBFIs to analyze the cost and risk components, simplicity and necessary process before launching any new financial service in our financial sector.

Professor Barkat-e-Khuda, Ph.D., Dr. Muzaffer Ahmad Chair Professor, BIBM in his concluding remarks, appreciated the team members of the keynote paper. He also thanked practitioners of banks and NBFIs for their valuable comments and suggestions in the discussion.

Key Points Highlighted by Participants

- Though in mitigating credit risk, reverse factoring is better than that of traditional mode of financing like Cash Credit (CC) or Overdraft (OD) but it is not being popular among corporates due to unwillingness of the CFOs of corporate clients to avail SCF products in their working capital. CFOs of corporates, in most of the cases, prefer traditional mode of financing even if obvious benefits in SCF produces.
- Some buyers do not show willingness to cooperate FIs for verification of the underlying transactions which impacts cash flow of suppliers against their supplied goods.
- Introduction of credit insurance for SCF products from local insurance and foreign multinational financial institutions like ADB or IFC could be a tool in reducing financing risk.
- Knowledge gap and capacity development at all levels, suppliers, buyers, practitioners etc., in handling SCF products have been a key concern for the lenders over the years

Paper Five

Crowdfunding and Its Implications in Bangladesh

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List of Abbreviations

B2B	Business-to-Business
CAGR	Compound Annual Growth Rate
CFA	Crowdfunding Act
CFP	Crowd Funding Platform
DAS	Dhaka Ahsania Mission
FAD	Finance and Account Department
FGD	Focus Group Discussion
IOSCO	International Organization of Securities Commissions
JOBS	Jumpstart Our Business Startups
P2B	Peer-to-Business
P2P	Peer-to-Peer
SEBI	Securities and Exchange Board of India
SEC	Securities and Exchange Commission
SMEs	Small and Medium Enterprises
SVP	Special Purpose Vehicle
UNDP	United Nations Development Program
YES	Youth Employment through Skills

Executive Summary

Liquidity crisis in some cases is triggered by depositor runs on banks, though in most cases it is a general realization that systemically important financial institutions are in distress. There are different ways by which an organization can raise funds that includes startup capital/shareholders equity, deposits, borrowing, foreign currency loan, refinance scheme, bond and debentures. The banking industry of Bangladesh uses these methods as the main source raising operating fund for their business. However, there has been a massive shift in the way of fundraisers thinking as new technology continues to take over. Crowdfunding is one of them. Crowdfunding is a new market-based financial approach that leverages social media and information technology to intermediate finance those who are in need of it, startups and idea creators, in particular. Though at the initial stage, crowdfunding was used mainly for receiving a donation for a charitable purpose, the concept turned into a business idea in the wake of subprime mortgage crisis 2008 that caused commercial banks to adopt tighter lending policies to Small and Medium Enterprises (SMEs) and startups.

The overall objective of this paper is to explore how crowdfunding can be used as a means of funding by the banks. However, the specific objectives of this roundtable discussion are to i) explore the conceptual framework of crowdfunding; ii) examine the scope of using crowdfunding as a means of funding in banks; and iii) identify some issues for discussion. Both primary and secondary data were collected to fulfill the objectives of the study. Secondary data were gathered from different publications related to international standard practices, framework, and laws. Primary data were mainly collected from the Finance and Account Department (FAD) of banks through a semi-structured questionnaire. 58 questionnaires have been sent to the head of FAD of which 30 questionnaires have been received. This study covers 4 state-owned commercial banks and DFIs, 20 private commercial banks excluding Islamic banks and 6 Islamic banks. Further, the team also conducted a Focus Group Discussion (FGD) with BD Venture to explore

the practice of crowdfunding in Bangladesh. BD Venture is one of the crowdfunding platforms in Bangladesh.

According to the *Global Crowdfunding Market 2016-2020 Report*, crowdfunding market is expected to grow at CAGR (Compound Annual Growth Rate) of 26.87% during the period 2016-2020. Just six years ago crowdfunding reported \$0.853 billion in 2010, showing a relatively small market with minimal growth potential. In 2013, the industry reported \$6.1 billion and expanded by 166% to reach \$16.2 billion in 2014. According to crowdfunding research firm Massolution, the industry earned more than double and reached \$34.4 billion in 2015. If this trend of doubling continues, we'll see \$90 billion by 2017. However, there are some risks in crowdfunding, such as valuation of the project, inadequate due diligence, lack of accountability, potential lack of financial matter, corporate governance, lack of structured communication channels, lack of entrepreneurship guidance and regulatory risk.

The study finds that slightly over half of the banks said that they were aware about the concept of crowdfunding. Remaining banks stated that they were not aware about the concept of crowdfunding. It is mentionable here that banks are yet to involve in crowdfunding process. Again, it finds that slightly over two-thirds of the banks stated that there is scope to use crowdfunding as a new source of fund by banks in Bangladesh. However, a regulatory framework will be needed prior to initiate this type of method for collecting funds by banks. Further, in response to a question regarding their readiness to use crowdfunding as a new source of fund within two years, four-fifth of the banks responded negatively. Only a fifth said that they may use this method of raising fund in their banks. Therefore, the study explicates that among others 'trust' is one of the key foundations of crowdfunding and trust cannot be built overnight. The study also identified that absence of proper risk mitigation techniques, cyber-attack and other fraudulent activities, and credible crowdfunding ecosystem are the main impediments to develop crowdfunding platform in Bangladesh.

Crowdfunding and Its Implications in Bangladesh

1. Introduction

Prevailing cash crunch in the country's banking sector is preventing many large and small-scale banks from providing loans. Several managing directors of the banks have said that the sector is passing the most difficult time, as neither substantial deposits are being made, nor loan collection is increased (Dhaka Tribune, 2019a). The reason for this, they mentioned, is the liquidity problem of the bank sector, which has reduced investment funds and increased the tendency of borrowing from the call money market. Analyzing the liquidity situation of banks in March, 2019 it has been found that 10 to 12 banks have funds to invest, while the rest are borrowing money to run daily activities (Dhaka Tribune, 2019a). Further, about 60% funding of the leasing companies comes from the banking sector, of them 40% are fixed deposits of banks and 20% are raised from call money market (Dhaka Tribune, 2019b). Hence, in recent few years the banking sector of Bangladesh is passing through the worst condition in its history due to liquidity problem (Rahman and Rana, 2018). In some cases, the crisis is triggered by depositor runs on banks, though in most cases it is a general realization that systemically important financial institutions are in distress (World Bank, 2016).

There are different ways by which an organization can raise funds that includes startup capital/shareholders equity, deposits, borrowing, foreign currency loan, refinance scheme, bond and debentures. The banking industry of Bangladesh uses these methods as the main source raising operating fund for their business. However, there has been a massive shift in the way of fundraisers thinking as new technology continues to take over. Crowdfunding is one of them. It has quickly become a popular avenue of funding for investment, seed money and start-up funding. The growth rates have been astounding over its short life span. Crowdfunding is a new market-based financial approach that leverages social media and information technology to intermediate finance those who are in need of it, startups and idea creators, in particular. Though at the initial stage, crowdfunding was used mainly for receiving a donation for a charitable

purpose, the concept turned into a business idea in the wake of subprime mortgage crisis 2008 that caused commercial banks to adopt tighter lending policies to Small and Medium Enterprises (SMEs) and startups. With a slow introduction of crowdfunding in 2009 (US\$ 0.53 billion), the industry grew to US\$34.4 billion in 2015, reflecting a 103% growth rate on an average over this period (Adhikary *et al.*, 2018). The Global Crowdfunding market was valued at 10.2 billion USD in 2018 and is expected to reach US\$ 28.8 billion by the end of 2025, growing at a CAGR of 16% between 2018 and 2025. Hence, crowdfunding can be an alternative source of funding a project that can be utilized a bank. However, the way banks can utilize the crowdfunding concept has been described later in this report.

1.1 Objectives

Based on the backdrop, the overall objective of this paper is to explore how crowdfunding can be used as a means of funding by the banks. However, the specific objectives of this roundtable discussion are to

- i) explore the conceptual framework of crowdfunding;
- ii) examine the scope of using crowdfunding as a means of funding in banks; and
- iii) identify some issues for discussion

1.2 Methodology

Both primary and secondary data were collected to fulfill the objectives of the study. Secondary data were gathered from different publications related to international standard practices, framework, and laws. Primary data were mainly collected from the Finance and Account Department (FAD) of banks through a semi-structured questionnaire¹. 58 questionnaires have been sent to the head of FAD of which 30 questionnaires have been received. This study covers 4 state-owned commercial banks and DFIs, 20 private commercial banks excluding Islamic banks and 6 Islamic banks.

¹A questionnaire that contains both open-ended and close-ended questions.

Table 1.1: Sampling Distribution

Bank Group	Sample Banks
SOCBs and DFIs	4
PCBs (Excluding Islami Banks)	20
Islami Banks	6
Total	30

The team also conducted a Focus Group Discussion (FGD) with BD Venture to explore the practice of crowdfunding in Bangladesh. BD Venture is one of the crowdfunding platforms in Bangladesh.

1.3 Coverage, Limitations and Organization of this Study

Broad area of this study is finance and account of banks. The findings of this report have mainly been presented in tabular form along with some graphical presentations. This study has been conducted on the basis of the survey of the sample banks. Hence, someone has to be careful in generalizing the findings of this study.

The contents of this report are organized into nine sections. Section-1 is the background including objectives, methodology, and limitation of this study. Section-2 includes conceptual aspects of crowdfunding. Evolution of crowdfunding explains in Section-3 while Section-4 illustrates different types and models of crowdfunding. Section-5 elucidates the future and trend of crowdfunding around the globe and Section-6 covers risks and regulations of crowdfunding in Bangladesh. Further, Section-7 and Section-8 explains some cases on crowdfunding. Again, in section-nine, this study explains some issues for discussion.

2. Conceptual Aspects of Crowdfunding

2.1 What is Crowdfunding?

Crowdfunding is a type of alternative funding compared to traditional borrowing that funding a project or venture by raising small amounts of money from a large number of people, typically via the Internet. Again, crowdfunding can be defined as a practice of funding startups or small firms or a project by raising small amounts of money from a large number of people utilizing online social media such as Facebook,

Twitter, LinkedIn and other specialized blogs (Adhikary *et al.*, 2018). It is an organized collective effort of many non-professional people who are embedded in trust to finance a venture via the internet. It is also known as social lending (Hulme and Wright, 2006) and Peer-to-Peer (P2P) lending (Freedman and Jin, 2008). Crowdfunding, as the contribution of a financial amount to projects, products or business ideas by a number of investors (Wenzlaff *et al.*, 2012), has recently emerged as an alternative possibility for individuals to receive funding (Agrawal *et al.*, 2013; Kleeman *et al.*, 2008; Unterberg, 2010). Contrary to typical financial investments, crowdfunding is fundamentally open to everyone (Blohm *et al.*, 2013; Wenzlaff *et al.*, 2012).

As a principle, crowdfunding is open to everyone - private persons as well as economic actors. A group of people, the crowd, financially contributes small amounts to projects, products or ideas. These projects, products or ideas are owned by fundraisers (e.g. entrepreneurs or private persons), seeking for money in order to get their project realized. Fundraisers search for investors directly or via a specific digital platform, referred to as intermediaries.

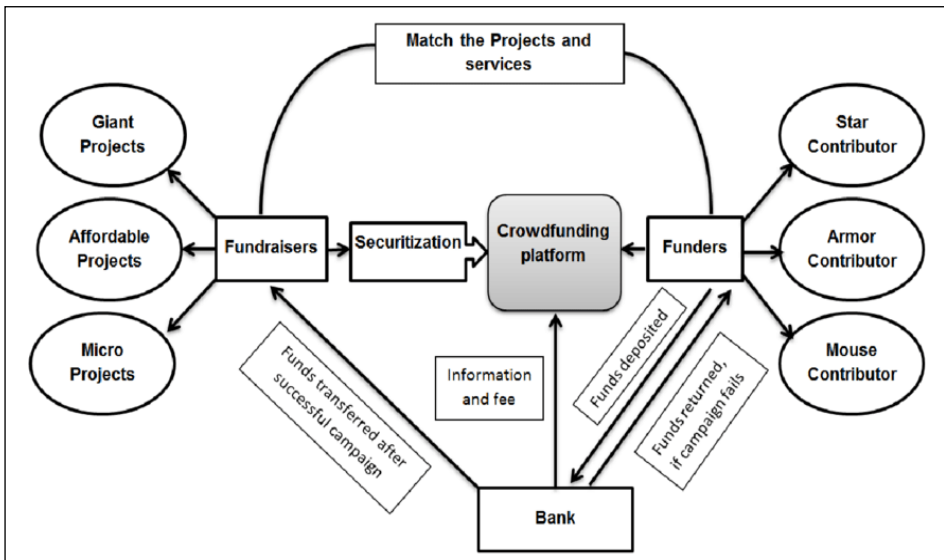
The term ‘crowdfunding’ is derived from another term ‘crowdsourcing’ that refers to the process of obtaining needed services, assets, knowledge or ideas by soliciting contributions from a large number of individual, a crowd of people especially from the online community rather than from the traditional employees or suppliers (Adhikary *et al.*, 2018). In case of crowdfunding, the same process is followed in procuring funds. However, the objective of crowdfunding is to finance a project or an idea or to help philanthropic organization by soliciting funds in a tiny unit from mass people.

In fact, crowdfunding can be viewed as a by-product of information technology. This new form of financial technology emerged in the wake of 2008 financial meltdown in response to the increased difficulties faced by the small business entrepreneurs in obtaining funds from the traditional banking system. Its underlying foundation is rooted in the three factors: trust, internet technology and willingness. In addition to raising funds for the entrepreneurs, crowdfunding is a technique to

validate entrepreneurial project by the potential user groups at the shortest possible time.

Notably, the traditional method of raising finance for a project includes preparation of a business plan, the undertaking of market research and then approaching wealthy individuals, banks, angel investors and venture capital firms limiting the fund raiser's option to a few key players. Crowdfunding, on the other hand, expand the fund raiser's reach and players as he can advertise this presence to a large number and variety of potential investors through the presence of online crowdfunding platforms or social media. Simultaneously, it helps fund suppliers to the reduction in transaction cost of investment by providing them opportunities to act as a quasi-monitor of the investee firms because the data on available investment opportunities and the reaction of other fund suppliers can be centrally accessed under crowdfunding system.

Figure 1.1: Conceptual Framework of Crowdfunding



Source: Hasan (2019)

2.2 Major Features of Crowdfunding

Crowdfunding represents a revolution in how entrepreneurial ventures are funded and disrupts traditional financial flow. Critical features of crowdfunding are as follows:

- Crowdfunding takes advantage of the new features of the Web 2.0 especially viral networking and marketing and social media to collect funds from the masses within a relatively short time span.
- It helps suppliers of funds to reduce their transaction cost of investment and gives them the chance to act as quasi-monitors of the investee firms as data on available investment opportunities and reactions of others who are supplying funds can easily be tracked under one crowdfunding platform.
- The entrepreneurial firms can receive sufficient freedom in the use of funds as against traditional bank loans which involve contractual obligations in the use of funds.
- Crowdfunding of the ‘pennies from many models,’ as it is known, allows people to materialize their creative or entrepreneurial visions. It is an exciting way to gather attention, validate an idea, and most importantly, raise capital without going into debt.
- Crowdfunding promises to democratize and expand the access to capital by enabling the community that is, the crowd to determine which entrepreneurs (micro, small and medium-sized enterprises) can obtain funds for growth.
- By centralizing access to data on available investment opportunities, crowdfunding investing portals can facilitate the flow of information from early-stage enterprise to potential investors more rapidly than has even been possible before.
- Crowdfunding allows investors to screen many proposals at the one time and determine quickly whether the company fits their portfolio strategy risk appetite or other criteria.
- Crowdfunding is a boundary-less approach to investment. Therefore, geography is not a barrier to the funding of projects.
- Crowdfunding helps to build exposure for the firms by receiving feedback from customers. Early-stage firms may use crowdfunding

to explore the viability of products at a low cost with low barriers of entry. Extensive feedback from potential investors and customers help entrepreneurs to revise the business model.

2.3 Crowdfunding versus Microfinance

Crowdfunding is fundamentally different from Microfinance, which is a rule-based institutional credit given to poor women, in particular, in a tiny amount. Microcredit is primarily a phenomenon dependent on the microfinance institutions where the institutions are the sole originator, provider and risk-taker of the loan. By contrast, crowdfunding is a market-based online financial tool where a large pool of investors jointly screens the visibility of a project before committing final investment. Crowdfunding platforms help meeting borrowers and investors by creating an online platform. Unlike microfinance institutions that directly disburse credit, crowdfunding platforms facilitate financial transactions for a fee, and they seldom invest in the firms seeking capital through their platforms. Crowdfunding platforms do the primary screening of a proposal and conduct necessary campaigns for raising fund when it deems viable. This means that crowdfunding platforms just originate a loan and the suppliers of the fund, who are ordinary people, bear the risk of the fund.

Moreover, firms are in need of larger amounts of funds which cannot be gained through microcredit institutions, as it exceeds their funding limits. However, larger amounts of funds can be obtained through the power of social networks such as crowdfunding. It is here that crowdfunding fills the gaps between microfinance and institutional investors and does not pose a threat to microfinance.

Crowdfunding is a boundary-less approach to investment, whereas geography constrains the suppliers and receivers of microcredits. In addition, in crowdfunding, many investor screen proposals at one time and provide feedback. Whereas, in microcredit, screening of proposals is first done by group members who plan to obtain credit then examined by a loan officer from the microcredit institutions.

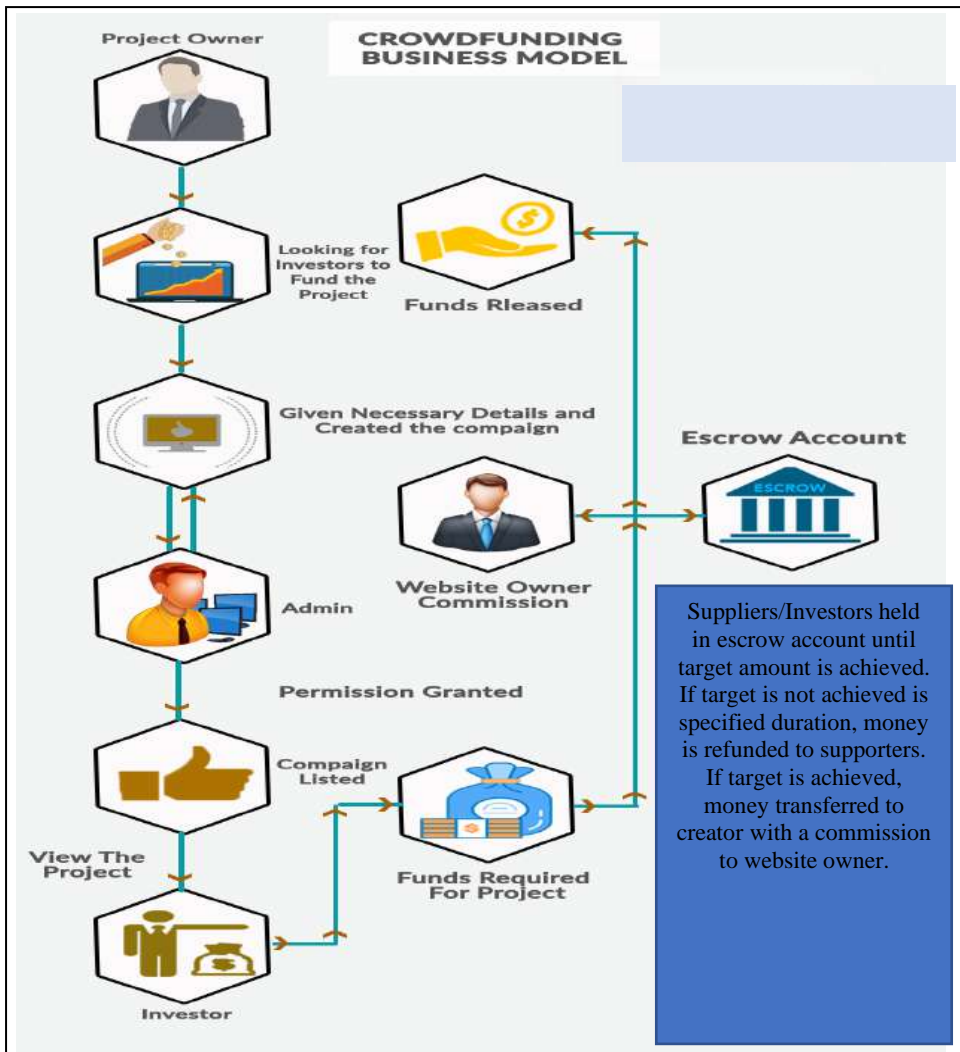
Crowdfunding can be used to test the viability of a product or to advertise products of a firm, but the primary purpose of microcredits is to generate income for poor people. However, crowdfunding extends some of the social mechanics of microfinance to help fund high-growth start-ups, frequently in the technology sector, or to provide expansion capital to existing businesses.

2.4 Crowdfunding Business Model

There exist four pre-defined crowdfunding business models – donation, reward, equity, and lending. Donation-based model is a perfect fit for community-based and charitable causes where reward model is a variation on donation-based funding; here the investors receive some reward – usually in the form of a product or service for which the campaigners are seeking the funding. Equity business model possesses a traditional trait as the investors typically pay a large amount of money and are given an equity position in the campaigner’s business. Whilst in lending, original amount is being repaid along with the interest.

Every crowdfunding portals incorporate two important entities. One is *project owner* (the one who own the idea) and the other is *project backer* (the one who fund the concept). Anyone with a sterling idea can list their project complying with the site’s terms and conditions. Those who are interested in this idea can contribute, where the funding amount and duration of the project are solely decided by the project owner alone.

Figure 2.1: Crowdfunding Business Model



Source: <https://www.agriya.com> A Crowdfunding Based on Internet

3. Evolution of Crowdfunding

Although crowdfunding is only recently starting to capture global interest as an alternative investment vehicle, crowdfunding has been around in less conspicuous form of hundreds of years. Whenever we put a few Dollars in the offering plate at church, chip into fund a Christmas party for neighborhood children, or give to a charitable organization, or to a Mosque, we are effectively participating in crowdfunding. Notable

example of vertical crowd campaigns is the funding of the pedestal of the *Statue of Liberty* in 1885.

Modern-day crowdfunding, however, came into being in the 1990s when some platforms for charity fundraising and projects funded by Internet-based campaigns emerged into the forefront. The UK-based charity fundraising platform JustGiving was founded in the year 2000. Then, ArtistShare, a reward-based Crowdfunding Platform (CFP), was founded by Brain Camelio in 2000 with the idea that fans would finance production costs for albums sold only on the Internet and artists also would enjoy much more favorable contract terms. Other reward-based platforms continued to emerge. A well-known and heralded example was Sellaband, founded by Holland's Pim Betist in 2005. Sellaband's model allowed artists to build a fan base, received contribution under a product presale model (in this case, a record album), and if the contribution level reached the target threshold, produce, market, and distribute albums.

In the year 2005, the first ever platform, where entrepreneurs could lend money to develop their ideas was launched. This platform was called Kiva. Today, Kiva is one of the most successful micro-lending platforms all over the world. Kiva's success led to the mushrooming of more such peer to peer lending platforms like Zopa, Prosper, Lending Club and so on.

Another popular crowdfunding platform Indiegogo came to be launched in the year 2008. Then, Kickstarter appeared within a year in 2009. Both these platforms are extremely preferred in the current crowdfunding market. The difference between these crowdfunding platforms and other crowdfunding platforms is that in these platforms the investors do not get their money back but instead receive reward depending on the plan of the project owner.

Crowdfunding emerged as a business tool for financing the startups and small firms just after 2008 financial meltdown that tightened, *inter alia*, the lending requirements of the commercial banks to startups and SMEs. Many entrepreneurs have managed to survive this harsh period relying on various crowdfunding platforms. Examples of some significant crowdfunding developments identified by Esposti (2013), the CEO of

Massolution.com are as Niche platforms, Locavesting, Enterprise crowdfunding, crowdfunding economic development, live crowdfunding. The evolution of crowdfunding is explained below:

1700's: The Irish Loan Fund: The Irish Loan Fund was established by author and Irish nationalist Jonathon Swift in the early 1700's as a way to provide loans to poor but creditworthy people in Dublin. The Fund was successful and sparked a wave of imitations, as well as an official Loan Fund Board in 1837. By 1843, there were approximately 300 loan funds in Ireland. The "crowd" part of the funding for Ireland's loan funds was in the form of donations from wealthier citizens, who saw it as a way to charitably help the poor. The funds were also aided by retained earnings, interest-free loans, and deposits that earned interest.

1852: The Creation of Credit Unions: A credit union is a non-profit bank that gets their loaning money from members, who also get a part ownership and voting power in the credit union. In 1846, *Herman Schulze-Delitzsch* created a cooperatively owned bakery and mill in response to a crop failure and famine in Germany. Six years later, Schulze-Delitzsch and Friedrich Raiffeisen took that idea of cooperative ownership and turned it on finance, creating the first credit union. German credit unions had democratic governance, a member-elected board of directors, were volunteer run, and gave each member an equal vote, regardless of how much money they contributed. Modern credit unions still adhere fairly closely to that original model. The "crowd" in credit unions are the members, who contribute by depositing their money with the bank and paying a (lower than average) interest on loans.

1976: The Grameen Bank and Microfinance: In 1976, Professor Muhammad Yunus launched a research project, where he loaned \$27 to 42 poor women in Jobra, Bangladesh. The project was so successful that it led to the development of the Grameen Bank Project, which is widely credited as being the first example of modern microfinance. Like the Irish Loan Fund, microfinance provides loans to people living in poverty who do not have access to traditional forms of credit. Unlike the Irish Loan Fund, the money in microfinance institutions may come either from members (as it does in credit unions) or from donations or they be look

more like traditional banking institutions, but with lower deposit amounts, loan amounts, and (ideally) interest rates.

1997: The Inception of Modern Day Crowdfunding: The first recorded successful instance of crowdfunding occurred in 1997, when a British rock band called Marillion funded their reunion tour through online donations from fans, who were eager for them to come on tour in the United States. Keyboardist Mark Kelly sent out an email to his 1,000 person mailing list, telling them that the band would lose about \$60k if they went on tour. The fans said: So why don't we raise the money? One fan even volunteered to put the money in escrow in his bank account in North Carolina, to be returned if not enough was raised. The campaign ended up raising the money and the band went on tour. But the impact of that email resonated far beyond one music tour. Inspired by this innovative method of financing, ArtistShare became the first dedicated crowdfunding platform — focusing on musicians who wanted to raise money either to produce albums or go on tour — in 2001. Shortly thereafter, more crowdfunding platforms based on the Marillion model began to emerge, including *IndieGoGo* in 2007 and *Kickstarter* in 2009.

2006: First Use of the Term “Crowdfunding”: The first recorded use of the term “crowdfunding” was in August 2006, by entrepreneur Michael Sullivan. Sullivan used it in the launch of his company fundavlog, which was a (failed) attempt to create an incubator for videoblog projects.

2008: The Great Recession: The collapse of the housing market and the financial industry in 2008 led to people being forced to seek funding by alternative means. As traditional banking institutions were no longer able or willing to provide the same loans as they were in the past, people turned to the internet — and to each other.

2009 – 2015: Crowdfunding Emerges as a Major Funding Source: The launch of Kickstarter and IndieGoGo led to an explosion of niche crowdfunding platforms. The crowdfunding industry has quickly emerged as a popular option for entrepreneurs to validate their ideas, gain exposure, and gain funding. Crowdfunding revenue tripled from \$530 million in 2009 to \$1.5 billion in 2011. By 2012, there were more than

450 crowdfunding platforms, which raised more than \$2.7 billion worldwide. By 2015, that number had jumped to \$24.4 billion.

2012: Crowdfunding Gains Washington’s Support: In April of 2012, President Barack Obama signed the Jumpstart Our Business Startups (JOBS) Act into law. Also known as “the crowdfunding bill,” the JOBS Act aimed to lessen regulation burdens on small businesses and legalized equity crowdfunding. This includes removing the ban on general solicitation that prevents entrepreneurs from publicizing that they’re raising money.

2012: Fundable Launches the First Business Crowdfunding Platform: The Fundable platform launched in 2012 to help entrepreneurs fund and grow their business through rewards and equity crowdfunding. Fundable was founded by serial entrepreneurs Wil Schroter and Eric Corl.

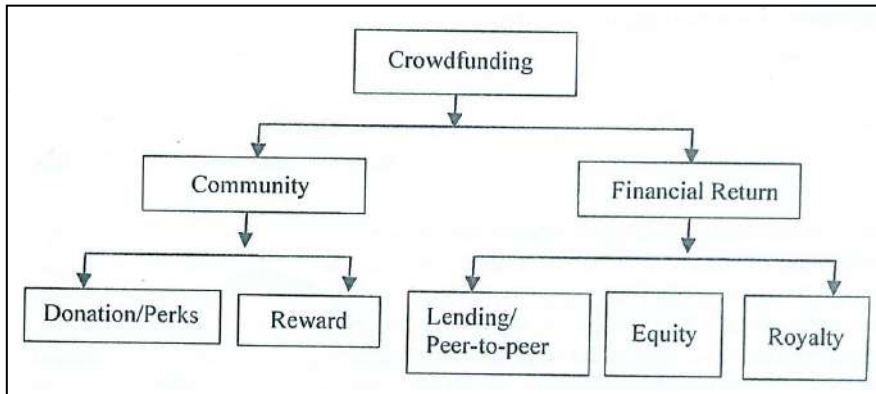
2017: Highest Funded Crowdfunding Campaign: As of September 2017, the highest funded crowdfunding campaign is Filecoin, a decentralized data storage application, which raised \$257 million over a month of activity.

4. Types and Models of Crowdfunding

4.1 Types of Crowdfunding

Crowdfunding can be broadly categorized into two groups: community crowdfunding and financial return crowdfunding. Community-based crowdfunding is again divided into “Donation-Based” or “Perks-Based” crowdfunding (from now on “Donation-Based”) and “Reward-Based” crowdfunding. Likewise, financial return crowdfunding is divided into “Lending-Based” or “peer-to-peer” crowdfunding (hereafter “lending-based”) “equity-Based” and royalty crowdfunding. Fig 4.1 identifies different types of crowdfunding.

Figure 4.1: Types of Crowdfunding



4.2 Crowdfunding Models

Crowdfunding leverages the power of information technology, particularly social media, and networks, to supply less cost finance to the fund seekers. While community-based crowdfunding could take place in a simple form, as the Crowdfunding Platform (CFP) could be set up within the entities seeking finance or asked an independent outside CFP to raise funds for them without taking many legal formalities, the financial return crowdfunding model is often diverse and complex in nature.

The structure of the financial return model largely depends on the levels of trust, rooms for opportunism, access to information technology, willingness of the common people, status of legal regulations, and the objectives of setting up the platforms.

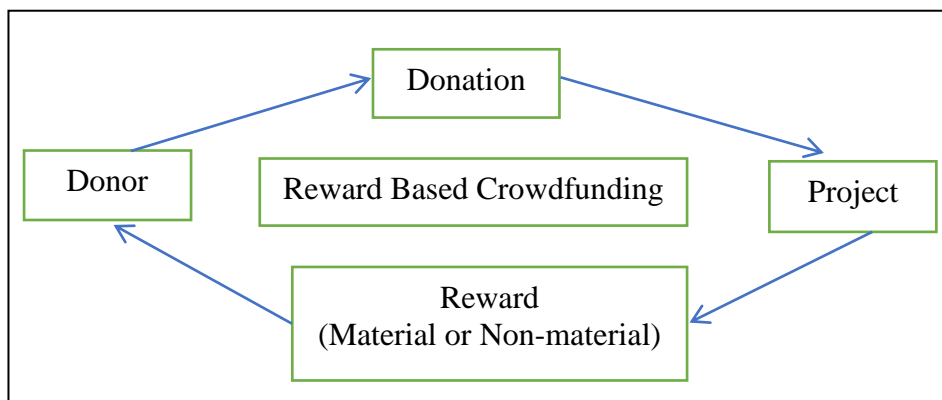
A. Community Based Crowdfunding Models

Under the community-based crowdfunding approach, an entrepreneur can create a separate blog in his website or ask an independent CFP to mobilize funds for him. In the former case, the fund campaigning is done by the entrepreneur himself. In the latter case, this is done by an independent CFP taking a fixed fee or a percentage of the collected fund. In this approach, investors usually do not expect any financial return (donation based crowdfunding) on their invested funds although they can receive a token gift in kind (reward-based crowdfunding). As a result,

community-based crowdfunding is mainly used by charitable and research institutions.

Donation-Based Crowdfunding: Donations-based crowdfunding allows individuals (donors) to send money to people (or projects) in need (beneficiaries), with no financial (return) consideration in exchange for their money. This form of crowdfunding is used primarily in the nonprofit sector to support various causes (social, environmental, political, and charitable). This platform derives its revenue stream primarily from donation.

Figure 4.2: Donation Based Crowdfunding



Source: Adopted by the Authors from IONOS Inc. Us

There are two common subcategories of donation-based crowdfunding:

- (i) **Personal Campaigns:** Personal campaigns typically involve an individual beneficiary, a household, or a small community raising money for a cause of its own interest. Typical examples include campaigns to fund for medical treatment, education, or personal hobbies. (Vargas *et al.*, 2014)
- (ii) **Charity Fundraising:** Charity fundraising involves a registered charity such as Anjuman Mofidul, Ahsania Mission Cancer Hospital, Kidney Foundation Hospital etc. in Bangladesh.

Both personal campaigns and charity fundraising can be promoted as either all-or-nothing or keep-what-you-raise campaigns. In case of the former, the beneficiary receives the collected funds only if the initial

threshold has been met. In case of the latter, the beneficiary can keep the funds even if below the threshold.

The largest market for donation-based crowdfunding is in North America, with \$210.38 million funded in 2015. For the whole American continent, the volume generated from donation-based crowdfunding increased from US\$151.09 million in 2014 to US\$215.56 million in 2015 (Latin America accounted for US\$5.18 million). Asia-Pacific region (excluding China), donation-based crowdfunding raised almost US\$25 million in 2015.

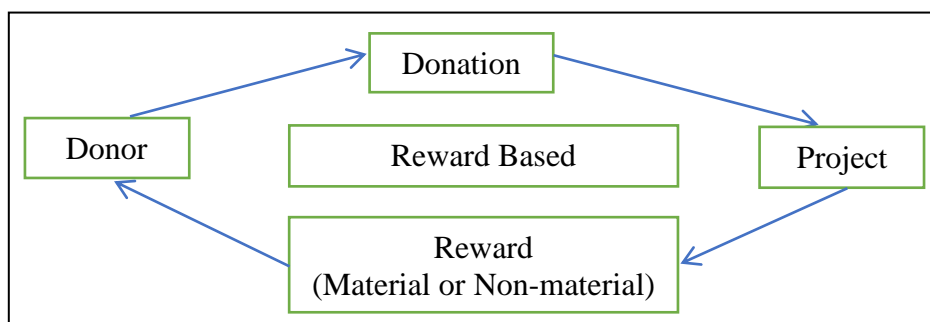
There are some benefits of donation based crowdfunding that includes community participation and a feeling of glow, voting with money and formalization of support. Donors who contribute to the campaigns of their relatives and friends may find it beneficial to use the platform to formalize their contribution (e.g., for tax purposes). This can bring the additional benefit of discouraging excessive risk-taking, because project failure may also negatively impact the social relationship (Lee and Persson, 2012).

However, it has some risks. The most obvious risk donor face is fraud, either in the form of fake campaigns or cyber-attack. The risk of fake campaigns is particularly relevant when a campaign is not run by an institution, such as a charity, that is often registered in a public register and subject to some minimum requirements (e.g., financial statements disclosure). Individual-run campaigns can be created for any unlawful purpose, including for purely selfish reasons initially not disclosed to donors. When the platform does not guarantee enough transparency, donors may not be able to check whether or not their donations were used for the intended purpose. Moreover crowdfunding platforms may be abused for money laundering and terrorist financing purposes, particularly where platforms escape the regulatory framework for anti-money laundering and counter terrorist financing due to a gap in their regulation and oversight.

Rewards Based Crowdfunding: Rewards Based crowdfunding is especially popular among startups and businesses that provide the product or service in return for funding to start or run the business. In the

west, Kickstarte and Indiegogo have emerged as the top two platforms for reward based crowdfunding. The Pebble Watch², launched on Kickstarter in 2015 stands as a stellar example of how the crowdfunding reward ideas was used to launch a product successfully in the market.

Figure 4.3: Reward Based Crowdfunding



Source: Adopted by the authors from IONOS Inc. Us

Box 4.1: Steps of Reward Based Crowdfunding

Step 1: Hatch a Plan

Planning ahead is crucial to running a good fundraiser. If an individual a startup, come up with the blueprint and calculate the cost of the product / service they wish to offer.

Step 2: Fix Individual Rewards

While some campaigners prefer to fix a single contribution amount for their product, others provide a range of rewards for different contribution amounts.

Step 3: Start a Fundraiser/CFP

² Migicovsky's company, Pebble Technology, USA launched a Kickstarter campaign on April 11, 2012, with an initial fundraising target of \$100,000. Backers spending \$115 would receive a Pebble when they became available (\$99 for the first 200), effectively pre-ordering the \$150 Pebble at a discounted price. Within two hours of going live, the project had met its \$100,000 goal, and within six days, the project had become the most funded project in the history of Kickstarter to that point, raising over \$4.7 million with 30 days left in the campaign. On May 10, 2012, Pebble Technology announced they were limiting the number of pre-orders. On May 18, 2012, funding closed with \$10,266,845 pledged by 68,929 people. At the time, the product held the world record for the most money raised for a Kickstarter project.

Write a solid pitch of their story and are clear about the rewards. In addition to that delivery date for the rewards as well can be mentioned.

Step 4: Find Backers/Fund Provider

Promote your fundraiser on social media to find backers. Target the core community

Step 5: Fulfill Your Commitment

For most platforms, the liability falls on the campaigner to fulfill the commitment made to the contributors. Moreover set a realistic timeline at which reward will be able to deliver, keep them updated about your progress and of course, say Thank you!

There are three types of reward based crowdfunding models these are all or nothing model, keep-what-you-get model and tangible v's intangible model.

All or Nothing Model: There is a compulsion to reach the goal amount. If it is not possible to reach the goal in the stipulated number of days, the fundraiser is nullified and donations are given back to the supporters.

Keep-What-You-Get Model: There is no penalty for not reaching the goal amount. This usually works best for NGOs and medical causes, where no matter the amount, the funds are always useful.

Reward Crowdfunding: Tangible vs. Intangible: Rewards often take the form of tokens of appreciation (artist's autograph, mentioning the donor's name in the credits, T-shirt) or the pre-purchasing of a product or service (the actual invention) according to the contributed amount.

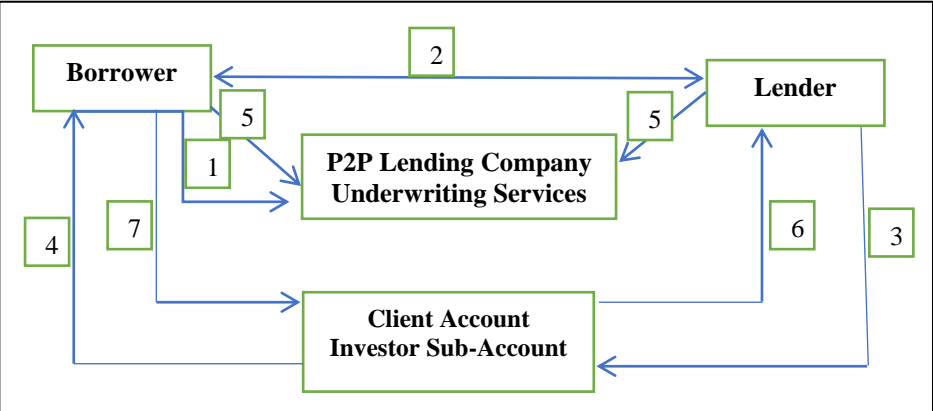
B. Financial Return-Based Crowdfunding Models

Financial return crowdfunding is used for a business motive — to finance the working capital requirement of a firm, expand product lines, purchase a sophisticated facility or anything that is important for advancing the growth of a firm. As previously mentioned, financial return crowdfunding can take many forms depending on the socioeconomic dynamics of a country and characteristics of the fund suppliers.

Debt Crowdfunding: Debt crowdfunding allows funders (lenders) to directly lend to fundraisers or invest in debt obligations issued through a platform. Debt crowdfunding is also known as *lending-based crowdfunding*, *marketplace lending*, or *peer-to-peer (P2P) lending*—terms that are not as broad as debt crowdfunding. Debt crowdfunding is best thought of as a new approach to lending rather than a completely new financial product. By leveraging the internet’s interconnectivity, this form of crowdfunding builds a direct relationship between the funder and the fundraiser.

P2P lending where individual funders lend to individual fundraisers and entrepreneurs. In many cases, the loan is unsecured. Based on the information disclosed by the fundraiser, funders decide to cover all or a certain amount of the requested loan sum (Savarese, 2015). If the campaign is successful, the loan is disbursed to the fundraiser, and later repaid with interest to the funder(s). To mitigate the default risk, some P2P platforms pool, slice, and sell packaged loans corresponding to the risk appetite indicated by the funder.

Figure 4.4: P2P Crowdfunding Model



- Here,
- 1 = Loan Request
 - 2= Identification
 - 3/4 =Loan Payout

5 = Administration Fees

6 = Loan Repayment

7 = Loan Repayment

Peer-to-business (P2B) lending where individual funders lend to SMEs. The loans are not secured. Speed, flexibility, and cost (Savarese, 2015) make P2B lending a viable business funding alternative¹³ that is attractive mostly for start-ups, small enterprises with growth potential, and medium-sized enterprises with specific plans for diversification and expansion to new markets.

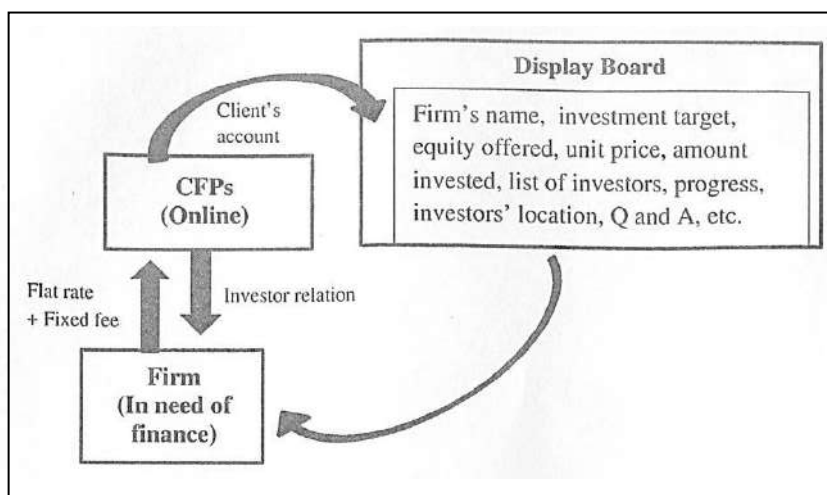
Business-to-business (B2B) lending where the funder is made up of different businesses—often very small companies—that want to lend money for good rates of return. Lending to businesses (both P2B and B2B) may also involve funding of pooled investment vehicles instead of individual businesses. Moreover there is a business to-peer subcategory where large institutional funders provide funds.

Debt crowdfunding platforms are diverse in their operational models, which largely depend on the legal and regulatory framework. Based on categorization introduced by International Organization of Securities Commissions (IOSCO) and other researchers (Kirby and Worner 2014), there are five major operational models of debt crowdfunding: (i) client-segregated account, (ii) balance sheet lending, (iii) notary, (iv) “guaranteed” return, and (v) offline.

Equity Crowdfunding Model: In this model, firms ask the CFPs to post their equity offerings on the campaign pages. Then, they use social media and personal networks to invite investors to buy their shares. Investors become equity stakeholder after buying the shares and receive a dividend as a return on their investment. In this model, investors take the risk of finance and become the “residual claimants” of the investee firm. On the other side, CFPs receive a flat rate from the firms on the amount of funds raised by them. They also receive a fixed fee from the firms for doing the public relation activities on their behalf. This type of crowdfunding is suitable for the startups and young firms as they can receive a large number of non-contractual funds from the crowd in a short span that is

important to augment their growth. Crowdcube in the U.K. is a famous example of this type of platform (Kirby and Worner, 2014). Notably, equity CFPs perform the similar functions that a stock exchange does. Therefore, the application of equity crowdfunding requires the compliance of the security laws of a country to protect investors from frauds and unfair means (Flowchart-6 summarizes the equity based crowdfunding model).

Figure 4.5: Equity-based Crowdfunding Model



Source: Adhikary *et al.*, 2018

Royalty Based Crowdfunding Model: In this model, the fund providers receive a royalty interest derived from intellectual property of fund raising company. Royalty crowdfunding offers backers a percentage of revenue from the project or venture the backer supports, once it is generating capital. A good example of this approach is a mobile app website where backers can support an app before it's fully developed or launched, and then share in the revenue once the app starts selling to the public.

Figure 4.6: Royalty Based Crowdfunding

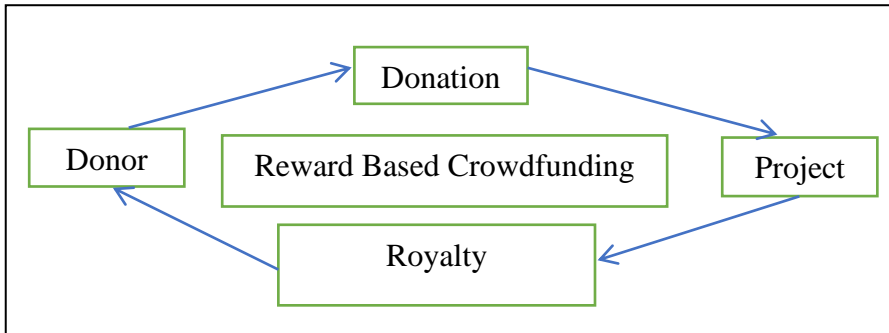
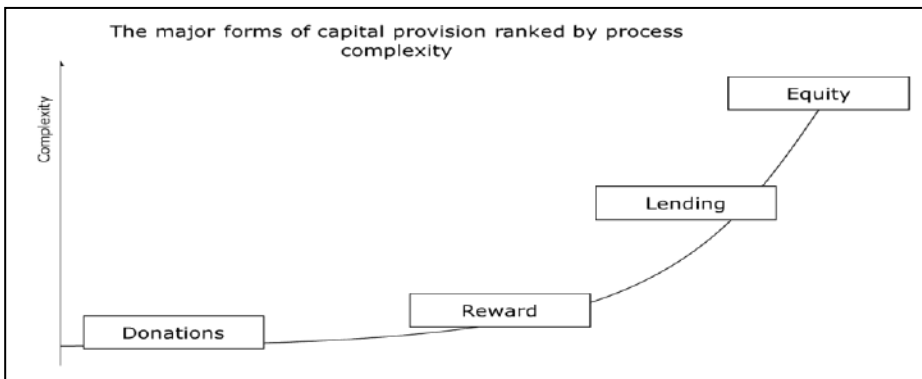


Figure 4.7: Major Forms of Crowdfunding by Complexity

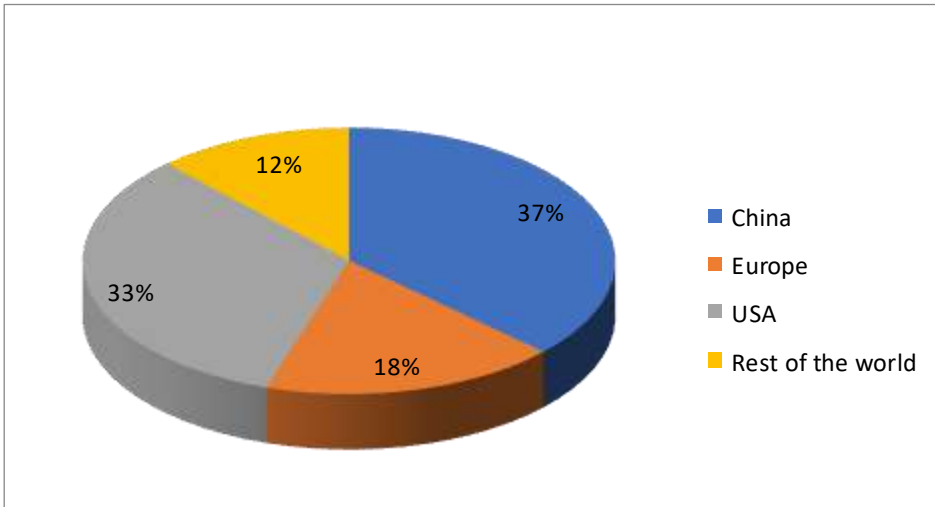


Source: investdor.com

5. The Future and Trend of Crowdfunding

The crowdfunding business first appeared in the UK in 2007, and then developed rapidly in the US market. The Chinese market only started in 2013. With the rapid rise of China's technology finance, the crowdfunding industry has developed rapidly in China. Since 2018, China has surpassed the United States to become the world's largest player. China is the largest region of Crowdfunding in the world in the past few years and it will keep increasing in the next few years. China market took up about 37% the global market in 2018, while Europe and United States were about 18%, 33%.

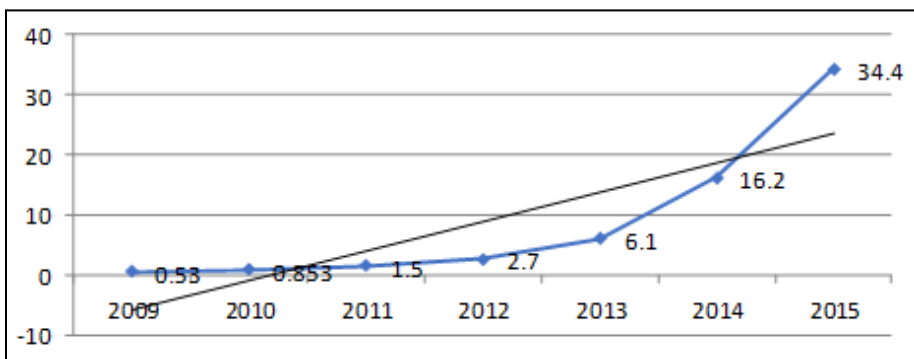
Figure 5.1: Share of Crowdfunding



Source: PRNewswire, 2019

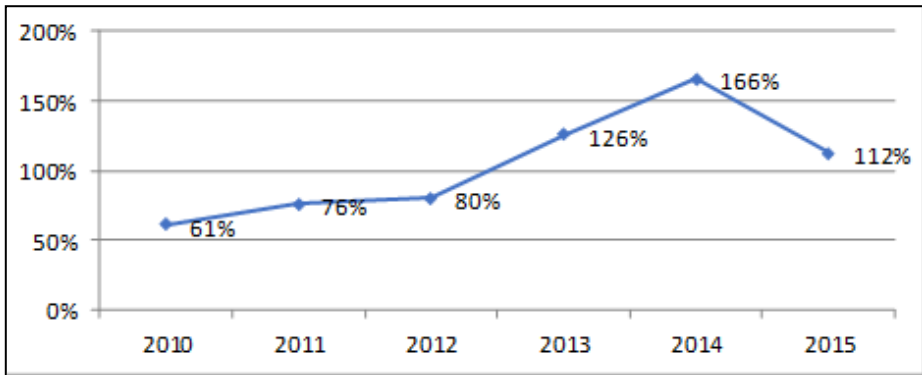
According to the *Global Crowdfunding Market 2016-2020 Report*, crowdfunding market is expected to grow at CAGR (Compound Annual Growth Rate) of 26.87% during the period 2016-2020. Just six years ago crowdfunding reported \$0.853 billion in 2010, showing a relatively small market with minimal growth potential. In 2013, the industry reported \$6.1 billion and expanded by 166% to reach \$16.2 billion in 2014. According to crowdfunding research firm Massolution, the industry earned more than double and reached \$34.4 billion in 2015. If this trend of doubling continues, we'll see \$90 billion by 2017.

Figure 5.2: Trend of Crowdfunding in Billion \$



Source: Adhikary *et al.*, 2018

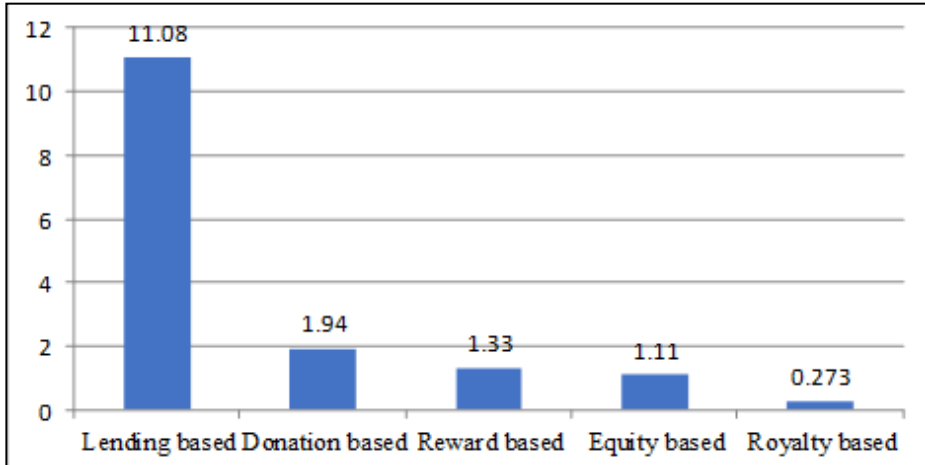
Figure 5.3: % of Crowdfunding Industry Growth



Source: Adhikary *et al.*, 2018

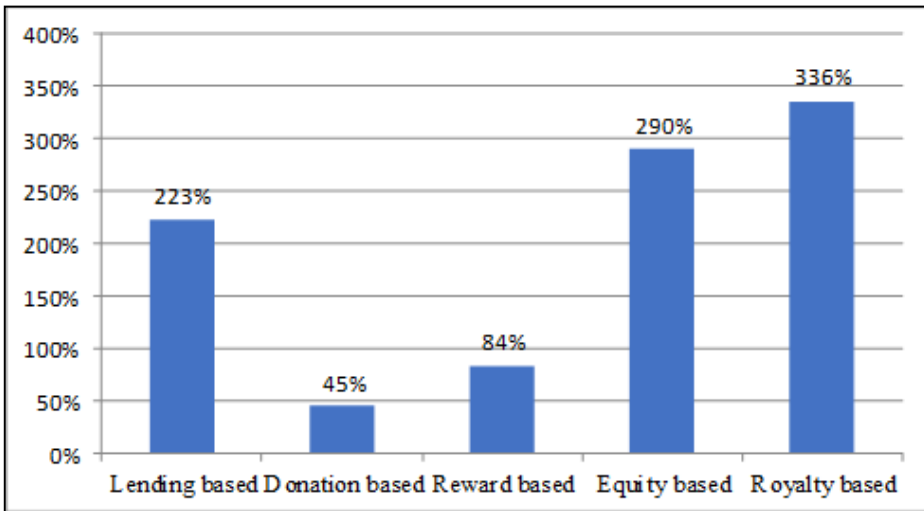
The figure indicates funding volume in \$ billion by forms of crowdfunding. It finds that in 2015, the volume of lending based crowdfunding was the highest by 11.08 billion followed by donation based crowdfunding by \$ 1.94 billion. However, the royalty based crowdfunding was the lowest by \$ 0.273 billion.

Figure 5.4: Funding Volume in \$ Billion by Forms of Crowdfunding



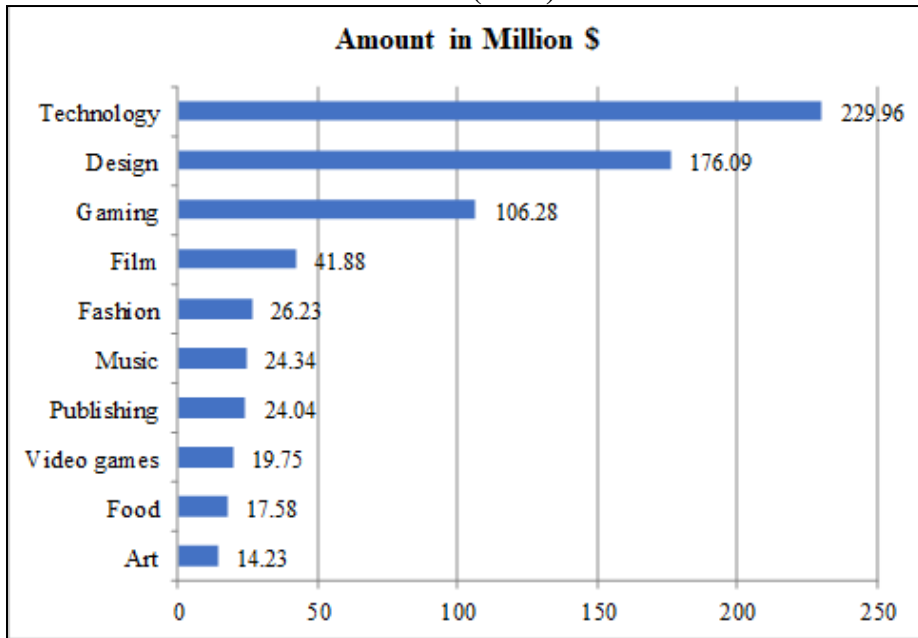
Source: massolution.com (2015)

Figure 5.5: % of Crowdfunding Growth by Types of Crowdfunding



Source: massolution.com (2015)

Figure 5.6: Amount of Money Raised by Crowdfunding Globally by Sector (2016)



Source: Statiastia.com (2017)

6. Risks and Regulations in Crowdfunding

6.1 Risks in Crowdfunding

Although the crowdfunding is playing a more and more critical role in solving the financing problems for startups, we cannot ignore the risks and problems of crowdfunding. In recent years, hackers have demonstrated an alarming ability to break into seemingly secure data repositories of leading retailers and companies and steal credit card details and other valuable client information. A similar risk exists for crowdfunding portals and platforms, which are vulnerable to attacks from hackers and cyber-criminals. The prospects of possible credit card or identity theft from a crowdfunding portal are risks that need to be taken into consideration. The study explains some risks of crowdfunding.

Risk-1: Valuation: Entrepreneurs usually determines the value of the business listed on crowdfunding platforms. However, this may not be accurate representations because startups are usually not as much worth as the entrepreneur thinks. This means that investors may not get the promised return in the absence of a correct valuation.

Risk-2: Inadequate due diligence: In crowdfunding, there is inadequate time for proper and detailed due diligence. This can lead to losses.

Risk-3: Lack of accountability: In crowdfunding, there is not accountability on the part of the startups to ensure that the money is spent wisely or as planned.

Risk-4: Potential lack of financial matter: Equity crowdfunding potentially lacks financial matter. Unlike crowdfunding, investors can choose one to take a seat on the board of the startups in equity financing that enables him to monitor firm's financial decision on behalf of other investors.

Risk-5: Corporate governance: Corporate governance mechanism is missing in crowdfunding and is at the discretion of the entrepreneur.

Risk-6: Lack of structured communication channels: This is an issue that is slowly being addressed by crowdfunding websites.

Risk-7: Lack of entrepreneurship guidance: Crowdfunding lacks entrepreneurship guidance as compared to a typical financing style. The traditional venture capitalists have experience of promoting and managing a business or have broader industry contacts or observation experience. However, the investors of crowdfunding cannot provide such service. Besides, the entrepreneur may be good at researching and developing, but may not be good at marketing and packaging. Moreover, the follow-up financing, as is done by venture capitalists, becomes difficult for the crowdfunding supporters, as they are likely to turn their attention to other startups.

Risk-8: Regulatory risks: Startups may disclose fraudulent information to raise funds. A large number of crowdfunding platforms also do not have perfect supervision system. The purpose of crowdfunding is to make more people to get involved in the projects or startups, but as mode of investing, it may be misused when there is no regulation or have ambiguous regulations.

6.2 Regulations of Crowdfunding

Austria: The main goal of these Crowdfunding platforms is/was to operate beyond the prospectus requirement and to avoid obtaining any license in the sense of the Federal law on Banking (Bankwesengesetz – BWG). Therefore, many Crowdfunding platforms work with the model of silent partnerships. Notwithstanding that, these platforms need to comply with the new Alternative Financing Act (Alternativfinanzierungsgesetz – AltFG), which has been entered into force in 2015.

Bangladesh: No specific regulation has been set. However, the current crowdfunding practices have been conducted under the Contract act-1872 and the Society Registration Act 1860.

Belgium: 2014: first Crowdfunding legislative initiative (the “Crowdfunding Act”) increasing the threshold of the “prospectus exemption” to EUR 300.000 and EUR 1.000 per investor.

2015: the Belgian Government introduced tax incentives in favor of Crowdfunding.

End 2016: the Crowdfunding Platform Act comprehensively regulates the licensing of Crowdfunding Platforms and the use of Financing Vehicles. It further increases the thresholds of the Crowdfunding exemption for licensed Crowdfunding Platforms in the Prospectus law to EUR 300.000 per project and EUR 5.000 per investor.

Bulgaria: In recent years several platforms of the type Peer-to-Peer (P2P) have been developed in Bulgaria. The most famous of them are: Iuvo; Klear; Mintos and Twino. There are no explicit legal regulations for Crowdfunding.

China: From 2015 to the end of September 2016, the central government of China has issued a series of policy announcements to encourage the development of crowdfunding. One of the major policies to boost crowdfunding is the “Internet Plus” initiatives announced on the 5th of March 2015 the aim of which was to help China achieve a digital economy. The plan is to integrate’ internet, cloud computing, big data, and the internet of things with traditional manufacturing and consumer industries” (The State Council of the People’s Republic of China, 2015). Under the Internet Plus action plan, allowing traditional financial institutions and alternative financing such as crowdfunding to carry out financial activities with the use of internet technology.

Croatia: There are no explicit legal regulations for Crowdfunding.

Cyprus: There have been no developments in Cyprus regarding Crowdfunding regulation, which remains largely under-developed.

Czech Republic: Under the new Consumer Credit Act, consumer loans providers and intermediaries must obtain a license from the Czech National Bank. New Corporations Act enables more flexible structure of target companies using Equity Model. No new regulation is expected in the near future.

Denmark: Danish Growth Fund and the Danish Crowdfunding Association published a report regarding the Danish Crowdfunding market in 2016. According to the report, Crowdfunding has experienced a rapid growth over the last few years, with reward-based and lending based Crowdfunding being the most popular in Denmark.

Finland: The Finnish Crowdfunding Act (“CFA”) took effect in 2016, laying down provisions on acquiring, offering and professionally mediating Crowdfunding using the Lending Model and Equity Model.

France: New crowdfunding regulation applicable since 1 October 2014 and significantly amended since 28 October, 2016.

Germany: first Crowdfunding regulation (Retail Investors' Protection Act - Kleinanlegerschutzgesetz) entered into force on 10 July, 2015.

Greece: Law 4416/2016 came into force on September 6, 2016, enabling the public offering of securities through equity Crowdfunding platforms without a prospectus, so long as the platforms are operated by licensed investment firms, local AIFMs following prior notification to the HCMC or the BoG, respectively.

Hungary: no recent developments in the Hungarian Crowdfunding regulation, except the non-binding guidelines of the Hungarian National Bank in relation to Crowdfunding.

Ireland: Currently no bespoke regulation of Crowdfunding in Ireland. Public consultation launched on 21 April 2017 regarding the potential regulation of Crowdfunding in Ireland

Italy: Law 33/2015: allowing also Innovative SMEs and investment funds to raise funds by means of online Crowdfunding platforms.

India: Rewards based crowdfunding *is free from the regulatory framework of SEBI. However,* the Securities and Exchange Board of India (SEBI) has issued laws on digital equity crowdfunding in India as “unauthorized, unregulated and illegal. Again, SEBI has proposed guidelines for crowdfunding aimed at improving access to funds for start-ups and small-to-medium enterprises.

Netherlands: Enhanced Crowdfunding regime for non-transferable loan Crowdfunding platforms. Dispensation for ban on taking commissions by MiFID license Crowdfunding platforms

Poland: Poland has not yet adopted any regulations that would specifically concern crowdfunding in any of its models.

Romania, Slovakia: Is on the way of crowdfunding regulations.

Spain: Crowdfunding platforms operating the Equity model and the Lending model are regulated for the first time by the Promotion of Corporate Finance Act 5/2015 of 27 April

Switzerland: Proposed amendment of the Banking Act and Banking Ordinance to ease the Swiss regulatory framework for FinTech providers – including Crowdfunding.

United Kingdom: The FCA is currently in the process of concluding a post implementation review of its Crowdfunding rules which commenced in July 2016.

United States: If a company would like to offer and sell securities through crowdfunding, they must comply with the federal securities laws. Under the federal securities laws, any offer or sale of a security must either be registered with the SEC or meet an exemption. Regulation Crowdfunding (2017) of USA provides an exemption from the registration requirements for securities-based crowdfunding allowing companies to offer and sell up to \$1.07 million of their securities without having to register the offering with the SEC.

Regulation Crowdfunding enables eligible companies to offer and sell securities through crowdfunding. The rules:

- require all transactions under Regulation Crowdfunding to take place online through an SEC-registered intermediary, either a broker-dealer or a funding portal
- permit a company to raise a maximum aggregate amount of \$1,070,000 through crowdfunding offerings in a 12-month period
- limit the amount individual investors can invest across all crowdfunding offerings in a 12-month period and
- require disclosure of information in filings with the Commission and to investors and the intermediary facilitating the offering

Securities purchased in a crowdfunding transaction generally cannot be resold for one year. Regulation Crowdfunding offerings are subject to "bad actor" disqualification provisions.

7. Cases of Crowdfunding

Mini Case-1: Dhaka Ahsania Mission (DAS)³ established in 1958 with the mandate of 'Divine and Humanitarian Service'. The last product of DAS was Ahsania Mission Cancer Hospital which was started in 2005 and inaugurated in 2014. Ahsania Mission Cancer Hospital was a community based crowdfunding project with Tk. 4189.14 million that collected through donation and reward based crowdfunding model (e.g. issuing lottery ticket). Agrani Bank Ltd. and Sonali Bank Ltd. are the linking partner of Ahsania Mission Cancer Hospital.

Source: http://www.ahsaniacancer.org.bd/donation_request.php

Mini Case-2: Kidney Foundation of Bangladesh was started in 2003 with TK = 75000/- as capital investment and six dialysis machines on loan under the Societies Act 1860. The Kidney Foundation Hospital (at Mipur, Dhaka) is also an example of community based crowdfunding model. They received donation from different organization and individual persons Tk. 2.64 crore and donation in Jakat fund Tk. 24.12 Lac in one year (2015-16).

Source: <https://www.kidneyfoundationbd.com/donation/donator>

Mini Case-3: Anjuman Mufidul Islam was founded in 1905, in Calcutta, British India, as a voluntary, non-profit and non-political social welfare organization (Registered Under Societies Registration Act of 1860). Anjuman was established in Dhaka, in September 1947 after the independence and partition of British India as a branch of Calcutta office. The last project of Anjuman was 'Tower Project' with 15 stored building on 30 Khatha at Kakrail, Dhaka completed in 2018 by Tk. 90 crore which has been raised though public donation. It is an

³Established in 1958 with the mandate of 'Divine and Humanitarian Service Dhaka Ahsania Mission (DAM) is now one of the leading voluntary development organizations in Bangladesh. Dhaka Ahsania Mission, a registered non-profit, non-government, non-political, voluntary and charitable society is incorporated in Bangladesh under the Society Registration Act, 1860.

example of donation based crowdfunding. They collect donation from public trust fund⁴, donation for Sadaqa and Jakat, and general donation.

Source: <http://www.anjumanmibd.org/index.htm>

Mini Case-4: UNDP started a crowdfunding platform in Bangladesh titled 'Youth Employment through Skills' (YES) in October 2016. In six months, after a successful pilot in the capital Dhaka's Korail slum, UNDP helped students who were barely familiar with computers to transform into IT freelancers, earning an average of \$100 USD per month (UNDP, 2016).

Mini Case-5: However, for the first time in Bangladesh, fundsme.com.bd a web based crowdfunding platform has brought together entrepreneurs and investors by BD Venture with partial grant from Nathan Associates, UK. It came into bring/market in September 2018. fundsme.com.bd is a virtual market for entrepreneurs and investors where the former places their interesting and profitable business proposal for getting invested and the later investors invest by their choice.

BD Venture uses mainly two mode of investment one is equity based and another one is reward based. In equity based model (Maximum BDT 10 million) the entrepreneur can raise money from the investors by offering share of their existing / proposed limited company or partnership firm. In reward based model (Maximum BDT 2 million), prior investment is required for the product of service offered or to be offered. It is similar to advance sale.

If any entrepreneur plans to get investment in his/her business, then he/she should register into the website with personal details viz. valid email, contact no., address, NID, trade license, etc. Then he/she has to start a crowd funding campaign by providing information about his business nature, operation, financial status with a video (The video returns to the prospective investors) into the platform. Alternatively the

⁴ A donor can create a Trust Fund by donating a sum of at least 5. lac (Five lac) Taka at a time. This sum will be invested by Anjuman and every year 20% of the income will be added to the capital. The capital will thus continue to grow. The remaining 80% of the income will be used by Anjuman for financing its humanitarian services. The donor will be informed every year about the fund position and use of the income.

entrepreneurs can also send their details in fundsme Facebook page or via email. Fund SME manages the remaining job proactively. After getting the application and details, fundsme evaluates the funding eligibility and conduct necessary correction and due diligence. If everything is in order the selected project will be uploaded on their website and will be open for investment. Fund SME does not deal in financial transactions. The investors will directly make financial transaction with the entrepreneurs. They only act as an intermediary between investors and entrepreneurs. They will charge a certain amount of commission on this investment.

Source: Personal Interview with BD Venture

Mini Case-6: Fundraising for the Statue of Liberty's Pedestal

SOFII's view: It's hard to imagine being in New York without the Statue of Liberty. Yet that would have happened without the inspiration of one man, Joseph Pulitzer, who realised that if you inspire thousands of ordinary people and give them a sense of pride you will raise incredible amounts of money for worthwhile causes.

Creator/Originator: Joseph Pulitzer, *The New York World*.

Summary/Objectives: To raise enough funds (\$200,000 in 1885, equivalent to \$2.3million today) to build a pedestal for the Statue of Liberty to stand on.

Background: The Statue of Liberty was a gift from France to America and was to be placed on a pedestal on New York harbor paid for by America. When the statue reached New York, the New Yorkers had not managed to raise enough funds because the wealthy philanthropists and the government were not willing to fund it. The statue lay in crates for over a year and it was a great shame for New York. Other cities, such as Boston and Philadelphia, were willing to fund it but only in exchange for the statue.

Joseph Pulitzer stepped in and, through his newspaper *The New York World*, ran a fundraising campaign targeted to working-class Americans and promised a reward. He promised to publish the name of every individual who donated on the front page of *The World*, no matter how small the amount. There was a clear reward system: any

donation of \$1 received a 6-inch replica of the statue and it was a 12-inch statue for each \$5 donation. People saw others give so they gave too, it was a ripple effect. By autumn 1885, within six months of launching the appeal, over 120,000 people had donated over \$100,000, \$2.3million today, with most donations being under \$1. Not only that but his paper’s circulation increased by 50,000.

Special Characteristics

- Perhaps the earliest example of crowdfunding.
- In-depth understanding of target audience, tapping into the basic need for sense of recognition, by promising rewards and making them part of history. Also making the working class feel powerful, mocking the stinginess of the wealthy.
- A tangible outcome.
- Regular updates and caricatures to engage and keep donors inspired.

Source: <http://sofii.org/case-study/fundraising-for-the-statue-of-libertys-pedestal>

Notably no banks or other NBFIs do practice crowdfunding in Bangladesh.

8. Funding Situation of Bangladesh- A Survey Findings

8.1 Sources or Means of Raising Fund in Banks

Most banks raise significant portion of their fund from some known sources, such as the deposit, borrowing from other banks, issuance of bonds, shareholders’ equity and refinance schemes (Table-8.1). Crowdfunding is yet to be explored by the banking sector of the country.

Table 8.1: Sources or Means of Raising Fund in Banks

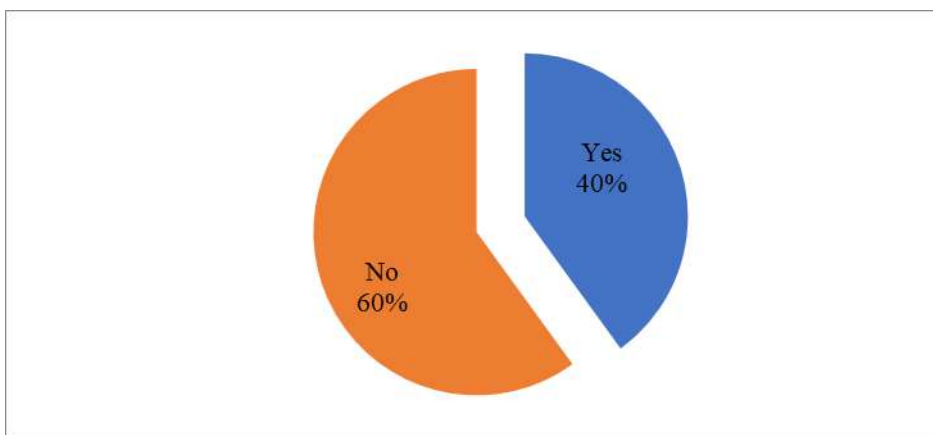
Sources of Fund	% of Banks
Deposit	100
Borrowing from Other Banks	95
Issuance of Bond/ Debenture	80
Foreign Currency Loan	65
Shareholders’ Equity	100
Crowdfunding	0
Refinance Scheme	95

Source: BIBM Survey, 2019

8.2 Problems Faced by Banks in Sourcing/ Raising Fund

According to survey response, around two-fifth of the banks Bangladesh faced problems in raising funds for banking business. Problems mentioned by the banks in raising fund are shown in the Table-8.2. These problems range from low interest rate to lack of transparency. For successful banking operation these needs to be addressed.

Figure 8.1: Problems Faced by Banks in Sourcing/ Raising Fund



Source: BIBM Survey, 2019

Table 8.2: Problems Mentioned by the Banks in Raising Fund

Problems:

- Interest rate of Government Savings Certificates is higher than bank's deposit rate.
- Lack of financial literacy among the depositor or investors.
- Absence of central platforms to promote Banks' funding project.
- Absence of central platforms to allow possible investors to evaluate all banks.
- Lack of transparency.
- Overall liquidity shortage in the banking industry.
- Lengthy regulatory procedure for raising fund through bond issuance.
- Existence of too many banks compared to the economic volume of the country.

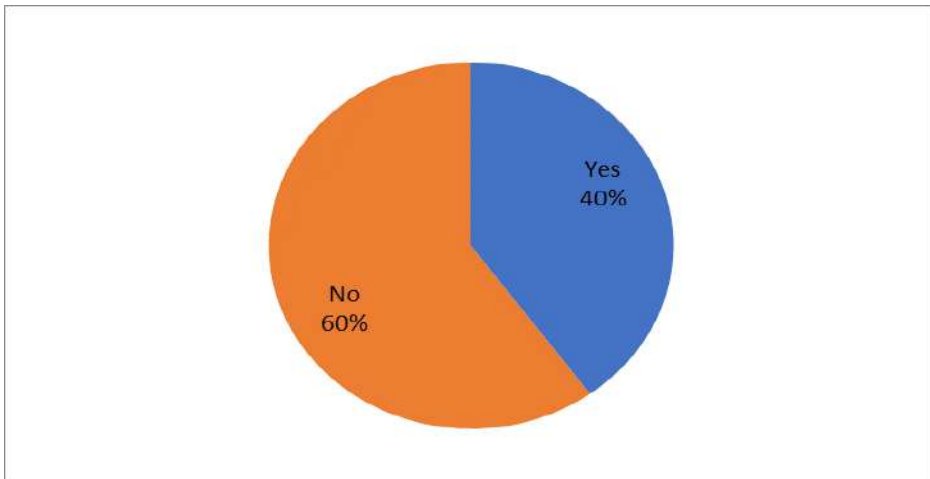
- Unhealthy competition among banks.
- Volatile money market/capital market.
- Banking habit of the people in which most people prefer cash transaction.
- Absence of developed bond market.
- Absence of fixed deposit rate centrally.
- Weaker capital market also impacts the bank's ability to raise its capital smoothly.

Source: BIBM Survey, 2019

8.3 Raising Fund is Considered as a Challenge in Banks in Bangladesh

According to this survey, around two-fifth of the banks which participated in the survey stated that fund raising is a big challenge in Bangladesh. Another three-fifth of the banks, mainly represented by the state owned and first generation banks, did not find it challenging task for them (Figure-8.2).

Figure 8.2: Raising Fund is Considered as a Challenge in Banks



Source: BIBM Survey, 2019

8.4 Suggestions to Resolve the Problems in Sourcing Funds

Alongside the identification of the problems, survey respondents also identified some remedies to the problems identified. These remedies are summarized in the Box-8.1.

Box 8.1: Suggestions to Resolve the Problems in Sourcing Funds

- Interest rate on Government's Savings Certificates should be lower than the deposit rate
- FDRs may be allowed as investments like savings certificates for tax rebate
- Government may support the financial inclusion programs of banks
- Reducing government borrowing through savings certificate
- Taking initiative to develop strong bond market
- Collecting low cost foreign fund
- There should be disincentives for cash transactions
- Deposit rate should be equal in the banking sector
- Making customers aware banks' rating

Source: BIBM Survey, 2019

8.5 Plan to Try New Sources or New Products for Raising Fund

Three-fifth of the banks stated that they have a plan to try a new source raising fund to get rid of the ongoing problems of raising fund (Table-8.3). However the remaining banks are not interested about new sources of raising fund. Rather they are in favor of accentuating the deposit collection drive from through financial inclusion and other measures.

Table 8.3: Plan to Try New Sources or New Products for Raising Fund

Category	Response (%)
Yes	60
No	40

Source: BIBM Survey, 2019

8.6 Awareness about Crowdfunding as a Source of Fund

Banks were asked about their awareness regarding the crowdfunding as a source of fund. Slightly over half of the banks said that they were aware about the concept of crowdfunding (Table-8.4). Remaining banks stated that they were not aware about the concept of crowdfunding. It is mentionable here that banks are yet to involve in crowdfunding process.

Table 8.4: Awareness about Crowdfunding as a Source of Fund

Category	Response (%)
Yes	55
No	45

Source: BIBM Survey, 2019

8.7 Advantages of Crowdfunding over Traditional Sources Funds

Slightly over half of the respondent banks who were aware about the concept of crowdfunding were asked to cite some advantages of crowd funding as a source of raising fund. Advantages stated by the banks are summarized the Box-8.2.

Box 8.2: Advantages of Crowdfunding over Traditional Sources Funds

- Crowdfunding is a faster way to raise funds with no upfront fees.
- It is a valuable form of marketing and would allow banks to showcase their strengths.
- Unconventional projects may be financed more easily through crowdfunding.
- It is an alternative source of fund for people those who faces difficulty in getting bank loan.
- Through crowdfunding process a bank may get loyal customers in future.
- Crowdfunding has no boundaries in contrast to traditional source of funding does.
- Crowdfunding is less time consuming and an inexpensive mode of fund raising.
- It works as evidence that the idea is credible as a many people evaluate the idea.
- Crowdfunding allows investors to select from hundreds of projects and can invest in projects requires little fund.
- Crowdfunding projects can get huge amounts of fund through social media.

Source: BIBM Survey, 2019

8.8 Disadvantages of Crowdfunding Compared to Traditional Sources of Funds

Slightly over half of the respondent who were aware about the concept of crowdfunding were asked to report some disadvantages of crowd funding as a source of raising fund. Disadvantages stated by the banks are summarized the Box-8.3.

**Box 8.3: Disadvantages of Crowdfunding Compared to
Traditional Sources of Funds**

- There is an initial marketing cost before launching a crowdfunding project.
- Banks may face reputational loss if enough funds are not raised or less revenue is earned.
- It is still at a nascent stage of development.
- Difficulty in shaping exit routes for the investors.
- Uncertain rate of return for the investors.
- Problem of distinguishing good or bad investment projects.
- Lack of due diligence in the absence of proper guidelines or framework.
- Public display of an idea enables the risk of others copying it.
- Business idea of a complicated product will find it harder to crowd fund.
- Lack of awareness about the product.
- Online platform fraud is major concern.
- The fund raising procedure may long time.
- More suitable for startup business rather than banks.
- Business idea should be protected by copy right which is still missing.
- Business idea has to be shared before launching actual operation.
- The business idea needs to be interesting and innovative to attract fund.
- Failed fundraising effort may cause damage to the reputation of the banks.
- Crowdfunding is not yet popular source for fund raising in Bangladesh.

Source: BIBM Survey, 2019

8.9 Steps Followed in Banks for Introducing New Funding Source

Banks are different in terms of organizational structure and new product approval process. As such, the number of steps taken to introduce a new source of fund widely varies across the banks. However, some common steps are mentioned be in the Box-8.4.

**Box 8.4: Steps Followed in Banks for Introducing
New Funding Source**

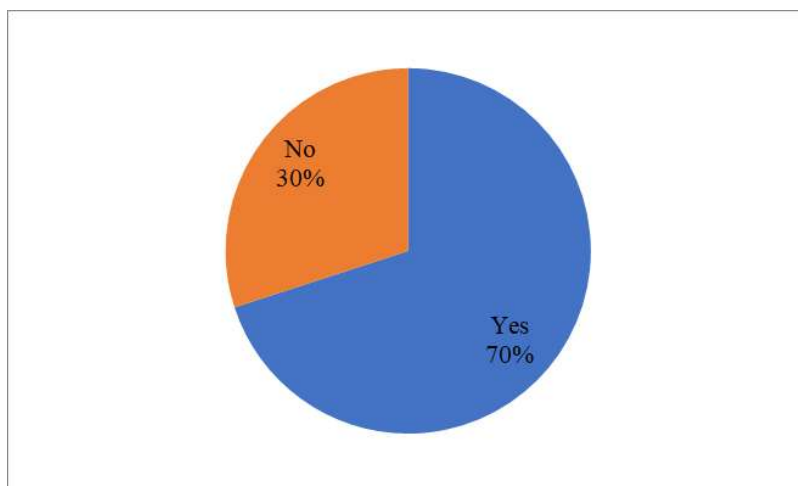
- Identifying the need for a new source of new fund
- Analyze the idea of the new source of fund or product
- Conduct gap analysis with the existing product
- Prepare feasibility test of the product
- Approval form the competent regularity authority
- Prepare Product Program Guidelines
- Train the official about the new product
- Launch the product
- Promotional activities
- Analysis of the CBS capability to run the new product
- Risk assessment with the product
- Piloting the acceptability among the customers
- Discuss with Senior Management Team
- Take approval from Board of Directors
- Fix the target and achievement strategy
- Engage team for marketing campaign and field work

Source: BIBM Survey, 2019

8.10 Crowdfunding as a New Source of Raising Fund in Banks

Slightly over two-thirds of the banks stated that there is scope to use crowdfunding as a new source of fund by banks in Bangladesh (Figure-8.3). However, a regulatory framework will be needed prior to initiate this type of method for collecting funds by banks.

Figure 8.3: Crowdfunding as a New Source of Raising Fund in Banks

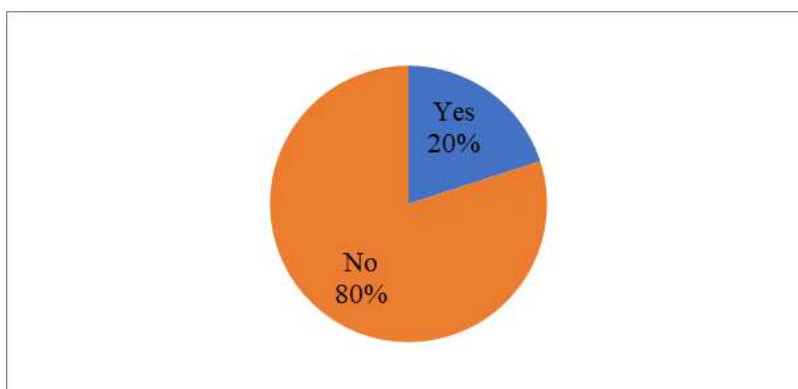


Source: BIBM Survey, 2019

8.11 Plan to Introduce Crowdfunding as A New Source of Fund in Next Two Years

In response to a question regarding their readiness to use crowdfunding as a new source of fund within two years, four-fifth of the banks responded negatively (Figure-8.4). Only a fifth said that they may use this method of raising fund in their banks.

Figure 8.4: Plan to Introduce Crowdfunding as a New Source of Fund in Next Two Years



Source: BIBM Survey, 2019

8.12 Challenges in Introducing/ Using Crowdfunding as A New Source of Funds in Banks

Though the banks are not experienced in the use of crowdfunding as a source of fund, they are suspecting many challenges which are summarized in Box-8.5. These challenges were captured from the questionnaire survey conducted for this purpose.

Box 8.5: Challenges in Introducing/Using Crowdfunding as A New Source of Funds in Banks

- Managing fraud risk
- Lack of due diligence
- Money laundering risk
- Lack of transparency
- Return is not guaranteed
- Funding target may not met
- Gaining the trust of prospective investors
- Reputational risk for banks, if enough fund is not raised
- Asymmetric information
- Lack of knowledge of the borrower and lenders about the process
- Fund diversion may take place
- Absence of regulation and regulatory authority
- Lack of expertise in crowdfunding
- Too many decision makers
- Lack of educated and well-informed investors
- Deciding about the rewards to crowd funders is a challenge.
- Getting permission from regulatory bodies like Bangladesh Bank and /or BSEC
- Maintaining confidentiality of the investor's idea
- Choosing and designing the right platform
- Managing legal compliance and accounting issues

Source: BIBM Survey, 2019

9. Issues for Discussion

Issue-1: “*Trust*” is one of the key foundations of crowdfunding. However, trust cannot be built overnight. It is an abstract belief deeply rooted in the society. If trust seems to be very fragile in the society, the cause of higher chances of malpractices will be rooted in crowdfunding. In contrast, “transparency and accountability” may serve as a proxy for trust as they tend to reinforce each other and improve decision-making quality. Therefore, Bangladesh first needs to ensure transparency and accountability in the crowdfunding system to make the industry successful.

Issue-2: Crowdfunding is largely an internet phenomenon that is not free from *cyber-attack and other fraudulent* activities such as money laundering and terrorism financing. Therefore, government and individual crowdfunding platform should take the initiative to check and prevent such threats and dishonest practices by formulating necessary laws and regulations.

Issue-3: Crowdfunding is used for financing the small firms and technology incubators that tend to have tended to lower success rate. Thus, investors may incur a capital loss in the *absence of proper risk mitigating techniques*. Thus, policy making institutions must institute proper risk mitigating techniques. One of the risk mitigating techniques could be to build an “investors protection fund” by taking a flat rate on the funds raised by the firms through CFPs.

Issue-4: “*Close relationship*” is another foundation in crowdfunding system as it tends to reduce agency costs. Thus, investors, local banks, CFPs, and entrepreneurial firms need to be integrated for achieving a common goal. To this process, the government should serve as a facilitator by extending necessary formal and informal supports.

Issue-5: The Muslim community constitutes almost 90% of the population in Bangladesh. On religious rule, they pay “Zakat”, a certain percentage of the income donated to the poor people, every year. A portion of this Zakat money can be used to form a “donation-based” crowdfunding, as interest is prohibited under the Islamic Law. Islamic Banks in Bangladesh can take the pioneering role in this respect.

Issue-6: Simultaneously, a *lending based crowdfunding approach* by interconnecting banks can be adopted to provide finance to the small firms.

Issue-7: Last, but not the least, credible crowdfunding ecosystem requires more than entrepreneurs and willing investors. Supportive factors include, among other things, forward thinking regulations, effective technological solutions, strong social media, and regulated online markets. Furthermore, accumulation of knowledge constantly being with the developed economies is indeed important to make the crowdfunding ecosystem more efficient and appropriate to country needs.

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Appendices

Appendix Table 1: List of Popular Crowdfunding Platforms in 2016

Name	Industry Focus	Model	Service Charge	Setup Year	Country
Kickstarter	Art, Comics, Dance, Design, Fashion, Film, Food, Games, Music, Photography, Publishing, Technology	Reward	Flat, 5% on raised capital	2009	USA
Indiegogo	Education, Technology, Film, Medicine, Medical Expense	Donation/ Reward	Flexible, 4-9% based on success of goals plus 3.5% for credit card processing	2008	USA
Justgiving	Charities, Gift, Medical Illness, Sports, Natural Disasters	Donation	Flat, 5% of raised Capital plus credit card processing fees		UK
GoFundMe	Medical Illness, Game, and Accidents	Reward/ Donation	Flat, 5% of donated amount	2010	USA
Ulule	Unique projects in areas of art, technology, Sports, Films or humanities	Reward	Flexible, 5-6.87% based on raised capital	2010	France
Lufax	Any business products and Ideas	Peer-to-peer Lending	Flat, 4% of each fund (loan)	2011	China

Name	Industry Focus	Model	Service Charge	Setup Year	Country
Fundrazr	Medical Care, Memorials, Animal Rescue	Reward	Flat, 5% of each fund	2008	Canada
Lending Club	Personal Loans, Trading of loans in the secondary market and IPOs	Peer-to-peer Lending	Return on loans is 5.47-10.22%	2006	USA
Prosper	Any loan products	Peer-to-peer Lending	Average return on loans is 10.69%	2005	USA
Yooli	Loans for Chinese microfinance investors	Peer-to-peer Lending	Average return on loans is 15%	2012	China
Jimubox	SME loans and individual consumer loans for Chinese Borrowers	Peer-to-peer Lending	Borrowers: 2.5% (personal loans only) and 0.75-2% for account management From lenders: 10% of interest returns and 0.5% for service fees	2013	China
RateSetter	“Provision Fund”- an internal fund to ensure against borrower default, and personal loan	Peer-to-per Lending	Average return on loans is 3.1-5% depending on amount of loans	2009	UK
Zoipa	“One size fits all” strategy. Any business and personal loan	Peer-to-per Lending	Return on loans is 6.5% for Zopa core, and 6.1% for Zopa Plus	2005	UK
CrowdCube	Equity and bonds to business	Equity /Lending	Return on bond is 6.5-8.00% Equity: varies by projects 10-26%	2011	UK
Funding Circle	Any business loans	Peer-to-per Lending	Return on loans is 6.5% for A+ grade loans	2010	UK
OurCrowd	Equity to early stage startups	Equity	-	2013	Israel
Equity Net	Equity to small business	Equity	-	2005	USA
Angelist	Technology startups that need seed funding	Equity	-	2010	USA

Name	Industry Focus	Model	Service Charge	Setup Year	Country
YouCaring	Personal, Medical, and Charitable Causes	Donation	No fees. Donation charge 2.9% of the fund plus \$.30 per transaction	2011	USA
RocketHub	Music, Comics, scientists, Game, Film, Photography, Publishing, and Philanthropy	Reward	Flexible, 4-8% based on the success of campaigns plus 4% for credit card processing	2010	USA
Alibaba		B2B		1999	China
Others					
Fundable, GoGetFunding, Patreon, Crowdfunder, CircleUp, Crowdfunder UK, Companisto, Campfire, Milaap, Crowdo, CrowdPlus, Modian, DemoHour, Jingdong, Suning					

Source: Compiled by authors' authors' from the website of individual CFP

Figure 2.1: Client Segregated Model

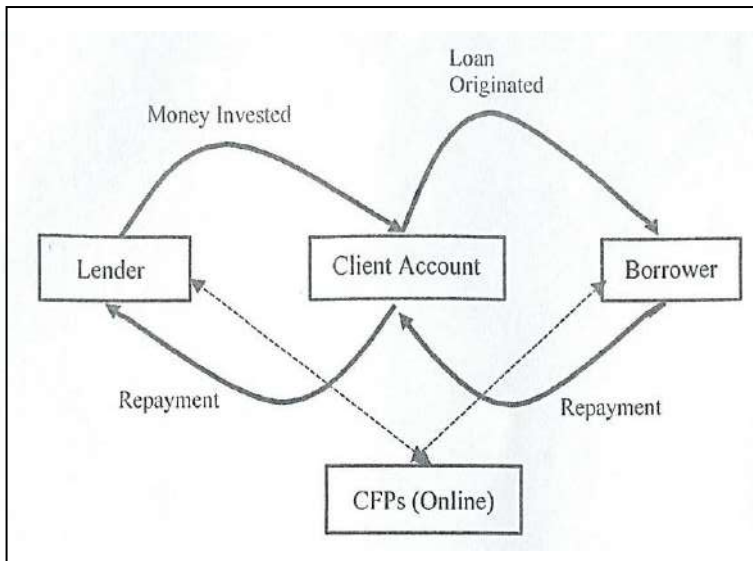


Figure 2.2: Notary Model

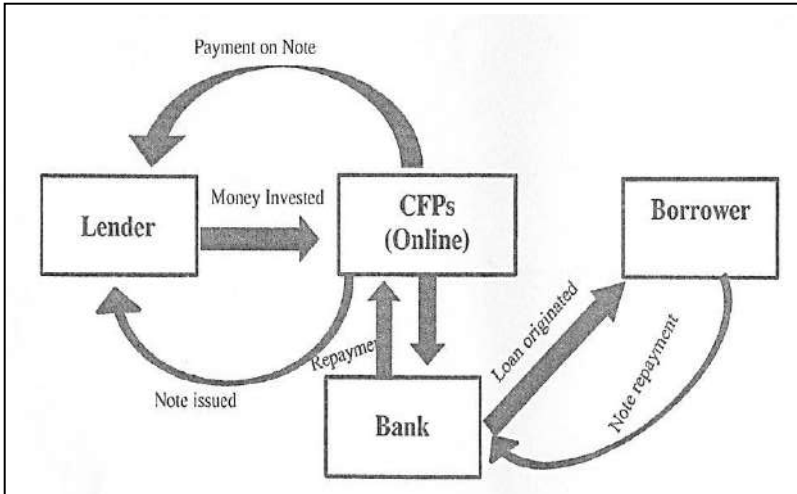


Figure 2.3: Guaranteed Return Model

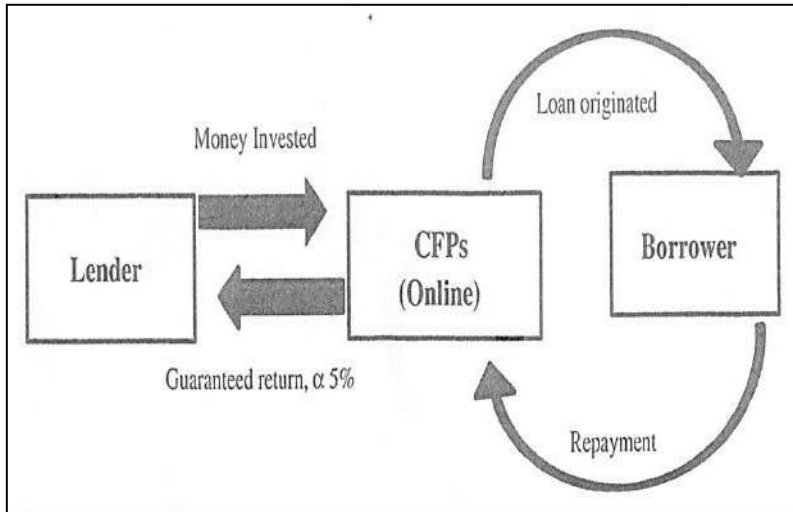
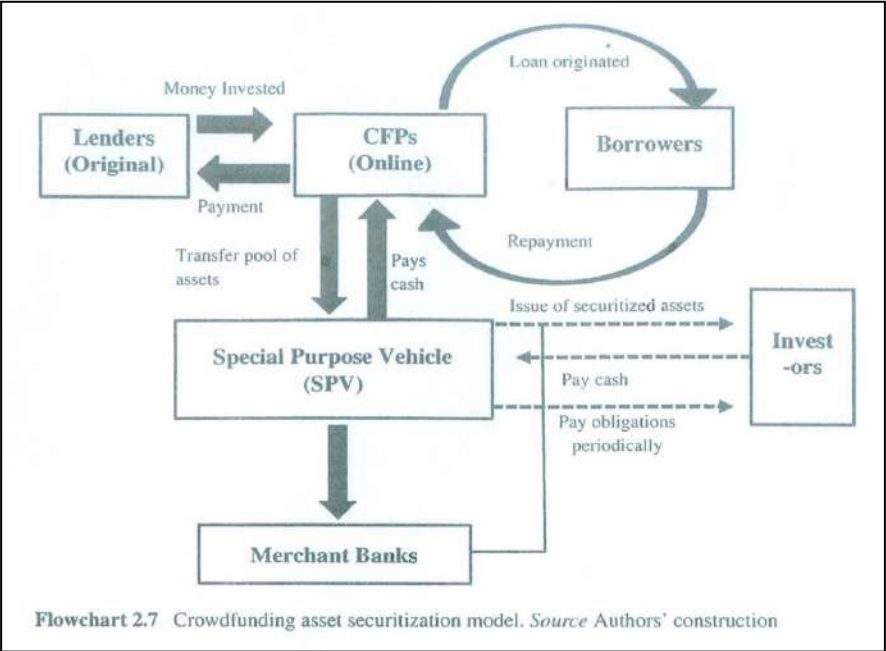


Figure 2.4: Crowdfunding



Appendix 3: Summary of Roundtable Discussions “Crowdfunding and its Implications in Bangladesh”

Bangladesh Institute of Bank Management (BIBM) organized a roundtable discussion “Crowdfunding and its Implications in Bangladesh” on October 02, 2019. Mr. S. M. Moniruzzaman, the then Deputy Governor, Bangladesh Bank as well was present as the Chief Guest in the roundtable discussion. A number of participants from different banks and NBFIs, faculty members of BIBM, and journalists have attended the roundtable discussion.

Dr. Prashanta Kumar Banerjee Professor and the then Director (Research, Development & Consultancy), BIBM delivered his address of welcome and explained the purpose of the roundtable discussion. After the welcome address, the roundtable discussion was inaugurated by the honorable chief guest Mr. S. M. Moniruzzaman, the then Deputy Governor, Bangladesh Bank as well. Then Dr. Mohammad Tazul Islam, Associate Professor, BIBM has presented the keynote paper on the above mentioned title. Other members of the research team are Mr. Atul Chandra Pandit, Associate Professor, BIBM, Ms. Rahat Banu, Assistant Professor, BIBM and Dr. Bishnu Kumar Adhikary Associate Professor, Doshisha University, Japan.

Mr. S. M. Moniruzzaman, the then Chairman, BIBM Executive Committee and Deputy Governor, Bangladesh Bank

He said, you are aware that there are different ways by which an organization can raise funds. In our country, banks raise funds from shareholders equity, deposits, money market borrowings, foreign currency loans, refinance schemes, bond and debentures. Deposit still remains as the main source of raising operating fund for banking business in the country. However, a massive shift in fund raising has already taken place as new technology continues to take over. Crowdfunding is a type of alternative funding method in which a project or venture is financed by raising small amounts of money from a large number of people, typically via the Internet. There exists four pre-defined crowdfunding business models – donation based, reward based, equity based, and lending based. Dhaka Ahsania Mission (DAS), Kidney Foundation Hospital, Anjuman

Mufidul Islam are some bright examples of donation based crowdfunding model.

Although the crowdfunding is playing a more and more effective role in solving the financing problems for startups, we cannot ignore the risks and problems of crowdfunding. Crowdfunding portals and platforms are equally vulnerable to attacks from hackers and cyber-criminals. Building “Trust” is one of the key aspects of crowdfunding which may not be very easy for us. We are yet to have regulations in this regard. However, it is a timely initiative to create awareness among the citizens of the country.

Lastly, he will requests the participants to actively take part in the roundtable discussion and share their precious comments/suggestions/opinions. It is expected that researchers will include discussants’ and participants’ suggestions and comments while finalizing the roundtable key note paper. At the end, he would like to expresses thanks to the authors for their key note paper. Once again I sincerely appreciate the effort of BIBM and wish them success in their pursuit of enlightenment.

Mr. Mazher, BD Venture Ltd.

He explicated that match-making between lender and borrower is the main function of a crowdfunding platform. Customer education is also important in the entire process. Projects are placed in the website and crowd can assess the potentials and express their intent to invest or not to intent. It has a social impact too. Small businesses rarely get fund from formal bank. Islamic minded customers may directly invest in the business rather than deposit they dislike. Risky(start-ups) customers may be sent to these crowdfunding platforms by banks. Crowdfunding is different from MLM in much respect.

Mr. Md. Yasin Ali, Former Supernumerary Professor, BIBM

He stated that crowdfunding should be properly defined first. Who has given the definition of crowdfunding? It must be clearly defined first. Is the IPO being a crowdfunding? Escrow account is a trust account. Securitization of Jumna Bridge may be a source of fund. Crowdfunding may be used for philanthropy. Good examples in Bangladesh are all related to the philanthropic initiatives not in profitable business.

Crowdfunding may be donation based in a Bangladesh. If we want to use it for the profitable business purposes, proper regulatory framework is a must. Moreover, crowdfunding should be properly licensed to formalize the model for the profitable business. Fund may be misused by the fraudsters. Bank's role is limited to only intermediation between investor and borrower.

Mr. Helal Ahmed Chowdhury, the then Supernumerary Professor, BIBM

He said that it is new in the formal sector but was common in the micro level. Various organizations was using lottery to raise public fund. It has two dimensions-charity and profit motive. Escrow is maintained in a third bank. How the money will be returned is not clear. There is a lack of Trust in our country. Besides, there is a valuation problem. Fund diversion may take place. Since, it is a new concept, some breathing space for the initiators. Then a regulatory framework will be needed. End use must be monitored. Otherwise it will result in loss of public resources. Sound regulation in this area may help to bring the people under the financial network. He cited many successful examples in the country.

Mr. Barkat-e-Khuda, Ph.D., Dr. Muzaffer Ahmad Chair Professor, BIBM

He thanks the paper presenters and the participants for their active participation. What constitute crowdfunding and non-crowdfunding must be properly defined. In case of profit motive crowdfunding, there are examples of misuse of fund. The concept is well-practiced in the informal sector and at the individual level. There are many successful examples also there. However, for using this for the formal sector regulations form both the BSEC and BB will be needed. Red-crescent is an example of crowdfunding. ICDDRB also receives donation. The amount of fund raise through this mode is very low compared to global GDP.

Dr. Prashanta Kumar Banerjee, Professor and the then Director (Research, Development & Consultancy), BIBM

He thanks the participants for their active involvement in the discussion. It is a self-rectified system to screen out bad project. However, we have to be careful in case of going ahead. SME foundation can raise fund by using crowdfunding.

Comments from Participants

- It will be good if we can engage our banks. It will expedite the development of our country.
- As a new concept it may help banks. But we have to create trust.
- Legal base in Bangladesh is not captured in paper.
- Govt. may collect fund using crowdfunding for mega project.
- How bank can be engaged is explained in detail. Regulatory framework may be developed.
- We have to be very careful about this new initiative as risky.
- At micro-level, crowd has financed much small initiative. If regulatory framework is developed, it may help greatly in the country.
- If technology-based trigger system introduced that if full fund is not raised should be sent back to all the funders. Areas of investment should be identified first. Bank may ensure the safety of the fund.
- Awareness building should be emphasized. It has huge potential. It may also use zakat fund for development of the country.
- Credible trustee appointment should be ensured first.
- Success rates should be assessed. Case studies may be documented. Bond market should be developed first.
- Projects may be certified by a qualified authority.
- What should be the responsibilities of crowdfunding platform in case of failure?
- Online frauds may be a great problem in this case.

- What will happen to a failed project?
- If Bangladesh bank is engaged, it will help flourish more.
- Who will give guarantee for the return? Who will ensure the reliability of the information disclosed through online platform? Who will supervise? How the investors will get return is not clear in the paper.

Mr. Md. Nazimuddin, the then Executive Director, Bangladesh Bank and Director General, BIBM

Finally, he has given his speech as the chair of the discussion. He said that trust is missing in our country. Oral trust is a major source of concern in many cases. We need written regulation from both the regulators including BSEC and BB. We need tough regulation in this regards and full compliance from the part of the stakeholders. The crowdfunding platform must be compliant with the regulation. Bank has larger role in this case. However, banks are suffering from large NPL, this type of initiative may create more NPL. If the amount of fund rose in our country in raising donation-based crowdfunding, may enrich the paper. He appreciated the initiative. The paper should be finalized very quickly. He thanked the authors.

Paper Six

Using US Dollar in Foreign Trade: Is there any Alternative Option?

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First Vice President & Head of Trade Operations

United Commercial Bank Limited

Mehdi Zaman

Senior Executive Vice President & Head of Treasury

Eastern Bank Limited

List of Abbreviations

ACU	Asian Clearing Union
AMU	Asian Monetary Units
AML	Anti-Money Laundering
BRICS	Brazil, Russia, India China & South Africa
CIPS	China International Payment System
CHY	China Currency
EUR	Euro
GBP	Great Britain Pound
JPY	Japanese Yen
LC	Letter of Credit
PBOC	People's Bank of China
SDR	Special Drawing Rights
SWIFT	Worldwide Interbank Financial Telecommunication
UNCTAD	United Nations Conference on Trade and Development
USD	US Dollar

Executive Summary

Liberalization and globalization measures brought in growing cross-border economic transactions where trade is at the center. To facilitate these transactions, a useful lead currency is the most effective. Here United States Dollar (USD) comes as lead currency as USD is holding the largest share of foreign currency deposits and official foreign exchange reserves maintained by the central banks and the concerned authorities throughout the World. Moreover, in international trade for invoicing and trade settlement, USD is considered as the most significant hard currency in terms of the coverage of the transactions as compared to other hard currencies. Several literature comes with conclusion that searching for an alternative of USD may not be feasible for a developing country having low volume of cross border transactions and a soft currency. However, as a short-term approach, there are evidences of minimizing transaction costs and exchange rate risks in trade transactions through regional payment arrangements of using hedging instruments.

Not different from other developing economies, international trade transactions of Bangladesh heavily depend on USD as mode of receiving and making payment. There is no doubt that making payment through USD to all trading partners might involve transaction costs in the process of currency conversion, and there are inherent exchange rate risks. However, using home currencies and holding extensive volume of multiple currencies (other than USD) involve other risks and complexities. The paper has been designed to draw a sketch of the use of USD and other currencies in trade transactions, and identify relevant issues to discuss the potential alternatives of using USD. The paper is mainly based on secondary information. Selected industry experts were consulted to validate certain information.

There are several efforts and initiatives to use alternative currency as part of bi-lateral and multilateral arrangements in the Globe. In early 2009, China and Russia initiated a joint effort for a new global currency. The idea was to create a universal currency for all which is different from any nation. Regarding other bilateral initiatives, in 2011, China and Japan decided to use their own currencies in bilateral trade transactions. Japan

also decided to buy Chinese bonds and decided to accumulate higher volume of CNY in its international reserves.

Dominance of USD is obvious in Global trading. Only 7 percent of the US's imports are invoiced in a currency other than USD. For some other countries the proportion is even higher: over 90 percent for Indonesia, South Korea and Turkey. Even in Japan, whose currency is a global 'safe haven', 71 percent of imports are invoiced in USD, though only about 13 percent come from the USA.

In the context of Bangladesh, evolution of the foreign exchange market in Bangladesh is closely linked with the exchange rate regime of the country. Foreign Exchange Regulation Act of 1947 empowered Bangladesh Bank, the central bank of the country to regulate and control all foreign exchange transactions. The regulation is applied through the enforcement of its circulars through the commercial banks. BB allowed commercial banks to maintain accounts in freely convertible currencies abroad subject to compliance with AML-CFT regulations of Bangladesh Bank and other competent authorities. For promoting bi-lateral trade using national currencies, Bangladesh Bank allowed commercial banks to open clearing accounts in the Chinese currency since 2018, which is the largest source of import for Bangladesh.

As observed in statistical data, in case of imports into Bangladesh, the trade transactions are clearly dominated by USD, and use of number of foreign currencies declined over time, from 35 to 21 currencies over the period from 2013 to 2019. However, use of USD remained consistently very high over the years (89% in 2019). Other than USD, only the use of Euro was visible with 4 percent, and the uses of other currencies were insignificantly low during 2013-2019. In exports from Bangladesh, around 27 currencies were used in 2013 for export receipt, which has increased to 34 in 2015, came down to 16 foreign currencies in 2019. Around 98 percent export transactions were conducted using USD in 2019 and the trend was around 97 percent during last decade.

Bangladesh has bilateral agreements with a number of countries to promote the regional cooperation and international trade transactions for developing a system of clearing payments on a multilateral basis with the

member countries, Asian Clearing Union (ACU) has been set up in 1974 for the settlement of eligible monetary transactions among ACU member countries' central banks. In addition, Bangladesh Bank also operates a foreign currency clearing arrangement to minimize time and cost in settlements for interbank transactions for commercial banks in USD, GBP, EUR, JPY, CAD and CNY.

It has also been found that, in import, despite a significant demand for Chinese currency 'Yuan' for the last few years, banks cannot capitalize the opportunity in initiating transactions in CNY, China's own currency. The key reason behind the non-capitalization of trade settlement is inadequate supply of CNY in the accounts of Chinese banks as opined by industry experts. Moreover, banks in Bangladesh are also concerned with the adverse impact of trade war between China and USA. In Bangladesh, a number of UPAS LCs is issued in Euro. Import settlement of those LCs is usually executed by taking loans in Euro or by converting nostro balance of USD into Euro through their correspondent banks. The current mechanism of import payment in Euro is expensive.

Dependence on USD for trade and other cross border transactions in the context of Bangladesh is not different from most of the other global economies. In such a scenario, it does not seem logical for a country like Bangladesh to think of searching an alternative reserve currency to replace USD. Using alternative replacing USD might be very risky. More arrangements for bi-lateral and regional payment and clearing arrangement might be beneficial for the country. Moreover, in the context of Bangladesh, extensive reliance on other convertible currencies may not be an wise options, however, home currency use in certain trade transactions with selected countries may help reducing transaction costs. Policy maker has to work on appropriate strategies to create supportive platform for effective use of the risk management techniques to minimize transaction costs and exchange rate risks in the country.

Using US Dollar in Foreign Trade: Is there any Alternative Option?

1. Introduction

It is well known the US Dollar (USD) is widely used for invoicing and settling international trade transactions around the Globe; and practically it is the USD that is holding the largest share of foreign currency deposits and official foreign exchange reserves maintained by the central banks and the concerned authorities throughout the World. USD is considered as the most significant hard currency in terms of the coverage of the transactions, settlement, and investment as compared to the other hard currencies like Euro, Yen, GBP or Chinese Yuan (IMF, 2019). The wide scale use of USD in international and even in several domestic transactions has made USD the lead global currency.

Globally, some economies and country groups are continuing with their efforts to internalize their currencies or finding alternatives to the USD as the led currency for international transactions. Even there are thoughts of considering Gold or Special Drawing Rights (SDR) as means of international transactions. In spite of on-going efforts over the years, Euro, Yuan or Yen could not turn up to be the realistic alternatives to the USD.

Because of the extensive use, fluctuations in USD and macroeconomic policies of USA have notable implications for Global exports and imports. It is important to note that USA's macroeconomic policy decisions may have a negative outcome¹ beyond the control of a developing economy. Searching for an alternative of USD may not be feasible for a developing country having low volume of cross border transactions and a soft currency. However, as a short-term approach, there are evidences of minimizing transaction costs and exchange rate risks in trade transactions through regional payment arrangements of using hedging instruments.

Not different from other developing economies, international trade transactions of Bangladesh heavily depend on USD as mode of receiving

¹ For example, China's holdings of USD denominated liabilities were negatively affected due to quantitative easing (Wang and Freeman, 2013).

and making payment. The country's cross border transactions composed of mainly exportation and importation of goods and services; and cross-border investment and other financial flows are minimal. There is no doubt that making payment through USD to all trading partners might involve transaction costs in the process of currency conversion, and there are inherent exchange rate risks. However, using home currencies and holding extensive volume of multiple currencies (other than USD) involve other risks and complexities. On this background, the objective of the roundtable keynote is to draw a sketch of the use of USD and other currencies in trade transactions, and identify relevant issues to discuss the potential alternatives of using USD. The paper has been finalized incorporating the comments of the roundtable discussion.

The paper is mainly based on secondary information. Selected industry experts were consulted to validate certain information and collect cases. It is organized into four sections. After the background, conceptual issues and global developments are discussed in Section-2. Section-3 is about Bangladesh scenario. Finally, Section-4 puts forward certain recommendations.

2. Using US Dollar in Global Trade and Cross Border Transactions: Search Efforts for Alternatives

2.1 Visible Dominance of US Dollar in Global Trade and Other Cross Border Transactions

Liberalization and globalization measures brought in growing cross-border economic transactions where trade is at the center. To facilitate these transactions, a useful lead currency is the most effective. "A currency can be regarded as the leading currency of the world economy if it is used for financial transactions (medium of exchange), as a monetary measure of value and as a reserve currency (store of value) not only by domestic economic actors, but by many or almost all actors around the world".²

² "For example, an Italian automobile company accepts payment in USD for its cars sold in Japan, even though it has to pay its employees and taxes in euros; the dollar revenues can be used, for example, to buy oil from OPEC countries; these countries have their own currencies, but they also accept the USD as a means of payment, because they can use the dollar proceeds for imported products from other countries" (<https://ged-project.de/allgemein-en/can-the-us-dollar-continue-to-defend-its-role-as-the-lead-currency/>)

These features are best met by the USD, and USA remained the largest economy with huge dominance.³

The movement of USD on the path of Global currency initiated with the 1944 Bretton Woods agreement. Till then, global economies used to follow gold standard. The developed countries agreed at Bretton Woods to peg the exchange rate for other currencies to USD when the USA held the largest gold reserves, and the agreement allowed global economies to back their currencies with dollars. By the early 1970s, countries began demanding gold for the dollars they held. These countries needed to combat inflation. In response to the pressure, the then President of USA detached USD from gold and did not allow gold reserve depletion. However, by that time, the USD became an established and dominant reserve currency for the globe (Amadeo, 2019).

The USD has been the world's premier currency for international trade and investment. Remarkably high volume of trade and trade finance transactions take place in USD than any other currency. Because of that global financial flows slow down when there is a shortage of USD that restricts global trade and financing activities. As Hyung Song Shin of the Bank for International Settlements (BIS) explains, when the world experiences a shortage of USD (indicated by a rising dollar exchange rate against all currencies), banks become reluctant to lend USD across borders; the outcome might be a drastic decline in trade transactions, particularly involving developing countries (whose currencies tend to be more volatile in relation to the USD), and a consequent decline in global trade (American Express, 2019).

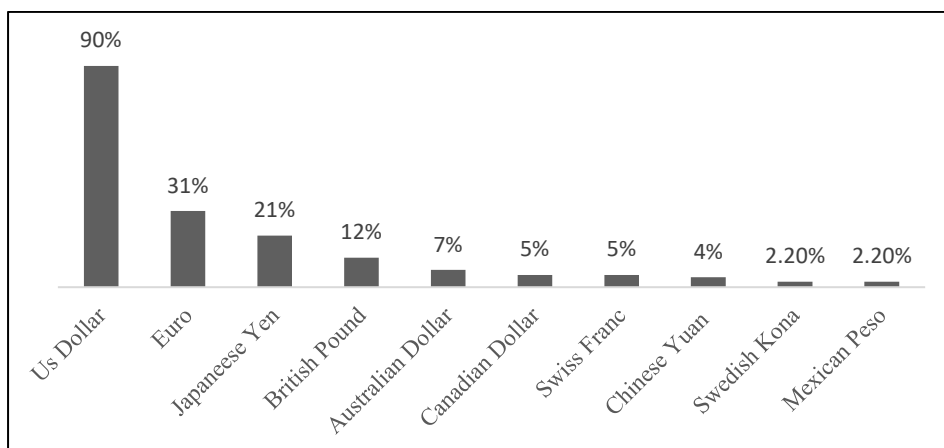
Dominance of USD is very much evident with the extensive use of USD for meeting domestic transactions. Huge volume of US bills is used outside the USA most of which are transacted in the former Soviet Union and in Latin American countries, as noted in a study by Miranda (2019).

³ USA GDP in 2018 amounted to over 20trillion USD; equivalent to around 24 % of global GDP; ahead of China (13.5 trillion USD, 16 % of world GDP) and Japan (5.1 trillion USD, 6.0 % of global GDP); even the Euro zone as a whole, with GDP of around 13.7 trillion USD, has less economic power than the USA (*IMF World Economic Outlook, 2019*).

The study also observes, more than one-third of the world's GDP comes from countries that peg their currencies to the USD.

International trade transactions take place mainly in USD. According to the USA Department of Treasury (2019), USD remains the world's prime currency in global foreign exchange transactions in terms of both market turnover and trade settlement. The US Treasury also finds, around 90 percent of foreign exchange trading involves USD; ideally, any one of the global economies could replace USD as the world's currency, but not possible as these are not as widely traded as USD (Figure 2.1).

Figure 2.1: Top 10 Traded Currencies in 2018



Source: BullMarketz.com

Gopinath (2019) found that the proportion of global imports and exports invoiced in USD were 4.7 times of the total US imports and 3.1 times of the total US exports. The figures are much higher than that of the Euro, the second-most-frequently used hard currency. According to Schelefer (2019) around 40 percent of the global debt is issued in USD, and thus multinational banks need a lot of USD to conduct businesses. The dominance of the USD may be observed in the official reserve assets maintained by the central banks. Even the developed countries generally maintain more USD denominated liabilities than in their own currencies (IMF, 2019). IMF's reserve data clearly indicates the dominance of USD as reserve currency: USD 6.74 trillion (61.82%), EUR-USD2.21 trillion (21%); JPY- USD572 billion (5%); GBP- USD495 billion (4%); CNY- USD213 billion (2%). In response to the most recent financial crisis, the

bank regulations enacted to prevent another crisis have made USD even scarce (Schelefer, 2019).

Table 2.1: Composition of Reserve Currencies

Name of the Currency	2018	2017	2016	2015	2014
USD	62	62	65	66	65
EUR	21	20	19	19	21
YEN	5	5	4	4	4
GBP	4	5	4	5	4
CNY	2	1	1	0	0

Source: IMF, 2019.

There are tendencies amongst countries to maintain gold bullions as foreign exchange reserves. It is also considered as viable alternative asset for official reserves considering its requisite liquidity and trust. Currently, USA⁴ is holding the highest volume of Gold reserve (Sheng, 2018).

Considering the issuer of the global currency (USD), USA keeps a watch on global economies⁵. USA Treasury carefully monitors developments of the other currencies to maintain dominance and for the purpose of macroeconomic management. Especially, Chinese Currency is closely monitored by the USA authority. According to the most recent USA Treasury Report to the Congress, “China’s exchange rate practices continue to lack transparency, including its intervention in foreign exchange markets. Based on Treasury estimates, direct intervention in foreign exchange markets by the People’s Bank of China (PBOC) over the last several months appears limited. Nonetheless, given China’s long history of facilitating an undervalued currency through protracted, large-scale intervention in the foreign exchange market, Treasury has continued to have ongoing discussions with the Chinese authorities about RMB developments and intervention practices. Moreover, in recent years, China

⁴ USA is holding the highest volume of Gold reserve in terms of Volume. In terms of proportion of total reserves, the highest Gold holding countries are: USA (76%), Germany (72%), Italy (67%), France (61%) and Russia (20%). USA is holding over 8000 metric tons; Germany 3300; Italy and France 2500; Russia and China 2000 each; collectively USA one-third of the Globe (Sheng, 2018).

⁵ Since U.S. imports are almost entirely in USD, changes in USD exchange rates don't significantly affect import prices, and therefore have little effect on domestic inflation. This helps the Federal Reserve to maintain full control over monetary policy (Gopinath, 2019).

has shifted from a policy of gradual economic liberalization to one of reinforcing state control and increasing reliance on non-market mechanisms. The pervasive use of explicit and implicit subsidies and other unfair practices are increasingly distorting China's economic relationship with its trading partners. These actions tend to limit Chinese demand for and market access to imported goods, leading to a wider trade surplus" (USA Treasury, 2019).

2.2 Global Efforts to Use Alternative Currency

There are several efforts and initiatives to use alternative currency as part of bi-lateral and multilateral arrangements in the Globe. In early 2009, China and Russia initiated a joint effort for a new global currency. The idea was to create a universal currency for all which is different from any nation. China also called for the IMF to develop a currency to replace USD (Amedo, 2019).

On this movement, the strangest force has been known as 'Anti-dollar Alliance' comprising the efforts of Russia, China and Ecuador (Joseph *et al.*, 2015). The plan was to avoid USD in cross-border trade transactions, financial transactions, and maintenance of foreign exchange reserves. This was part of Russia's alternation idea of forming an economic forum popularly called as 'Eurasian Strategy'. There were several efforts by Ecuador, Cuba and Bolivia to develop alternative currency and payment system. Especially, Ecuador's moves were particularly notable that comprises reforms against strategies of the IMF and the World Bank and the other USA based multi-national agencies. As an ally Iran signed a number of credit agreements with Ecuador ignoring international sanctions and Belorussia became the economic partner of Ecuador's movement. A strategic alliance was also formed with China at that time. Ecuador also experimented with a state-run digital currency in 2014 (Joseph *et al.*, 2015).

Attempting to build an alternative to the Worldwide Interbank Financial Telecommunication (SWIFT) system was initiated by the duo-Russia and China. As part of the initiative, China launched 'China International Payment System (CIPS)' in 2015 to facilitate Yuan clearing transactions.

In the same line, a SWIFT-like payment system for Visa and MasterCard transactions was launched by Russia's central bank.

Regarding other bilateral initiatives, in 2011, China and Japan decided to use their own currencies in bilateral trade transactions.⁶ Japan also decided to buy Chinese bonds and decided to accumulate higher volume of CNY in its international reserves. In 2012, agreements⁷ were signed amongst BRICS countries (Brazil, Russia, India, China and South Africa) on the use of their own domestic currencies in trade transactions with each other. China has also bi-lateral arrangement to use home currency with Africa's trading partners and United Arab Emirates. China and the United Arab Emirates has agreement on using home currencies in oil transactions, which considered by many as threat to the petrodollar system; and Iran even used barter, payment in local currency etc. bypassing USD in response to sanction of USA.⁸

Europe has also been very active to find an alternative to the USD that specially intensified following several sanctions and unilateral decisions by the USA regarding Global trade and financial transactions (Johnson, 2019). The United Nations has also been propagating for an alternative to the USD as the reserve currency of the world; and IMF also published several reports calling for the USD to be replaced as the reserve currency of the world.⁹

2.3 Risks and Costs Associated with the Use of Foreign Currencies in International Trade

Dominance of USD is obvious in Global trading. The difference between the USA and the rest of the world is striking. Only 7 percent of the US's imports are invoiced in a currency other than USD. In contrast, over 60

⁶<https://jref.com/threads/china-and-japan-direct-currency-exchange>.

⁷<https://www.firstpost.com/world/intra-group-investment-brics-to-soon-trade-in-local-currencies-256162.htm>

⁸<https://economictimes.indiatimes.com/industry/energy/oil-gas/india-set-to-pay-for-iranian-oil-using-rupees-from-november-sources/articleshow/65887179.cms?from=mdr>

⁹In April 2010, the IMF released a report called the "Reserve Accumulation and International Monetary Stability" that notes, "a more ambitious reform option would be to build on the previous ideas and develop, over time, a global currency. Called, for example, *bancor* in honor of Keynes, such a currency could be used as a medium of exchange-an 'outside money' in contrast to the SDR which remains an 'inside money'" (<https://www.freedomworks.org>).

percent of Australia's imports are invoiced in a foreign currency: the figure is similar for the UK. For some other countries the proportion is even higher: over 90 percent for Indonesia, South Korea and Turkey. Even in Japan, whose currency is a global 'safe haven', 71 percent of imports are invoiced in USD, though only about 13 percent come from the USA. Some of these imports are oil and commodities that are priced in USD to sell in the global markets, which is also true for several non-commodities (Gopinath, 2019).

It is obvious that when a high proportion of a country's trade is invoiced in USD, movements in its currency exchange rate against other countries become much less significant, even if they are important trade partners. USD exchange rate has become the principal indicator of a trading partner's competitiveness and the terms of trade between even other countries. Research shows that if the USD exchange rate appreciates by an average of 1 percent against all other currencies in the world, within a year the change cause a 0.6-0.8 percent decrease in the volume of total trade transactions between the countries of the rest of the world (Rey, 2015).

A measurable benefit of running an international currency is international seigniorage. Rogoff (1998) estimates that USD holdings by non-US residents were roughly 50 percent of the total stock of US currency outstanding, which is the source of international seigniorage. It is estimated (by Rogoff) that the flow of international seigniorage to the USA approximately 0.1%-0.2% of GDP. Regarding the impact of exchange rate volatility on trade transactions, several empirical studies (Hooper and Kohlhagen, 1978; Goldstein and Khan, 1985; Kroner and Lastrapes, 1993 etc.) came up with mixed results- both positive and negative on exports and imports. It is evidenced that differential country conditions matter, however there are more or less agreements that volatilities create uncertainty. Avoiding dependence on USD or other currencies or internationalization efforts are also expensive. Both theory and historical experiences suggest that internationalization of a currency needs to satisfy several pre-conditions: liberalization of financial markets; openness of capital account transactions; and allowing currency convertibility (Kenen, 2011). China is yet far from all these and taking these reforms will not be

easy and costless. Especially, complete capital account openness on the way to internalization of a currency might prove to be very risky.

Several evidences indicate that that exchange rate volatility might not be a major policy concern as a number of hedging instruments and strategies have developed over the years (UNCTAD, 2013). There are now ample instances when international businesses invoice their counterparties in their own local currency, while and making payment to their suppliers in other currencies. And on the way to using multiple currencies, managing exchange rate risks using hedging techniques are very common. Even after all these, there are tendencies in international businesses to address exchange rate risk by trading entirely in one currency i.e. USD (American Express, 2019). However, foreign currency derivatives market has not yet much developed and foreign exchange hedging instruments are yet to receive due popularity. There are also limitations and restrictions with exchange rate management systems and regulatory interventions (Vinh and Trinh, 2019). In such a circumstance, tendency of considerable reliance on a single currency i.e. USD does not seem irrational in the context of the developing countries.

3. Use of US Dollar in Foreign Trade in Bangladesh: Scopes for Using Alternatives

3.1 USD as Part of Policy and Regulatory Framework

Evolution of the foreign exchange market in Bangladesh is closely linked with the exchange rate regime of the country. After independence, the exchange rate of the newly created currency BDT was fixed with the GBP in January 1972, and the dual exchange rate system was replaced by unitary exchange rate mechanism. The GBP was floated with USD, after the collapse of the Bretton Woods system, which made the taka to float with dollar via the GBP. The government of Bangladesh pegged BDT to a basket of currencies consists of the major trading partners in 1979. The same exchange rate arrangement continued till the early 1990s. During this period, a notable change was the replacement of pound sterling with that USD as the intervention currency in 1983 (Hossain, 2000).

Foreign Exchange Regulation Act of 1947 empowered Bangladesh Bank, the central bank of the country to regulate and control all foreign exchange

transactions. The regulation is applied through the enforcement of its circulars through the commercial banks. BB allowed commercial banks to maintain accounts in freely convertible currencies abroad subject to compliance with AML-CFT regulations of Bangladesh Bank and other competent authorities. The BDT accounts of all foreign bank branches or correspondents outside Bangladesh are regarded as non-resident accounts. Banks are also permitted to maintain Non-Resident Taka Accounts for overseas branches and correspondents against inward remittance in convertible currencies. As per GFET, different foreign currency accounts such as RFC, NFD, and ERQ accounts may be opened in USD, GBP, Euro or Japanese Yen. Other account like foreign currency accounts of shipping companies, airlines and freight forwarders can be opened and maintained in USD or other freely convertible currencies. Moreover, in respect of portfolio investment in Bangladesh, the non-resident investors are allowed to open NITA with freely convertible foreign currency.

All convertible currencies¹⁰ can be used to make and receive international trade payments in the country. GFET (2018) notes, any convertible currencies may be used to make or receive payments under Letter of Credit (LC). For all types of barter agreements or foreign loans/grants, convertible currencies have been mentioned as the means of receiving and making transactions. For promoting bi-lateral trade using national currencies, Bangladesh Bank¹¹ allowed commercial banks to open clearing accounts in the Chinese currency since 2018, which is the largest source of import for Bangladesh. It is expected to help settling imports with China easily through the clearing accounts. Till then, commercial banks were allowed to open such accounts in USD, GBP, EUR, JPY and CAD with the Bangladesh Bank. It is to be mentioned that the Chinese currency became the fifth currency of the basket of IMF's Special Drawing Rights (SDR). In addition, Bangladesh Bank has conducted a feasibility study on the impact of USA-China trade tension in 2018 which helps the regulators

¹⁰ USD, GBP, Euro, JPY, CHY, CND

¹¹ <https://www.thedailystar.net/news/business/banking/banks-can-now-open-clearing-accounts-yuan-1620853>

and market players comprehend the impact as our major import partner is China (Box-3.1).

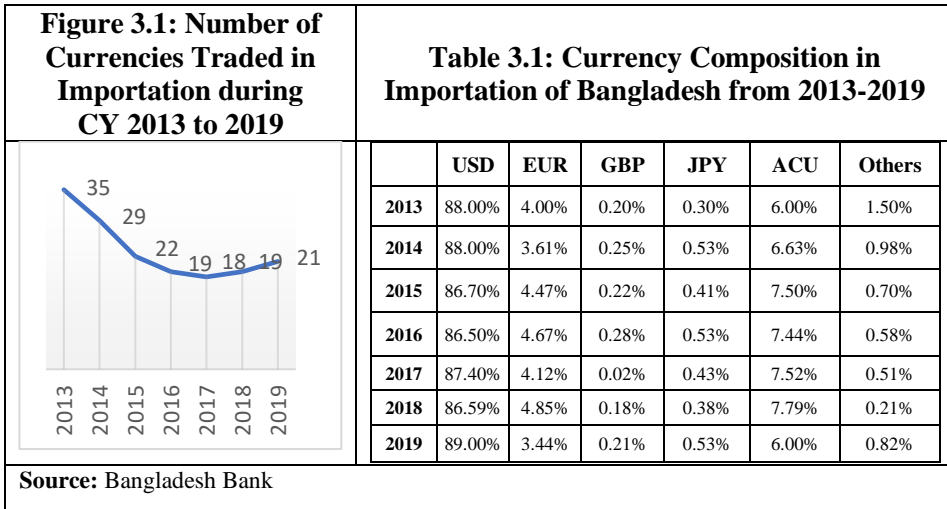
Box 3.1: Feasibility Study on USA-China Trade Tension by BB

The ongoing US-China trade tension has raised concern as well as opportunity for many emerging economies including Bangladesh. As China is the Bangladesh's highest import partner and USA is one of our major export destinations, Bangladesh's trade transactions will be highly linked with their policies. That's why, China's exports amounting USD250 billion (11% of China's total export), which is under US tariff has to find its new market through price reduction to clear them. In that case, Bangladesh will face tougher competition from China, though lower import cost will have beneficial effect on our external balance. overall impact on external balance appears to be favorable, though it is too early to assess the dynamic effect of US-China trade tension on Bangladesh economy

Source: Bangladesh Bank

3.2 Use and Dominance of USD in Trading and Cross Border Transitions in BD

In Bangladesh, the trade transactions are clearly dominated by USD, and use of number of foreign currencies declined over time (Figure-3.1). However, use of USD remained consistently very high over the years (Table-3.1). Other than USD, only the use of Euro was visible with 4 percent, and the uses of other currencies were insignificantly low during 2013-2019. Though the country's major import partner has been China (Table-3.3), import payments have been dominated by USD. Though, BB allowed CHY (Chinese currency) for import payment, till date the mechanism yet to get the expected level of impetus.



In exportation, around 27 currencies were used in 2013 for export receipt, which has increased to 34 in 2015, came down to 16 foreign currencies in 2019. Though the country’s major export trading partner is Germany (Table-3.4) for last few years, USD remained the sole dominated currency for receiving export payment in Bangladesh. Around 98 percent export transactions were conducted using USD in 2019 and the trend was around 97 percent during last decade. Besides, Euro and GBP have been used in export but the amount remained insignificant (Box-3.2).

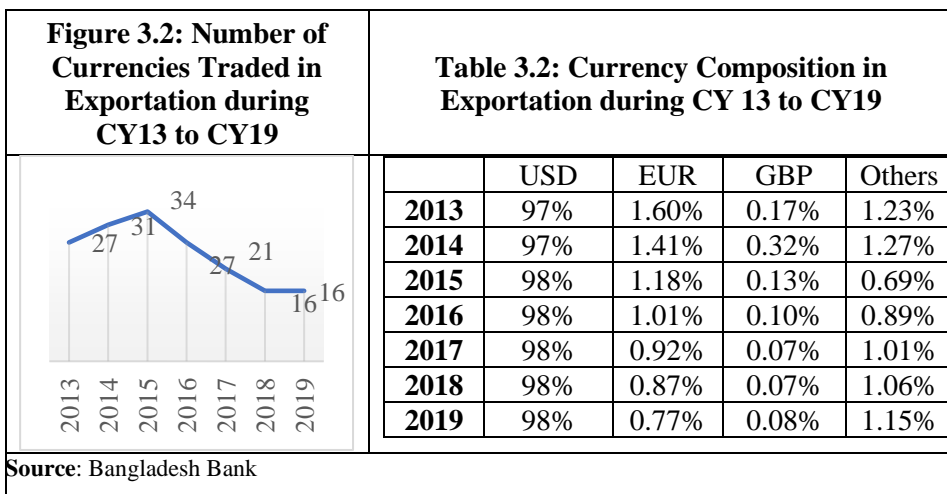


Table 3.3: Major Trading Partners in Importation during the Year 2017-2018		Table 3.4: Major Trading Partners in Exportation during the Quarters April-June, 2019	
Country	Import Payment in %	Country	Export Receipt in %
China	23.8%	Germany	16%
India	17.5%	USA	15.7%
Singapore	5.5%	UK	10.6%
Japan	3.8%	Spain	7%
Indonesia	3.6%	France	6.4%
USA	3.5%	Italy	4.4%
Brazil	2.9%	Poland	3.5%
Malaysia	2.9%	Canada	3.4%
Korea	2.6%	India	3%
Thailand	2.4%	Netherlands	2.7%
Germany	2.0%	Japan	2.7%
United Arab Emirates	1.8%	Australia	2.2%
Australia	1.7%	Belgium	2.2%
Saudia Arabia	1.6%	Denmark	2.1%
Taiwan Province of China	1.6%	China	1.9%

Box 3.2: Trading Currencies in Bangladesh	
Trading Currencies in Export [as of 2013]	Currencies Dropped in Export [as of 2019]
ACU, AED, AEU, ANG, AUD, BDT, CAD, CHF, EUR, GBP, HKD, INR, JPY, LKR, SGD, and USD	ANG, BHD, DKK, IDR, LKR, LYD, MMK, NOK, NPR, NZD, OMR, PHP, PKR, SAR, THB
Trading Currencies in Import 2013	Currencies Dropped in Import [as of 2019]
ACU, AED, AEU, ANG, AUD, BDT, CAD, CHF, CNY, EUR, GBP, HKD, INR, JPY, KRW, KWD, MYR, QAR, SDR, SEK, LKR, SGD, and USD	BHD, CNY, DKK, IRR, NOK, NZD, PHP, QAR, SAR, SEK, THB
Source: Bangladesh Bank	

3.3 Bi-lateral and Regional Initiatives to Use Domestic and Alternative Currencies

Bangladesh has bilateral agreements with a number of countries to promote the regional cooperation and international trade transactions. For making deep trade integration through export diversification and improvement of competitiveness with the trading partners, Bangladesh government has its policy and strategic guidelines. And the country has been exploring that on bi-lateral and multilateral basis.

For developing a system of clearing payments on a multilateral basis with the member countries, Asian Clearing Union (ACU) has been set up in 1974. The system allowed secure regional co-operation for the settlement of eligible monetary transactions among the central banks of Bangladesh, India, Iran, Nepal, Pakistan, Sri Lanka, Myanmar, Bhutan and Maldives using Asian Clearing Union (ACU) mechanism in ‘Asian Monetary Units (AMU)’ (Bangladesh Bank, 2019).

In addition, there are options for border trades and border haats with Myanmar and India respectively, to facilitate border business. In 2010, Bangladesh and India opened 'border haats,' or 'common marketplaces' in different border areas of the two countries with a limit of USD 100 (equivalent to local currencies) for any particular day in the border haats. Moreover, Bangladesh has border trade agreements with Myanmar with a limit of USD 10000 per transactions. Banks from both sides settle their net amount in the transactions through correspondent banks.

Bangladesh Bank also operates a foreign currency clearing arrangement to minimize time and cost in settlements for interbank transactions that has been helpful for the commercial banks to settle their mutual claims in USD, GBP, EUR, JPY, CAD and CNY. Under this arrangement, the commercial banks maintain clearing accounts with the central bank in these currencies. In addition to the settlement of interbank transactions among commercial banks, these accounts may be used for transferring funds with the foreign entities having correspondent banking relationship. Moreover, for trade settlement facilities, around ten Bangladeshi banks have twenty overseas business operation centers in the form of representative offices, bank branches and financial agent.

3.4 Risk of Using USD and Other Currencies, and the Risk Management Efforts

In Bangladesh, USD is used as major currency for international trade settlement due to comparative convenience. In import, despite a significant demand for Chinese currency ‘Yuan’ for the last few years, banks cannot capitalize the opportunity in initiating transactions in CNY, China’s own currency. In the absence of this currency facilitation, banks of Bangladesh are to incur extra transaction costs in making import payments in CNY. The key reason behind the non-capitalization of trade settlement is inadequate supply of CNY in the accounts of Chinese banks as opined by industry experts. Moreover, banks in Bangladesh are also concerned with the adverse impact of trade war between China and USA.

In addition, according to statistics of Bangladesh Bank, Bangladesh receives a huge amount of loans and grants in Japanese currency, JPY. The volume of trade transactions in JPY is also considerable. In most of the cases, after receiving JPY, these are converted in other currencies, mostly in USD. Conversion of JPY into other currency is mainly for negative interest rate in JPY, higher charges current account charges in JPY and relatively higher fluctuation than other currencies.

In Bangladesh, a number of UPAS LCs is issued in Euro. Import settlement of those LCs is usually executed by taking loans in Euro or by converting nostro balance of USD into Euro through their correspondent banks. The current mechanism of import payment in Euro is expensive. In some cases, banks open LCs in Euro but makes payment in USD due to the availability and easy arrangement of USD. Though, a large portion of the country’s export is conducted with European countries (Table 3.4), the export payments are done in USD mainly. In this context, Bangladesh Bank is considering refinancing scheming in Euro to reduce interest charges and to widen the scope of alternative currency. However, due to the lower interest rate in Euro, some traders are interested to avail financing facility in this currency. But they have to take the exchange rate risk in the international market (Case 3.1). Globally, banks use hedging instruments to minimize this risk which is not operationally easier for Bangladeshi banks due to

non-availability of proper credit limit with foreign banks. In this case, some banks are using cash collateral arrangement for availing the fund.

Case 3.1: Exposure to Exchange Risk in Availing Financing Other than USD

An importer opened a deferred LC on USD. The client's bank approached to an OBU for initiating a financing facility. In the financing process of this deferred LC, the client shifted from LC currency USD to Euro. The interest rate in euro was 0.25% whereas the rate in USD was 3.25%. But when the deferred payment was actuated, the exchange rate of USD/ Euro had been increased. And ultimately the bank had to incur an exchange rate loss.

Source: Bank

In case of Bangladesh, the uses of different foreign exchange derivatives are very limited in both local and foreign periphery. The country's foreign exchange market is basically a spot market where transaction takes place to meet immediate foreign currency need of the traders or individuals at spot exchange rate. Of the nature of the use of derivative products, some hedging transactions take place. Speculations are not allowed and some big trading houses use foreign exchange forward transactions in limited volumes. Of the other market segments, foreign exchange swap are relatively active that is mostly short dated. As a funding technique, banks commonly use swaps for a week or so.

Moreover, transactions in Vostro accounts in Bangladesh are mainly used for wage remittance receipt. Some FCBs and PCBs are maintaining the account and around USD 200 million equivalents BDT has been kept as balance. But these accounts are not that much used for international trade settlements. Due to the limited use of Vostro accounts in trade transactions, local currency, BDT, is not getting proper opportunities for trade settlement. If the use of Vostro accounts increases, transaction cost of trade settlement may decrease.

4. Policy Recommendations

One, Dependence on USD for trade and other cross border transactions in the context of Bangladesh is not different from most of the other global economies. Historical evidences and trends clearly support the rationale for huge inclination on the USD throughout the World. Global efforts to search for an alternative to USD have not been successful till date. In such a scenario, it does not seem logical for a country like Bangladesh to think of searching an alternative reserve currency to replace USD. Using alternative replacing USD might be very risky.

Two, There are several global instances of having cross-border trade transactions using the currencies of home countries as part of bi-lateral or regional arrangements. The trends rather increased in recent years having more intense multi-dimensional political and economic power game. Special payment and clearing arrangement for trade transactions have been beneficial for Bangladesh. For example, under ACU mechanism, net interest income is positive which is beneficial for Bangladesh. More arrangements for bi-lateral and regional payment and clearing arrangement might be beneficial for the country.

Three, Bangladesh Bank permitted banks to open foreign currency clearing accounts in the Chinese currency however benefits are yet to be realized. Though there is a huge demand for CNY in import payment, bank cannot utilize this opportunity to reduce transaction costs in making import payment in ‘Yuan’. The key reason of non-capitalization of trade settlement is the inadequate supply of CNY in the accounts of Chinese banks. Moreover, banks in Bangladesh are also concerned with the adverse impact of trade war between China and USA. The country need to follow caution to address the situation.

Four, In Bangladesh, a number of UPAS LCs is issued in Euro. Import settlement of those LCs is usually executed by taking loans in Euro or by converting nostro balance of USD into Euro through their correspondent banks. In some cases, banks open LCs in Euro but makes payment in USD due to the availability and easy arrangement of USD which makes the current mechanism of import payment in Euro is expensive. In this context, Bangladesh Bank is considering refinancing scheming in Euro to reduce

interest charges and to widen the scope of alternative currency. It might be beneficial, associated risks should be monitored.

Five, In the context of Bangladesh, extensive reliance on other convertible currencies may not be an wise options, however, home currency use in certain trade transactions with selected countries may help reducing transaction costs. Policy strategies for effective use of some hedging instruments might be helpful to handle foreign exchange and commodity price risks. Policy maker has to work on appropriate strategies to create supportive platform for effective use of the risk management techniques to minimize transaction costs and exchange rate risks in the country.

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Appendix 1: Discussion Summary of the Roundtable Discussion on Using US Dollar in Foreign Trade: Is there any Alternative Option?

Bangladesh Institute of Bank Management (BIBM) arranged a roundtable discussion on “Using US Dollar in Foreign Trade: Is there any Alternative Option?” on October 24, 2019. Mr. S. M. Moniruzzaman, the then Chairman, BIBM Executive Committee and Deputy Governor, Bangladesh Bank as well was present in the discussion as the Chief Guest, and also inaugurated the roundtable discussion. Mr. Barkat-e-Khuda, *Ph.D.*, Dr. Muzaffer Ahmad Chair Professor, BIBM and Mr. Md. Yasin Ali, Former Supernumerary Professor of the BIBM were present in the roundtable as designated discussants. Professor Barkat-e-Khuda, *Ph.D.*, Dr. Muzaffer Ahmad Chair Professor, BIBM chaired the first part of the roundtable discussion and the second part was chaired by Mr. Md. Yasin Ali, Former Supernumerary Professor of the BIBM. Mr. Md. Nazimuddin, the then Executive Director, Bangladesh Bank and Director General of BIBM as well delivered concluding remarks. Dr. Prashanta Kumar Banerjee, Professor and the then Director (Research, Development & Consultancy), BIBM delivered his welcome address and the purpose of the roundtable discussion organized by BIBM.

Team leader of research team, Dr. Shah Md. Ahsan Habib, Professor and the then Director (Training), BIBM presented the paper on “Using US Dollar in Foreign Trade: Is there any Alternative Option?” Other members of the research team are: Mr. Tanweer Mehdee, Assistant Professor, BIBM; Ms. Antara Zareen, Assistant Professor, BIBM; Mr. Tofayel Ahmed, Assistant Professor, BIBM; Mr. Mohammad Anisur Rahman, Deputy General Manager, Forex Reserve and Treasury Management

Department, Bangladesh Bank; Mr. A.S.M. Shahab Uddin, Deputy General Manager, Foreign Exchange Investment Department, Bangladesh Bank; Mr. Mehdi Zaman, Senior Executive Vice President & Head of Treasury, Eastern Bank Limited and Mr. Md. Khairul Alam Chowdhury, First Vice President & Head of Trade Operations, United Commercial Bank Limited; A large number of participants including senior executives, high officials of different banks, academicians, media representatives and faculty of BIBM participated in the roundtable. The summary of roundtable discussion is as follows:

Comment of the Chief Guest

Mr. S. M. Moniruzzaman, the then Chairman, BIBM Executive Committee and Deputy Governor, Bangladesh Bank as well drew the importance of USD as the world's foremost reserve currency held by most of the central banks and other institutions. He mainly emphasized the reasons of dominance of USD in the context of Bangladesh. He said, "dominance of USD is obvious as U.S.A has more advantageous positions, as compared to other economies, in terms of larger economy and innovation in technology." He pointed out the holdings of foreign exchange reserves by central banks and issuance of world's debt and investment market in USD across the globe are due to the volatility of other currencies. He also expressed his opinion that U.S sanctions on some economies with other currencies, insignificant return from gold holdings, trade war between China and U.S.A etc. are some critical concerns for the dominance of USD. He also uttered that though Bangladesh Bank has allowed banks to open accounts in other currencies but recent experience of demonetization of Indian Rupee brought exchange value zero for Bangladesh.

Comments of the Discussants

Mr. Yasin Ali, Former Supernumerary Professor, BIBM initially pointed out the potential trade benefits Bangladesh could get out of trade war between China and USA. He said, "getting benefits out of the trade war, most of the times, is very difficult as each country is self-centered." He mainly focused the factors affecting USD to become global currency. He said that acceptability of an economy's currency depends relative size of its economy, relative volatility, and trade relationship with the currency, global acceptability of the currency, etc. He also raised how an economy's currency is affected by government intervention in foreign exchange

market and international sanctions. Finally, he came up with a conclusion that trade transactions with USD is a safe position for our country though he opined an alternative option other than USD which could be regional and bilateral arrangement.

Mr. Md. Nazimuddin, the then Executive Director, Bangladesh Bank and Director General of BIBM, as well in his concluding remarks, appreciated the team members of the keynote paper. He also agreed with discussants and audience that the country is not in a position to have alternative currency other than USD in international trade and investment.

Key Points Highlighted by the Participants

- As travelers' frequent visit from Bangladesh to China, banks may think of issuing international credit cards in Chinese local currency for smooth transactions.
- Traders and bankers should try to manage multicurrency arrangement in international trade.
- Local banks incur extra costs, in correspondent banks' account, in converting other foreign currencies into USD.
- Almost all participants opine that dominance of USD will remain in coming years and any alternative option other than USD could be difficult. However, few of the participants opt for to bring back barter trade system to some extent with some neighboring countries.

Paper Seven

FinTech and RegTech: Possible Impact on Banking Systems in Bangladesh

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List of Abbreviations

AI	Artificial Intelligence
AML	Anti-Money Laundering
API	Application Program Interface
ASEAN	The Association of South East Asian Nations
BB	Bangladesh Bank
BEFTN	The Bangladesh Electronic Funds Transfer Network
DFS	Digital Financial Services
EU	European Union
FCB	Foreign Commercial Bank
FIs	Financial Institutions
GDP	Gross Domestic Product
GDPR	General Data Privacy Regulation
IT	Information Technology
KPMG	Klynveld Peat Marwick Goerdeler
KYC	Know Your Customer
NPAs	Non-Performing Assets
PCB	Private Commercial Bank
PSD2	Payments Services Directive 2
RTGS	Real-Time Gross Settlement
SMEs	Small and Medium Enterprises
SoCB	State-owned Commercial Bank
SSA	Sub-Saharan Africa
USD	United States Dollar
WB	World Bank

Executive Summary

Financial intermediation has significantly changed over the past couple of decades, due in large part to technological transformation arising from advances in information technology, telecommunications, and financial practice. This technological progress has impelled financial innovations that have altered many financial products, services, production processes, and organizational structures. To the extent that such financial innovations reduce costs or risks, social welfare may be improved. However, many financial innovations fail due to fundamental design flaws or being replaced by better alternatives. The emergence of FinTech and RegTech has brought a revolution in the financial service sector.

Modern banking sector can't sustain without the technology and now it is not a theoretical statement rather it has been proven with many practical incidents. According to financial stability board FinTech may be understood as the use of innovative information and automation technology in the financial services. FinTech is the term given to financial service firms whose product or service is built upon technology, often resulting in highly innovative, pioneering services. "FinTech" as a term is a compound of "finance" and "technology". It is a relatively recent term and is certainly not a buzzword. FinTech is here to stay. Why? Put simply, FinTech is changing finance as we know it and is already impacting how increasing numbers of individuals and businesses alike conduct their financial matters.

A question usually comes to the mind of the academicians, researchers, bankers and regulators that are banks worried about the wave of FinTech? Obviously they are. Although their worry does not come from the market share FinTech firms have currently, as it is minuscule. The real worry comes from what FinTech firms could do to banks' market share in the future. The fear is that mid- to long-term, ironically, banks could lose their own sector: banking or a significant portion of it at the very least. FinTech growth is seemingly unstoppable. Banks readiness is essential in this regards.

Eighty-five percent of CEOs recognize the importance of integrating automated business processes with artificial intelligence and cognitive

processes¹. In today's fast-paced and rapidly changing environment, the financial service industry is challenged to find innovative ways to reach strategic growth objectives, further reduce compliance costs, and ensure effective management of regulatory change. As the industry is focusing on cost containment, remediation, and new regulations in a low-interest-rate environment, firms are now putting greater emphasis on their growth agenda. This includes acquisitions, new product development, cross-selling products and services, and improving customer service, which has all re-emerged under a digital technology lens as the industry's highest priority. Regulators and central banks are also seeking ways to leverage new technologies to meet public policy objectives and complex supervisory requirements. For many organizations, leveraging technology is the answer. While Financial Technology (FinTech) has become a core focus for all financial services players over the past decade and many banks have established their own labs, formed partnerships, and taken FinTech companies into residence programs, the focus is now zooming in Regulatory Technology (RegTech) solutions (KPMG, 2017).

RegTech solutions provide the ideal platform for supporting the industry's strategic growth agenda, accelerating their speed to market, and optimizing business processes while meeting regulatory standards. These solutions provide a way to first connect business processes with the labyrinth of complex regulatory obligations and then streamline and simplify these mandates into manageable processes that firms can implement effectively and relatively quickly. This will allow firms to deliver enhanced control over their enterprises' activities, which, when combined with an appropriate risk culture, ultimately culminates in better protection from reputational damage and improve enterprise risk governance.

As a regulatory body Bangladesh Bank is contentiously monitoring the activities of financial institutions of Bangladesh and providing appropriate guidelines. In recent times when bitcoin issue was booming, BB took necessary actions to stop that and raised awareness among different stakeholders. BB has also taken various initiatives for the smooth operation of e-banking in Bangladesh. BB has developed BACH, BEFTN, NPSB,

¹ KPMG International's 2016 Global CEO Outlook Study

RTGS infrastructure for smooth payment systems. BB is closely monitoring the activities of growing FinTech firms and giving appropriate directions to them.

With the above background, BIBM has conducted this roundtable discussion paper with the following objectives. The broad objective of this paper is to examine the possible impact, opportunities, and challenges of FinTech and RegTech in the Banking system of Bangladesh. The specific objectives of this paper are

- To discuss the conceptual issues of FinTech and RegTech.
- To identify global scenario of FinTech and RegTech and its impact in global financial services.
- To show the current status of FinTech and RegTech in the banking and financial sector of Bangladesh.
- To assess the possible impacts of FinTech and RegTech on banking systems in Bangladesh.

This paper used both primary and secondary data. Secondary data were obtained from different online and physical sources (websites and published articles). Both interview and questionnaire methods were used for collecting primary data. Primary data were collected through a semi-structured questionnaire. The questionnaire was sent to Head of Information Technology Departments of 58 banks in all categories including SoCB, SB, PCB and FCB of which 32 questionnaires were received. The study covers 4 SoCBs and 28 PCBs in Bangladesh.

67 percent of the respondents have very high level of awareness about FinTech whereas the awareness level is not satisfactory in RegTech. 58 percent of respondents have a moderate level of awareness about RegTech. Top level executives should change their mind-set to quick adoption of financial technology to cope up with the upcoming challenges channeled from FinTech firms, especially in the area of retail banking/financial services. Banks should develop awareness and reduce perception gap of bank management on technology adaptability issues.

The majority of the FinTech products are relating to retail financial services. In the retail banking sector, most of the services should be attractive to customers. For example, the payment system, online banking service, ATM services, utility services, etc. are some retail services that are the fruit of the use of FinTech. So, the concept of how technology be used in retail financial services developments is needed to give proper attention from the top level executives and IT professionals.

Updated and flexible policy, regulations and guidelines are inevitable for promoting FinTech products and services in our country. For better monitoring and supervisions of FinTech services, Government may form separate regulatory authority like The Microcredit Regulatory Authority (MRA) or BB may form separate wing to ensure effective guidance. Accurate and effective initiatives should be taken by Government or BB in this regard.

FinTech and RegTech: Possible Impact on Banking Systems in Bangladesh

1. Introduction

The banking industry has been faced with low-interest rates, deleveraging and low credit growth, increased regulation and compliance requirements, and a damaged reputation since the 2007-2009 financial crisis. Along with the appearance of these threats significant changes have taken place in the banking sector in recent years (Xavier, 2019).

Banks and Financial institutions are undergoing a massive change in the digital age - from their roles and responsibilities, service offerings, products to the distribution channels. At the same time, banking and financial sectors are going through the revolution in financial history called the FinTech² revolution which has led to a great transformation in the banking sector. With the adoption of technology, ever-changing regulatory landscape, and ever-growing consumer expectations, there is a rapid entry of new entrants in the market, which is of growing concern for the incumbent Financial Institutions (FIs). Innovation in the FinTech industry has taken the world by storm, becoming a global phenomenon not limited to any one region alone. Going forward, it may not be surprising to see increasing participation from the non-financial service sector, such as telecom, power, and retail, leveraging open data as a means to augment their portfolio by foraying into financial services. Dominant market players continue to emerge in the areas of payments and lending. Meanwhile, a broader range of companies focused on innovation in areas, such as Artificial Intelligence (AI) and data analytics, thereby attracting attention from investors. The Asian FinTech market is currently dominated by two growing economies, China and India. Albeit initiatives led by the government and regulators for digital Bangladesh, aided by the growing internet and smartphone penetration, has led to the adoption of digital technologies. The financial services industry is rapidly evolving and moving from the traditional 'one size fits all' approach to a more

² FinTech means innovative and modern technologies including Artificial Intelligence (AI), Blockchain, Data Analytics, etc.

personalized service approach. The adoption of these technologies by financial institutions can be achieved through collaboration with FinTech firms³, integration or development of the in-house skillset to execute these technologies. However, the real impact of digital transformation is likely to come from AI-driven data intelligence and distributed ledger technology which is also known as Blockchain.

Eighty-five percent of CEOs recognize the importance of integrating automated business processes with artificial intelligence and cognitive processes⁴. In today's fast-paced and rapidly changing environment, the financial service industry is challenged to find innovative ways to reach strategic growth objectives, further reduce compliance costs, and ensure effective management of regulatory change. As the industry is focusing on cost containment, remediation, and new regulations in a low-interest-rate environment, firms are now putting greater emphasis on their growth agenda. This includes acquisitions, new product development, cross-selling products and services, and improving customer service, which has all re-emerged under a digital technology lens as the industry's highest priority. Regulators and central banks are also seeking ways to leverage new technologies to meet public policy objectives and complex supervisory requirements. For many organizations, leveraging technology is the answer. While Financial Technology (FinTech) has become a core focus for all financial services players over the past decade and many banks have established their own labs, formed partnerships, and taken FinTech companies into residence programs, the focus is now zooming in Regulatory Technology (RegTech) solutions (KPMG, 2017).

With industry-wide compliance cost ballooning to an estimated \$70 billion annually in the United States alone, RegTech solutions have proven to be the accelerator that helps firms respond to increased regulatory expectations while reducing compliance costs, increasing enterprise-wide coordination, and making firms' business strategies more agile (KPMG, 2017).

³ FinTech Firms are companies providing financial services with the help of innovative and modern technologies.

⁴ KPMG International's 2016 Global CEO Outlook Study.

RegTech solutions provide the ideal platform for supporting the industry's strategic growth agenda, accelerating their speed to market, and optimizing business processes while meeting regulatory standards. These solutions provide a way to first connect business processes with the labyrinth of complex regulatory obligations and then streamline and simplify these mandates into manageable processes that firms can implement effectively and relatively quickly. This will allow firms to deliver enhanced control over their enterprises' activities, which, when combined with an appropriate risk culture, ultimately culminates in better protection from reputational damage and improve enterprise risk governance. Additionally, these solutions use the power of automation to reduce headcount spend and another compliance-related cost. For instance, compliance can be improved by limiting manual intervention and taking advantage of non-biased technology to accomplish certain fundamental processes (KPMG, 2017).

As a regulatory body Bangladesh Bank is contentiously monitoring the activities of financial institutions of Bangladesh and providing appropriate guidelines. In recent times when bitcoin issue was booming, BB took necessary actions to stop that and raised awareness among different stakeholders. BB has also taken various initiatives for the smooth operation of e-banking in Bangladesh. BB has developed BACH, BEFTN, NPSB, RTGS infrastructure for smooth payment systems. BB is closely monitoring the activities of growing FinTech firms and giving appropriate directions to them. With the above background, BIBM has conducted this roundtable discussion paper with the following objectives.

1.1 Objectives of the Study

The broad objective of this paper is to examine the possible impact, opportunities, and challenges of FinTech and RegTech in the Banking system of Bangladesh. The specific objectives of this paper are one, discussing the conceptual issues of FinTech and RegTech; two, identifying global scenario of FinTech and RegTech and its impact in global financial services; three, showing the current status of FinTech and RegTech in the banking and financial sector of Bangladesh and four, assessing the possible impacts of FinTech and RegTech on banking systems in Bangladesh.

1.2 Methodology

The round table discussion paper used both primary and secondary data. Secondary data were obtained from different online and physical sources (websites and published articles). Both interview and questionnaire methods were used for collecting primary data. Primary data were collected through a semi-structured questionnaire⁵. The questionnaire was sent to Head of Information Technology Departments of 58 banks in all categories including SoCB, SB, PCB and FCB of which 32 questionnaires were received. The study covers 4 SoCBs and 28 PCBs in Bangladesh.

1.3 Organization of the Paper

The paper is organized into six sections. The first section describes the introduction, objectives, and methodology. Section two reviews the literature and conceptual issues on FinTech and RegTech. Section three, shares global FinTech and RegTech scenario and its impact in the financial system. Section four, shows the current status of FinTech and RegTech in the banking and financial sector of Bangladesh. Section five, shows an in-depth analysis of surveyed data related to possible impact of FinTech and RegTech on Banking System in Bangladesh. And finally, Section six discusses major findings and suggests some recommendations.

2. Literature Review and Conceptual Issues

FinTech companies usually collaborate with banks due to three fundamental reasons. First, the banks facilitate the way for the FinTech companies to enter the market, since the banks already exist in the market and have their customer bases, second the banks boost the FinTech companies' profitability, and third the banks reinforce the FinTech products (Bömer and Maxin, 2018).

Lohia (2018) analyzed the engagement of Banks and FinTech for the profitability of each other. Those banks which have been cognizant of the changes and invested in FinTech have attained positive gains from their collaborations. FinTech assists banks in developing their product offerings and in turn generating more profitable paths to deploy their capital. In

⁵ A questionnaire that contains both open-ended and close-ended questions.

recent years both Banks and FinTech have perceived the advantage of each other's strengths. There has been a drastic evolution in the Business Model of Banking, from one bank providing all services to a group of players providing a variety of services. However, some researchers argue that the relationship between the FinTech companies and the banks is competitive such as Navaretti *et al.* (2017), banks have the ability to compete with the new entrants due to the following three reasons, firstly the banks have a tremendous source of funds that are protected either explicitly or implicitly by public guarantees, secondly the degree of regulatory stringency is more heterogeneous across the financial services that provided by the FinTech companies, thirdly the largest banks have already started to integrate digital innovation.

In another article Sur (2018) has identified that the highest number of FinTech service providers are in payments, clearing and settlement categories. FinTech also presents a wide variety of risks, banks should always be aware of risks and their implications before they develop their FinTech strategies. The new tech revolution is impacting almost all aspects of banking operations.

Milne (2016) argues that the more ambitious prognostications of the outcome of the current FinTech revolution. These FinTech transformations of banking benefit the customers, depending on their banking platforms. It argues that technology developments have indeed matured to the points where there is a change in banking and financial services. If policy intervention is supportive then the technology-driven change in banking can be profound.

Buitenhek (2016) found that blockchain, the technology underpins bitcoin and cryptocurrencies looking for potential disrupt and transform the financial services industry. This blockchain highlights the work that the industry needs to make blockchain applications a mainstream part of financial service and it can help the entire industry by speeding up transactions and making them more secure. The blockchain is a constantly update the public ledger of transactions. Pozzolo (2018) conducted a study of whether FinTech is creating competition or enhancing the services provided by the traditional banks. Furthermore, FinTech is imparting

banks with effective ways of doing the same traditional things and also increasing customer satisfaction. FinTech operated banks are comparatively better at managing raw information that can be digitalized, and further focus on additional standardized assets. FinTech is developing at a high speed and hence has become the most incumbent in the financial markets. The paper focuses on how financial services firms can gain greater strategic advantage, reduce cost, and harmonize coordination through RegTech (KPMG, 2017).

Figure-1 shows that how traditional model differs from innovative technology based FinTech solution. The gap creates opportunities for FinTech companies.

Figure 1: Evolution of Financial Services

User Needs [1]	Traditional Model	Gaps [2]	Technological Innovations [3]				FinTech Solutions
			AI/ML	Data Cloud Platforms	DLT/ Crypto	Mobile	
Pay	Cash/ ATM Check Wire/ Debit/Credit Cards Centralised Settlement	Speed Cost	L	H	H	H	Virtual currencies remittances mobile payments mobile pos p2p payments b2b transactions DLT-based settlement
Save	Bank deposits Mutual Funds Bonds Equities	Transparency	L	H	H	L	Virtual currencies mobile market funds blockchain bonds
Borrow	Bank Loan Bonds Mortgages Trade Credit	Access	H	H	H	L	Credit modeling platform lending crowd-funding blockchain bonds auto-underwriting
Manage Risks	Brokerage underwriting structured products trading regulatory compliance KYC Insurance	Security	H	L	H	L	Regtech, smart contracts suptech Crypto-asset exchanges eKYC, Digital ID
Get Advice	Financial planner Investment advisor		H	M	L	M	Robo-advising automated wealth management

Source: IMF staff.

1. This figure maps users’ needs for financial services—explained in IMF (2017)—to traditional solutions and emerging FinTech solutions. In doing so, it flags the key gaps that technology seeks to fill, and which new technologies are applied in different services.

2. In gaps, transparency encompasses search and matching frictions, while access encompasses product tailoring needs.

AI/ML refers to Artificial Intelligence and Machine Learning algorithms applied to extract insights from large amounts of data. Data/Cloud Platforms are cloud-based technologies that facilitate B2B, C2B, C2C, and B2C exchange of data via Application Programming Interfaces (APIs), across FinTech firms, financial institutions, customers, and governments. Access to digital platforms can be secured with digital identification technologies, such as biometrics. DLT/Crypto captures distributed ledgers, such as smart contracts and related decentralized technologies. Mobile refers to feature phones and smartphones running financial apps. The scheme reflects a judgment on whether the specific technology has a low (L), medium (M), or high (H) level of benefit for the corresponding FinTech solutions. Scaling is purely illustrative.

2.1 Different Types of FinTech Firms

FinTech firms can be classified into many categories. Many banks and financial institutions consider FinTech firms as their enemies. Practically, FinTech firms are not always acting as the competitors of banks and financial institutions. Sometimes, they are very good friends of banks and financial institutions. Table-1 shows different types of FinTech firms and their activities.

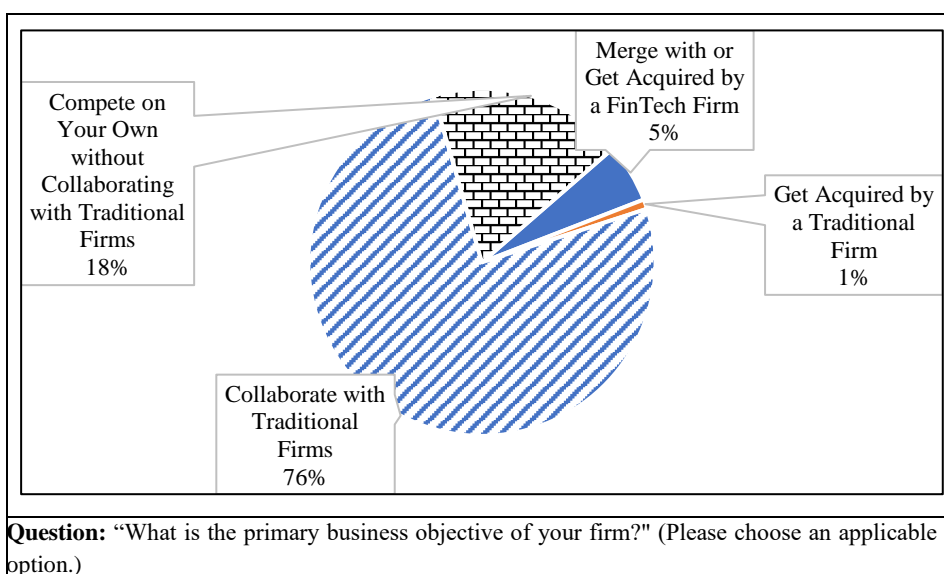
Table 1: Type of FinTech Firms and Their Activities

Types of FinTech Firms	Activities
Enabler firm providing technology support	FinTech firms that provide technology-based offerings to traditional firms or other FinTech firms. E.g., Firms that provide data mining services
The firm providing customer services	FinTech firms that provide financial services to customers or help in distributing financial services offerings. E.g., Neo-Banks or Challenger banks
Firm providing value-added services	Firms providing value-added services to customers such as a comparison of financial products. E.g., Online portals to compare insurance products

Source: Capgemini Financial Services Analysis, 2018

Figure-2 shows the primary business objectives of FinTech firms. The figure was adopted from the world FinTech report survey, Capgemini (2017). It is clear from the following pie chart that the majority of the FinTech firms have a common objective to collaborate with traditional firms. Traditional firms have already had a huge market share in terms of customers and trust whereas FinTech firms have innovation. A combination of these two facts stimulates FinTech firms for collaboration.

Figure 2: Primary Business Objectives of FinTech Firms (%)



Source: World FinTech Report Survey, Capgemini, LinkedIn, Efma, and MaRS, 2017

Note: The percentages represent FinTechs who have chosen the particular option.

2.2 Technological Backgrounds of FinTech and RegTech

The following section covers various technologies adopted by FinTech and RegTech. API, Cloud Computing, Big Data are some of the technologies behind. Blockchain or Distributed Ledger Technology is going to change the payment landscape globally by introducing peer to peer transfer systems. Disruptive technologies enhance the capability of FinTech firms. Mobile technology has brought a revolution in the era of FinTech.

Application Program Interface (API): APIs are definitions, protocols, and tools that specify how different software should interact. They allow the development of computer programs such as personal finance

management applications that access a person's bank (or other) account information to provide a range of facilities (e.g. financial management tools).

Cloud Computing: Cloud computing is an internet-based model for delivering Information Technology (IT) services. It employs a network of remote servers that enable IT resources to be centrally pooled, rapidly provisioned and quickly redeployed. The cloud computing market in India is expected to contribute US\$17.2 billion in new business revenues and create around 1.1 million jobs by 2021. However, data privacy remains a concern and many banks prefer private clouds over public clouds for data storage.⁶

Big Data and Analytics: Big data is typically characterized by the 3Vs — volume, velocity, and variety⁷. Big data technology enables sourcing, aggregation, and analysis of such data. Analytics, which includes behavioral analytics, predictive analytics, and sentiment analysis, is used to gain more precise insights about the customer. Many Indian banks are using analytics across a multitude of functions, including managing customer relationships, reducing credit losses and NPAs, countering fraud/money-laundering, managing risks mapping networks, etc.⁸

Artificial Intelligence and Machine Learning: Higher efficiency and higher productivity at lower costs are among the benefits of artificial intelligence and machine learning, which uses statistical and mathematical models to draw inferences and patterns based on large sets of raw information. Machine learning applications cut across various functions including fraud prevention, risk management, customer service, and marketing. The adoption of machine learning in financial services is on the rise, as it enables constant innovation and development of an enterprise or personalized solutions.⁹

⁶ "Banking in the age of disruption," EY, February 2017

⁷ "Volume, Velocity, Variety: What You Need to Know About Big Data," Forbes, 19 January 2012.

⁸ "Analytics in Indian Banking Sector – On a Right Track," Analytics Magazine India, 28 February 2015.

⁹ Wealthfront, Form Adv, October 2017, accessed November 2017 at https://www.wealthfront.com/static/documents/form_adv_part_1.pdf

Blockchain: Blockchain technology is a decentralized digital ledger distributed across a network of computers known as nodes, which maintain a growing list of transactions between participants. The transactional record is synchronized, as each copy of the record is identical and automatically updated, and immutable, as data cannot be modified, but only a few records can be added. In addition to providing enhanced security and control over data, blockchain can help banks in cutting transaction times and reduce costs. Indian banks have already started to implement blockchain solutions for implementing KYC protocols and executing overseas transactions such as remittances. A 30-member consortium of public and private sector banks and NBFCs in India, known as Bankchain, has been formed to implement a blockchain solution for the due diligence of corporate borrowers, evaluation of corporate lending risk and vendor management. The blockchain solution is expected to streamline the KYC implementation procedure as banks will be able to share information such as risk profiles for corporate customers and suspicious transactions with other banks on the network.¹⁰

IoT: The IoT is the network of internet-connected sensors that can be embedded into physical devices (things). These devices can collect data and share it across the web with people, applications and other devices. Data collected through the IoT can aid banks in decision making by helping them to gain insights into their customers' spending patterns, ATM-usage and financing needs. The IoT can boost rural banking services in India in a big way. The simplest application could be banks negotiating financial agreements with a farmer after calculating yield by tracking the condition of crops.¹¹

Numerous innovations in financial products and services are observed across the globe, some of which are summarized in Box-1.

¹⁰ "Indian banks ready to launch first blockchain-based solution to map corporate borrowers, spot fraud," Sourcecode Media, 13 December 2017.

¹¹ "The digital bank: tech innovations driving change at US banks," EY, 2016; "Banking in the age of disruption," EY, February 2017.

Box 1: Examples of Financial Products and Services Using FinTech

Digital Payments and E-money: FinTech innovations are increasingly explored for wholesale payments, but most of the action is in the retail payments. Particularly in developing countries, where cash accounts for the bulk of retail payments and where payment (debit and credit) cards are not widely used, FinTech firms offer options for peer-to-peer transfers, bill payments, and electronic purchases. In many cases, these services are attached to an e-money product, i.e., a digital wallet where customers can hold monetary value for an undetermined period of time. A pioneer was Kenya's M-PESA, offered by Safaricom, a mobile network operator, but there are numerous other examples. These products may also be tied to savings accounts or insurance products.

International Remittances: there is a wealth of FinTech innovation focused on large international remittances corridors. FinTech has been simplifying procedures and cutting the costs of transfers, including to serve the undocumented diaspora in a variety of countries. The services may be based on e-money products, traditional bank accounts, cryptocurrencies (see below), or combinations of these.

Personal and Business Loans: FinTech credit is a burgeoning market and can take many forms and target various customer segments, including low-income borrowers and micro, small and medium enterprises. Most often, FinTech credit utilizes novel credit scoring methods based on alternative data collected outside of the financial sector (e.g., Big Data, bill payments history, mobile phone usage). Many products are based on automated credit decisions, whereby a customer applies for and has her loan disbursed in only a few minutes, simply by pushing some buttons on her mobile phone.

Peer-to-peer (P2P) Lending Platforms: within FinTech credit, an important development is peer-to-peer lending platforms, which are mostly Internet-based services provided by a FinTech firm where lenders and borrowers "meet". Platforms vary widely in format and operating rules.¹²

Crowdfunding Platforms: Crowdfunding platforms are mostly Internet-based services provided by FinTech firms to facilitate funding/investment

¹² For further descriptions, see FSB (2017).

opportunities, including equity investment and donations. Like P2P lending platforms, these vary widely in shape and operating rules.¹³

Robo-advisors: Robo-advisors (also called “automated” or “digital investment” advisors) are online platforms that provide services such as financial advice and, most often, portfolio management, with minimum or no human intervention.

Cryptocurrencies: Bitcoin was the first widely used cryptocurrency, but many others have been created since 2009 when Bitcoin was launched. Cryptocurrencies are not issued by government authorities and are not usually recognized as and do not represent fiat currency. Like Bitcoin, other cryptocurrencies are based on DLT. Individuals and companies can acquire and sell cryptocurrencies by being parties in the distributed ledgers, or by using specialized cryptocurrency online exchanges.

Source: FinTech, RegTech, and SupTech: What They Mean for Financial Supervision (2017)

2.3 Engagement Model between Banks and FinTech

Banks and FinTech companies can engage with each other primarily through the following possible five modes:

Table 2: Types of Banks and FinTech Engagement Models

Engagement Model	Description
Investment	Banks invest their own capital in FinTech start-ups as: <ul style="list-style-type: none"> • Dedicated in-house venture capital or strategic investment arms • Independent venture capital funds • Investments on their own balance sheet business
Collaboration	Banks enter into various types of arrangements with FinTech companies: <ul style="list-style-type: none"> • Utilizing products or platforms developed by FinTechs (e.g., teaming up with a Robo-advice FinTech to offer investment management service) • Joint ventures or co-created services (e.g., partnering with FinTech to launch digital market place)

¹³ IOSCO (2014) classifies P2P lending as a type of crowdfunding.

	<ul style="list-style-type: none"> • Collaborating as a network to develop and test new technologies and solutions • Referral arrangements between FinTech companies and the bank
In-house product development	<p>Banks are accelerating their in-house development of FinTech products and services. Steps include:</p> <ul style="list-style-type: none"> • Developing a FinTech framework that rewards innovation • Selecting an innovative operating model that connects new ideas to business needs while balancing innovation with risk
M&A	Acquiring a FinTech company can increase a bank's digital footprint and short-cut the development of new technology.
Joint FinTech program	Collaborative role with other banks alongside program participants (e.g., VCs, government agencies and program managers).

Source: "Unleashing the potential of FinTech in banking," EY, June 2017; EY Analysis

2.4 RegTech as a Subset of FinTech

Bank and financial institutions are highly regulated. Use of technologies by the financial institutions have raised concern by the regulators to increase supervision. As with its bigger brother FinTech, the definition of RegTech will mean different things to different people in this developing area. While the name is new, the marriage of technology and regulation to address regulatory challenges has existed for some time with varying degrees of success. Increasing levels of regulation and a greater focus on data and reporting have however brought the RegTech offering into greater focus thereby creating more value for the firms that invest in these solutions. (Deloitte, 2016).

RegTech refers to a sub-division of the FinTech sector that focuses on technologies that may facilitate the delivery of regulatory requirements more efficiently and effectively than existing capabilities. Companies that develop agile financial technology can not only help financial companies to better comply with regulations but also assist regulators to better enforce prudential regulation and supervise financial institutions (Arner, Barberis, & Buckley, 2015). FinTechs have taken the view that the challenges to

traditional banking currently are simply questions of engineering and technology that can be solved through a combination of high-quality data and automation (FRB Chicago, 2016).

FinTechs amplify the burden on incumbent financial services providers by exposing weaknesses in their existing business models. They also amplify the burden on regulators to effectively monitor their subjects. A blurred line though lies in the interaction of RegTech as a tool to be used and applied by regulators on their subjects and the subjects themselves as well as the benefits and risks that this interaction brings. That is also partly because, in contrast to FinTechs, RegTechs have been more of a top-down phenomenon. This is a setting where technology providers act in response to demand from bulge bracket financial institutions (and regulators) in order to address both the objective of decreasing regulatory and compliance requirements costs as well as increasing market monitoring capabilities and as such, this has also introduced opportunities for RegTech start-ups (Eyers, 2016). Furthermore, this increasing use of technology in finance progressively demands more pressure on the regulators to switch their approach from regulating human behavior to controlling and supervising the algorithmic/electronic processes and this accelerated growth of FinTech has also spurred the need for RegTech (Ernst and Young, 2016).

RegTech-generated solutions enhance the ability to scale and flex operative capacity and provide:

Agility: Disordered, cluttered, and tightly knit data sets that can be de-cluttered and re-organized. This provides the potential for the universal harmonization of data compliance tool standards to be shared nationally, regionally, and globally; a level-playing, much sought after data quality (Deloitte, 2016).

Timely Reporting: Reports that can be configured and generated quickly. It offers, for example, near real-time transaction analysis, online registration, and open source compliance systems. It enables data-driven compliance and pro-active regulation and risk management (Brummer, 2015).

Speed and Integration: They afford much shorter timeframes to devise and implement a solution.

Analytics: Intelligent mining of existing large data sets and unlocking the full potential by using ready-made, repository data for multiple purposes. It creates risk data warehouses and monitoring activity tools; it potentially affords smarter regulatory policy modeling to simulate the impact of new policies on a case-by-case basis even before legislating through, for example, regulation gap analysis tools (Deloitte, 2016).

Various management information tools such as financial health check, transaction reporting, regulatory reporting, and training tools.

RegTech, while incremental, is still in relatively early stages and follows in parallel as a subset of FinTech. Yet, neither a strict designation of what it actually exists nor a trajectory to verify potential full-scale effects. This informatively richer and innovative technology does not properly fit into any current legal category created by recalcitrant regulatory structures, as some have put it (Kaal, 2016). As a novel concept, it is a feebly ‘quiet’ structural transformation force in motion in the financial services sector and in-depth knowledge of this ‘sub-sector’ is still in its early stages. Its market stake is still not large enough to warrant a materially risky status in terms of a commanding share of the financial services industry and hence a commanding share of regulation as well. This is also partly due to the current industry participants’ status as obstacles to entry and hence the skepticism regarding innovative products and services (a point which we discuss in our concluding section). More specifically, due to their closeness to the end-user, incumbent financial institutions have habitually considered challengers and other non-financial companies as rivals rather than partners. At the same time, the FinTech/ RegTech ecosystem is not as small to be neglected (Fernández, 2016) and yet challenger banks are still hovering silently away from the regulators’ watch owing to their size. But as with any other large market player they are expected to draw scrutiny as they begin to reach significant size/volume (McKinsey, 2015). With regard to the latter argument, for example, Cortez (2014) argues that although it is nowadays widely accepted that novel, disruptive technologies as a whole are generally less expensive, less complicated and more accessible than

pre-existing ones, their impact on regulatory infrastructures is often diverse and thus it potentially demands different policy responses to various challenges posed.

2.5 RegTech for Financial Institutions

Significant business opportunities for RegTech arise from the trade-off between the need to stay compliant with ever-changing regulations and the need to cut costs to remain profitable. Accordingly, most of RegTech today centers around solutions for regulated financial institutions, helping them comply more efficiently and with greater certainty with regulations and improve risk management, while cutting costs. While the market is still developing, the following areas of RegTech can be identified:¹⁴

Box 2: Areas of RegTech

Compliance: This represents a good part of RegTech today. Examples include enterprise-wide solutions for identifying and keeping track of changes in regulatory requirements, at local or global levels, and solutions for automated real-time monitoring of compliance levels and compliance risk, based on the analysis of operational and other data (e.g., employee monitoring, historical email analysis, human behavior analysis, trade communication analysis). This form of automated compliance may be called “dynamic compliance”, i.e., regulatory requirements are embedded into IT protocols to ensure continuous compliance and confirm whether the data reported to supervisors is accurate and relevant. This type of RegTEch can dramatically reduce the costs of manual compliance procedures. A wave of start-ups and a few tech giants operate in this arena to help institutions keep up-to-date with regulatory requirements, identify potential financial crimes, and manage financial risk. Numerous other topic-specific solutions can be found, e.g., for cybersecurity, shareholder disclosure, automated audits, etc.

Identity Management and Control: Another important area in RegTech focuses on counterpart due diligence and KYC procedures, Anti-money Laundering (AML) controls and fraud detection. For instance, digitalization of client or partner onboarding processes, digitization and sharing of customer/partner information, gathering and analyzing customer and transaction data, and identifying suspicious transactions based on automated

¹⁴ Based on Deloitte (www2.deloitte.com/lu/en/pages/technology/articles/regtech-universe.html) and IIF (2016).

triggers and constantly updated customer/partner profiles. KYC utilities based on DLT or other technology are also included in this area of RegTech.

Risk Management: This area focuses on tools to improve the risk management process at financial institutions, by bringing efficiencies to the generation of risk data, risk data aggregation, internal risk reporting, automatically identifying and monitoring risks according to internal methodologies or regulatory definitions, and creating alerts and automated actions triggered when pre-determined risk levels are reached. These solutions may rely on advanced data analytics supported by machine learning or other AI applications.

Regulatory Reporting: This is a crucial area for supervisory agencies and a central element in regulatory compliance. RegTech solutions help automate and integrate regulatory reporting requirements to cut costs, and streamline and increase the accuracy and timeliness of reporting, including making real-time reporting possible.¹⁵

Transaction Monitoring: This area focuses on conduct-of-business requirements, and solutions offer real-time transaction monitoring and auditings, such as by using DLT, end-to-end integrity validation, anti-fraud and market abuse identification systems, back-office automation (post-transaction settlement, closing procedures), and risk alerts.

Trading in Financial Markets: This area relates to the automation of the numerous procedures related to transacting in financial markets, such as calculating margins, choosing central counterparties and trading venues, assessing exposures, complying with good conduct-of-business principles, etc.

Source: FinTech, RegTech, and SupTech: What They Mean for Financial Supervision (2017)

A useful consideration is whether RegTech solutions are developed and implemented separately by individual financial institutions in bilateral partnerships with FinTech firms, or whether financial institutions cooperate to jointly build or use a third-party solution to achieve efficiency gains – the “shared utility model”. Examples of the shared utility model include regulatory reporting utilities and KYC utilities.

¹⁵ This area is influenced by the complexity of the post crisis risk data aggregation and reporting requirements, such as those related to capital, liquidity, stress testing, FSB’s requirements on recovery and resolution plans, reporting on OTC derivatives, etc.

Box 3: Case Studies of KPMG's RegTech Solutions on Credit Scoring

ASEAN's premier consumer banking group over 1,000 branches in Malaysia and across ASEAN and over 13 million customers across various customer segments.

Develop an application scorecard for their credit card portfolio (using a sample of 31,680 credit card applications from Jan 2013 to Jun 2015) and benchmark the estimated default rate with the observed default rate.

KPMG, working with DATOS, used a cognitive machine to perform:

- Rapid data assessment
- Build Training Data
- Built application scorecard using deep learning neural network

Significant reduction in bad loan rate from 1.29% to 0.93%. Translates to US\$3.5 million savings on provision per year.

Source: RegTech Service Preparing your financial institution for the future, KPMG (2016)

3. Global FinTech and RegTech Landscape

3.1 Global FinTech Landscape

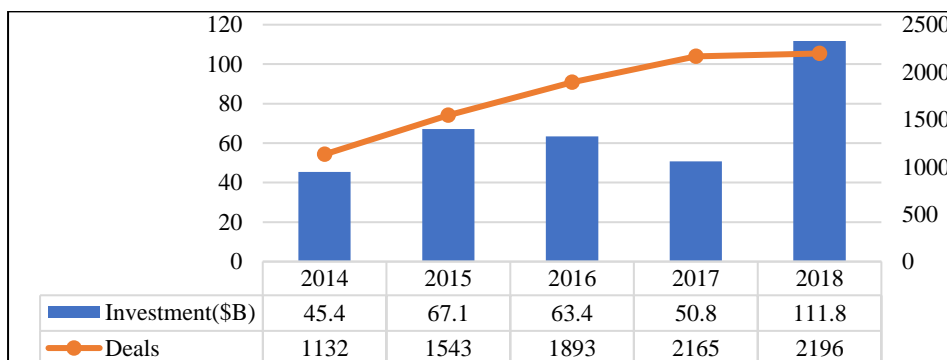
Mobile money innovation, adoption, and usage the Sub-Saharan Africa (SSA) has become the global leader. Across Africa, the adoption and use of technology in the provision of financial services is changing the way in which financial service providers operate and deliver products and services to their customers. The region leads the world in mobile money accounts per capita (both registered and active accounts), mobile money outlets, and the volume of mobile money transactions. Mobile money account penetration in SSA countries recorded a remarkable increase. Based on the Findex 2018 report—as of the year ending 2017, since 2014 the share of adults in sub-Saharan Africa with a mobile money account has nearly doubled to 21 percent. In addition, close to 10 percent of GDP in transactions are occurring through mobile money, compared with just 7 percent of GDP in Asia and less than 2 percent of GDP in other regions. (WB, 2019)

The FinTech market in Europe is growing but is unevenly distributed, with non-EU countries trailing European Union peers in FinTech adoption. European authorities (such as France, Lithuania, Luxemburg, Malta, Switzerland, and the United Kingdom) have been proactively encouraging

FinTech innovation and exploring regulatory responses. The European Union has introduced two key regulations in the form of the General Data Privacy Regulation (GDPR) and the Payments Services Directive 2 (PSD2), both of which came into effect in 2018. The full implications of these significant policy developments will take some time to become clear. Nonetheless, Europe is already among the most financially-developed and inclusive regions in the world. Therefore, unlike some other regions, FinTech would mainly affect the intensive margin of financial services provision. While lagging somewhat in investment in FinTech startups, existing financial institutions are actively adopting new financial technologies, as manifested, for example, in the fact that Europe is the leading region for digital payments (WB, 2019).

According to Figure 3, in 2018, global investment in FinTech companies hit \$111.8B with 2,196 deals (KPMG, 2018). It is also seen that year-over-year growth in both volume and aggregate value of dollars invested across all private investment transactions, it is remarkable just how swiftly the sector grew. It is seen from the figure that 2017 was not a good year for FinTech investment. Although the number of deals was remarkable in that year.

Figure 3: Global Investment Activity (VC, PE, and M&A) in FinTech



Source: Pulse of FinTech 2018, Global Analysis of Investment in FinTech, KPMG International (data provided by PitchBook) January 4, 2019.

Asia has made significant advances in nearly every aspect of FinTech, although there is heterogeneity within the region. FinTech use has expanded beyond payments to include lending, insurance, and investment; adopting a wide range of technologies based on consumer needs, level of development, regulatory stance, and existing financial and technological

infrastructure. Asian tech giants (e.g., in Bangladesh, China, Indonesia) have become important providers of financial services, putting competitive pressures on traditional financial institutions. Policymakers are trying to catch up with the rapid pace of FinTech development while ensuring that FinTech risks are well understood and mitigated. Some FinTech products have raised significant consumer and investment protection issues, as well as financial stability and integrity concerns (particularly in crypto-assets and P2P lending). Regulators are using mechanisms such as FinTech units and regulatory sandboxes, and some regulators have been testing RegTech/SupTech applications (e.g., Malaysia and the Philippines). Some countries have issued regulations on digital lending (e.g., Indonesia, Malaysia, the Philippines, Singapore, and Thailand) and equity crowdfunding (e.g., Malaysia, Singapore, and Thailand). Similarly, the government of India via India Stack and the Jan Dhan-Aadhaar-Mobile Trinity is supporting the digitization of payments, amending KYC requirements, and customer's digital onboarding, and enabling automated access to data from various digitized government systems in the country (WB, 2019).

Figure-4 and 5 show total investment activities (VC, PE, and M&A) in FinTech in China and India respectively. The figure 4 clearly shows that 2018 was a big year for China due to the 18230.7 million USD investment. Compared to china it is seen that India is lagging behind in investment in FinTech. However, Investment in India's FinTech sector is also growing faster compared to 2014.

Figure 4: Total Investment Activity (VC, PE, and M&A) in FinTech in China

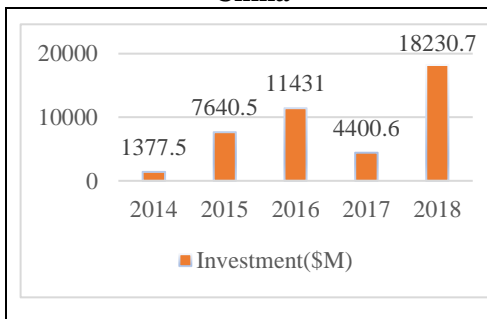
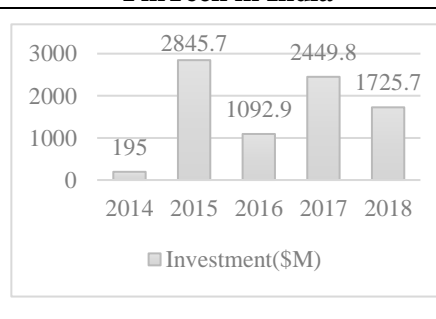


Figure 5: Total Investment Activity (VC, PE, and M&A) in FinTech in India



Source: Pulse of FinTech 2018, Global Analysis of Investment in FinTech, KPMG International (data provided by PitchBook) January 4, 2019

Box 4: The Case of China

China serves as a primary example of the large effect FinTech and BigTech firms can have on the banking sector. Its mobile-based connectivity ecosystem along with the scarcity of consumer-targeted bank offerings and the innovation-friendly regulatory framework has allowed large tech companies to seize major market share. P2P lending is prominent in China, as are mobile payments.

Bigtechs' activities in finance are prevalent in China, especially in mobile payments for consumption which have been increasingly popular constituting 16% of the country's GDP. (Comparing with less than 1% of GDP in the US and the UK.) Taking advantage of the not so developed payments system, in 2003 and 2004 China's most prominent online commerce company, Alibaba, introduced Alipay (later renamed Ant Financial) as a third-party online payment platform, which has been instrumental in Alibaba's success. It now offers payments, wealth management, lending, insurance, and credit scoring services counting more than 520 million users and managing money at the same level as China's big four traditional lenders. The platform has managed to now cover more than 50% of the \$5.5 trillion Chinese mobile payments sector with tech giant Tencent (which owns the dominant messaging app WeChat) as its only major competitor and the two firms accounting for 94% of the market. The online Money Market Fund (MMF) Yu'e Bao of Ant Financial commanded US\$ 200bn assets in September 2018, the largest MMF in the world.

Ant Financial is also a key provider of insurance services holding a majority stake in Cathay Insurance China and a founding stake in ZhongAn Insurance, China's first online-only insurance firm with 535 million insured customers. At the same time, China is the largest market for FinTech credit with 2,525 FinTech credit platforms by the end of June 2017 and FinTech credit volumes steadily growing with cumulative lending having reached RMB 1.359 trillion (\$215 billion) in the first half of 2017. The search engine Baidu has also moved into banking and financial services.

Overall, smartphones have evolved into a major platform for the provision of alternate services in China. Single platforms integrate online shopping, as well as mobile phone wallet and money transfer capabilities.

Source: WEF (2017), Carstens (2018) and FSB (2019)

3.2 Global RegTech Landscape

RegTech promises to disrupt the regulatory landscape by providing technologically advanced solutions to the ever-increasing demands of compliance within the financial industry.

RegTech companies are providing solutions in the areas of Regulatory Reporting, Risk Management, Identity Management & Control, Compliance, and Transaction Monitoring. Table-3 gives an overview of where the RegTech companies are located, their size when they were founded as well as which industry they are targeting in particular.

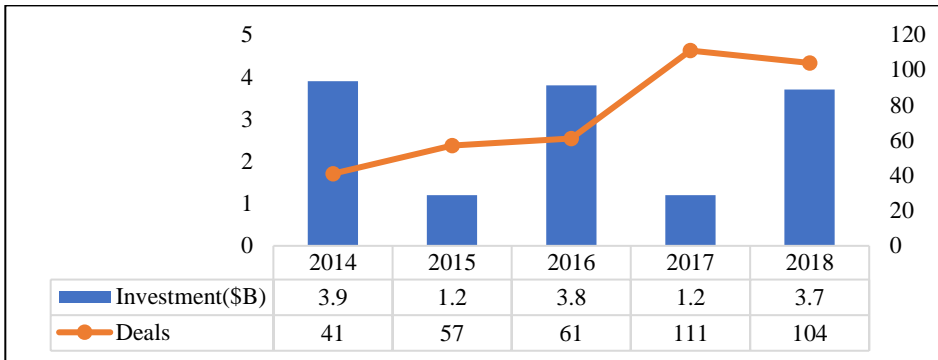
Table 3: Top RegTech Companies in the World

Type	Company Name	Location	People	Target Industry
Regulatory Reporting	Abide Financial	UK	51-200	Financial Industry
	Fundsquare	Luxembourg	51-200	Financial Industry
	Setrega	USA	200+	Financial Industry
Risk Management	Ayasdi	USA	200+	Financial Industry
	Observeit	USA	51-200	Broad
	Secondfloor	Netherlands	51-200	Insurance
Identity Management and Control	Accuity	USA	200+	Financial Industry
	Exiger	USA	200+	Financial Industry
	RDC	USA	200+	Financial Industry
Compliance	Abside RegTech	Spain	200+	Broad
	CUBE	UK	51-200	Financial Industry
	MJ Freeway	USA	51-200	Healthcare
Transaction Monitoring	b-next	Germany	51-200	Broad
	Neuroware	Malaysia	51-200	Payments & Money Transfer
	Synet Global Solutions	Ireland	200+	Financial Industry

Source: <https://www2.deloitte.com/lu/en/pages/technology/articles/regtech-companies-compliance.html#tab4>

Figure-6 depicts global private investment (VC, PE, and M&A) in RegTech. According to the graph, it is seen that 3.9 billion was invested in 2014 with only 41 deals. In 2015 and 2017, a total of 2.4 billion was invested in RegTech. It is also seen from the figure that 2018 was a good year for RegTech with a 3.7 billion investment.

Figure 6: Global Private Investment (VC, PE, and M&A) in RegTech



Source: Pulse of FinTech 2018, Global Analysis of Investment in FinTech, KPMG International (data provided by PitchBook) January 4, 2019.

4. FinTech and RegTech in the Banking and Financial Sector of Bangladesh

The uses of the Internet and mobile phones have been maintaining an upward growth in the last five years (Figure-7 and 8). At the end of December 2018, the total number of internet subscribers has reached over 91 million and the total number of mobile phone subscriptions has reached 157 million (BTRC, 2018). This digital integration has already brought proven changes and development in the economic and social lives of the country.

Figure 7: Mobile Subscribers¹⁶ (in millions) from 2014-2018

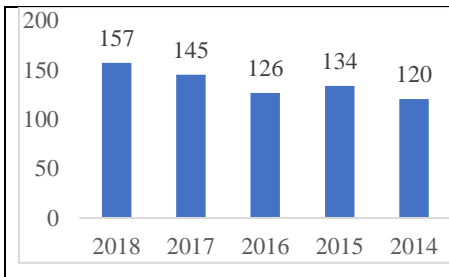
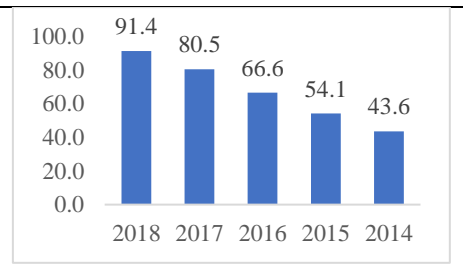


Figure 8: Internet Subscribers¹⁷ (in millions) from 2014-2018



Source: BTRC, 2019

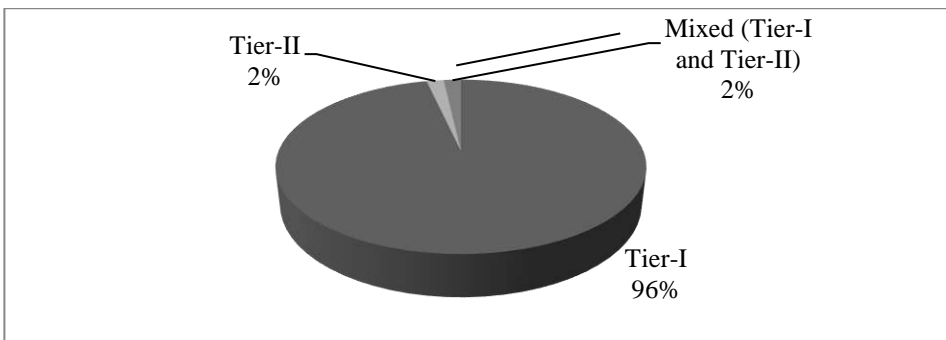
¹⁶ Mobile Subscriber means the biometric verified subscribers/subscriptions who have any activity (voice, data, sms etc.) at least once in the preceding 90 days.

¹⁷ Internet Subscriber means subscribers/subscriptions who have accessed the internet at least once in the preceding 90 days.

4.1 ICT Infrastructure of Banks

According to the Guideline of BB on ICT Security for Banks and Non-Bank Financial Institutions (Version 3.0, which was released on May 2015), around 96 percent of banks have introduced real-time online banking, meeting the Category-1 architecture at the end of 2018. The rest have introduced either Category-2 (2%) or Mixed Category (2%) architecture, as shown in Figure 9. Banks of Mixed Category partially implemented Category-1 architecture and gradually transferring the branches to meet the Category-1 architecture from Category-2 architecture. SBS mainly falls in this category.

Figure 9: Level of ICT Infrastructure



Source: BIBM Survey

4.2 Mobile Banking

Mobile banking is a term used for performing banking activities via a mobile device such as a mobile phone. Mobile banking is most often performed via USSD or the Mobile Internet but can also use special programs called clients downloaded to the mobile device. At the end of 2018, 19 banks have got permission where 18 banks were offering MFS services. Recently two banks have closed their operations. A high growth per year is observed in terms of the number of customers, the volume of transactions and the number of transactions since 2014 (Table-4).

Table 4: Mobile Banking Growth, 2014-2018

	2014	2015	2016	2017	2018
No. of Approved Banks	28	28	19	19	19
No. of Banks Offering MFS	19	18	17	18	18
No. of Agents	540,984	561,189	710,026	786,459	886,473
No. of Customers	25,186,250	31,845,658	41,078,524	58,825,414	67,519,645
No. of Active Customers	12,154,492	13,218,356	15,874,325	21,065,321	37,323,000
No. of Total Transaction (Millions)	589.48	1,166.05	1,473.24	1875.64	2272.75
Total Transaction Amount (Billions BDT)	1,031.55	1,772.76	2346.92	3146.62	3788.85

Source: Bangladesh Bank

4.3 FinTech Companies in Bangladesh

Some banks and non-banks financial institutions strive to develop some form of FinTech companies. The following list of popular FinTech companies in Bangladesh will give an overview of the FinTech sector.

The mobile-money market in Bangladesh is currently dominated by bKash with Rocket as a distant second. However, there are many other Digital Financial Services (DFS), each with its own distinct focus.

iPay Systems Ltd. is a FinTech company founded in 2015. The goal of the company is to become a pioneer in the FinTech industry that not only simplifies life but also introduces a whole new dimension of the cashless society in Bangladesh. To make payments convenient, iPay has a unique approach which implements QR code based payment, introduced for the first time in Bangladesh

Nagad is a venture by the Bangladesh Post Office that facilitates the day-to-day financial transaction needs of the people. It has over 8500 branches in the country. Unlike other players in the market, this service has a regulatory advantage. This is due to it not being regulated by the central bank as a result of the postal act. This allows users to make over 5 times greater daily transaction limits of other MFS in the country.

Dmoney is a FinTech firm which ensures easy, fast and secure means of going digital. Dmoney is an intellectual property of Dmoney software.

bKash Limited (bKash) is a Bank-led Mobile Financial Service Provider in Bangladesh operating under the license and approval of the Central Bank (Bangladesh Bank) as a subsidiary of BRAC Bank Limited. At present, bKash is one of the leading Mobile Financial Services Provider in the world. Currently, bKash is running a network of more than 180,000 agents throughout urban and rural areas of Bangladesh with over 30 million registered accounts.

Rocket Dutch-Bangla Bank Limited, a technology savvy commercial bank in Bangladesh, started Rocket on 31 March, 2011. Rocket is a Bank-led model to fulfill the basic banking needs utilizing mobile phones in Bangladesh where only 24% of the adult population has bank accounts, but 60% are using mobile phones.

SureCash is pre-paid reloadable mobile wallet that allows users to pay utility bills, education payments, online payments and money transfer. It was established in 2010. SureCash is working with 6 local banks, 5 microfinance institutes, around 300 payment partners and more than 35,000 retail agents to provide banking and payment services to more than 700,000 end customers. SureCash is product offered by Progoti Systems Ltd.

iFarmer is an online crowdfunding platform for farming communities. It enables an individual to invest in farming and livestock enterprises of Bangladesh. The platform connects farmers, landowners, sponsors, and crop buyers and creates a farming supply chain and allows sponsors to fund projects for a social cause or share the profits from farming businesses.

SmartKompare Launched in 2015, it is a platform to compare financial products - Personal loans, Home Loans, Car loans, Credit Cards and Insurance. The company is based out of Dhaka, Bangladesh. The platform also offers a learning center which educates users on personal finances.

Projekt.co is a secure platform that gives innovators, artists, and change-makers the opportunity to raise funds from their friends, family and project community for a project they want to create. Right after the launch, the start-up received quite a good response from the community.

CloudWell Founded in November 2012, Cloud Well offers several payment solutions under its brand name PayWell, including prepaid debit cards, payment gateways, and point-of-sale systems. Pay Well is used for prepaid mobile phone top-ups, train ticket purchases, utility bill payments, etc. Cloud Well has a network of more than 5,000 retail shops. Its main customers include big enterprises across the financial services, telecommunications, and e-commerce industries.

Box 5: IPDC Rolls out Blockchain-based Supply Chain Finance Platform

IPDC Finance Ltd. has rolled out a blockchain-based supply chain finance platform, the first of its kind in Bangladesh, with a view to giving out low-cost loans to micro and small entrepreneurs.

Since its inception (Operating since 1981), IPDC Finance has played a pivotal role in developing the country's industrial landscape. As the fastest growing financial institution of the country, their major shareholders include the People's Republic of Bangladesh (21.88%), BRAC (25.00%) and General Investors (27.47%). They were recently rated AAA by Emerging Credit Ratings, which is the strongest rating for an NBFi in the country. Supply Chain Finance is one of the most important strategic products of IPDC Finance Limited. In most emerging markets including Bangladesh, Small and Medium Enterprises (SMEs) lack access to credit and liquidity that they require for their daily working capital needs. With a motto to serve a wider range of SME clients, IPDC intends to expand its arena beyond metro cities of Bangladesh.

SMEs are one of the most crucial driving factors of the economy, supporting the big Corporate Houses in both production and operation. High risk lies in SME businesses as there are challenges in tracking and recovering funds. Loan without proper monitoring is extremely risky in SME financing. IPDC took the challenge of working with these SME entrepreneurs, starting supply chain financing in 2012. IPDC established a coordinated approach by working as a financial bridge between the SMEs and the Suppliers by providing low cost financing at very lenient terms and conditions. This resulted in IPDC becoming the market leader within a span of 5 years. Currently IPDC holds a share of around 30% in this industry while competing with established Banks and NBFIs. IPDC's portfolio consists of more than 250 customers who are serving around 190 corporate houses in Bangladesh. Since its inception, IPDC has disbursed USD 400 Million (approx.) to these investors which has created more than 10,000 jobs in the country over the last 7 years.

IPDC strongly believes in the mission to enable customers and communities to rise unbound and to live to their fullest potential and that financial inclusion can be done more efficiently with FinTech innovation. With this view IPDC initiated the Supply Chain Digital platform called “Orjon”, which integrates the Buyers, Suppliers and their Financiers at the same time. It has been done in association with IBM, using the first ever Blockchain Technology in Bangladesh. With this platform in place, IPDC is poised to bring more efficiency and momentum in the Supply Chain Financing industry while holding the leadership position in all aspects.

Supply Chain Financing through Blockchain: IPDC currently holds more than 30% of the total SCF market in Bangladesh with over 8500 Million working capital financed. Micro & Small Entrepreneurs have become Emerging Corporates, and this is a trend that will continue further to the deeper roots of the society.

The physical documents move manually from one stakeholder to another, backlogging the hyper-speed electronic systems. MSE's issue invoices, which is also another key factor for clogging the process. The lead-time is often lengthy, and service delivery is delayed. But financial choke is a repetitive process in the entire business ecosystem. With a view to overcome these challenges and to ensure excellence in technical support, IPDC worked hand-in-hand with IBM as our technical service provider to bring to life, the first ever blockchain based platform in Bangladesh. This will eliminate some of the strongest barriers to growth and deliver high consumer satisfaction through improved service delivery. They are automating document travels - everything will be digitized, thus will achieve near real-time activations. There will be authenticating mechanisms in place which will lower risk through high security and ensure reliability. This is the newest revolution, not only for IPDC, but for Bangladesh, and its enterprising citizens. This model is based on the Shared Public Ledger system, thus ensuring 100% transparency. This blockchain mechanism ensures the highest security. They can now ensure real-time authentication and processing, thus creating the highest order of efficiency in the digital world of today. This will change the modules of processing, along with time all this will come at a fraction of the previous operational cost – thus giving a great edge for our customers.

The Five-Year Road Map with Supply Chain Financing: With this initiation, they are going to complete 2019 with a disbursement of BDT 8000 Million covering 1200 MSMEs. In 2020, this disbursement will grow to BDT 2.5 Billion. This growth phase shall continue till 2021, when they are planning to disburse

BDT 4.5 Billion, covering to 3500 MSMEs. The Orjon platform will provide low-cost credit facilities and support to develop more than 25,000 small enterprises and businesses over the next five years. This will generate around 20 lakh new jobs with greater financial progress than ever before. Orjon is one of the historic landmarks of Digital Bangladesh. “Digital Bangladesh is the philosophy of a revolution. And the latest initiative will give a boost to this end.”

The latest model initiated by the IPDC will help small entrepreneurs get financing in an easy method, which will add value to the economy. Other banks and NBFIs should come forward to introduce similar platforms. The IPDC has shown courage by rolling out the platform for the first time in the country which is not an easy task at all.

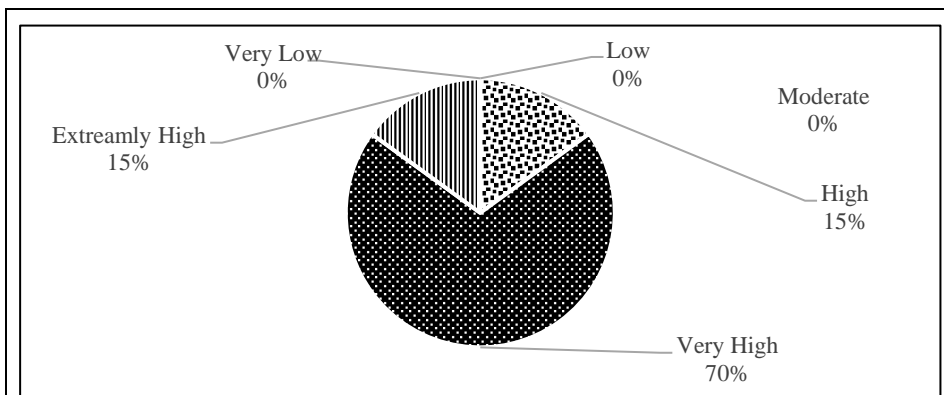
Source: www.ipdcbd.com

5. Impact of FinTech and RegTech in Banks- Survey Findings

5.1 Impact of Technological Advancement in Financial Systems

The following pie chart depicts that technological advancement will affect the financial systems in the near future. According to the survey response, 70 percent of the respondents believe that technological advancement will affect financial services in the near future at a very high level. So, it is a clear indication that banks and financial institutions need to have greater preparation to accommodate the changes.

Figure 10: Technological Advancement Affecting the Financial Services in the Near Future



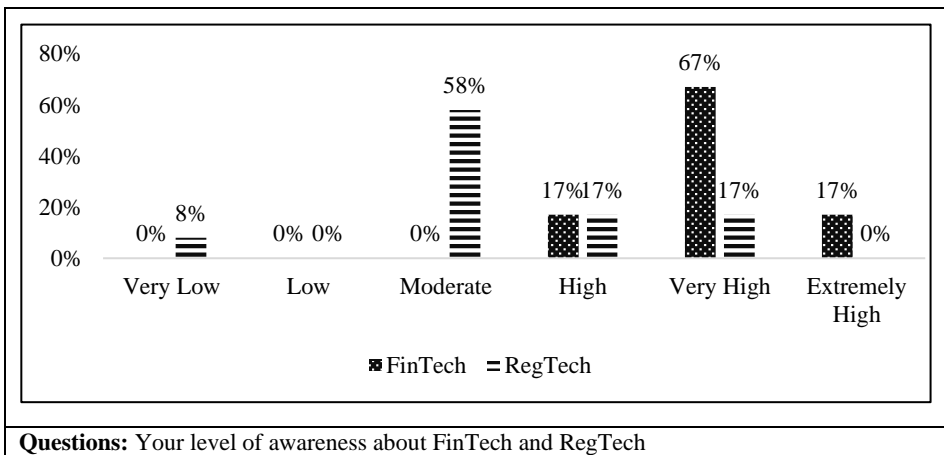
Question: Level of technological advancement affecting the financial services in the near future

Source: BIBM Survey

5.2 Awareness about FinTech and RegTech among Bank Officials

FinTech is not a new issue anymore. FinTech has already had massive market penetration. Although RegTech is not gaining popularity among the bankers. According to the survey, 67 percent of the respondents have awareness about FinTech whereas the percentage is lower in the case of RegTech. 58 percent of respondents have a moderate level of awareness about RegTech.

Figure 11: Awareness about FinTech and RegTech



5.3 Impact of FinTech and FinTech Firms in the Banking Systems of Bangladesh

Financial technology includes API, Blockchain, Artificial Intelligence, etc. Financial technology firms mean firms using advanced technologies like API, Blockchain, AI, etc. to provide financial services to the customers. Table 6 shows that 70 percent of the respondents believe that FinTech has an impact on Bangladesh's banking system, whether the impact can be positive or negative. On the other hand, 55 percent of the respondents agree that FinTech firms have a high impact on Bangladesh's banking systems.

Table 5: Impact of FinTech and FinTech Firms in the Banking Systems

Scale	FinTech (in %)	FinTech Firms (in %)
Very Low	0	5
Low	0	5
Moderate	30	35
High	25	20
Very High	40	35
Extremely High	5	0

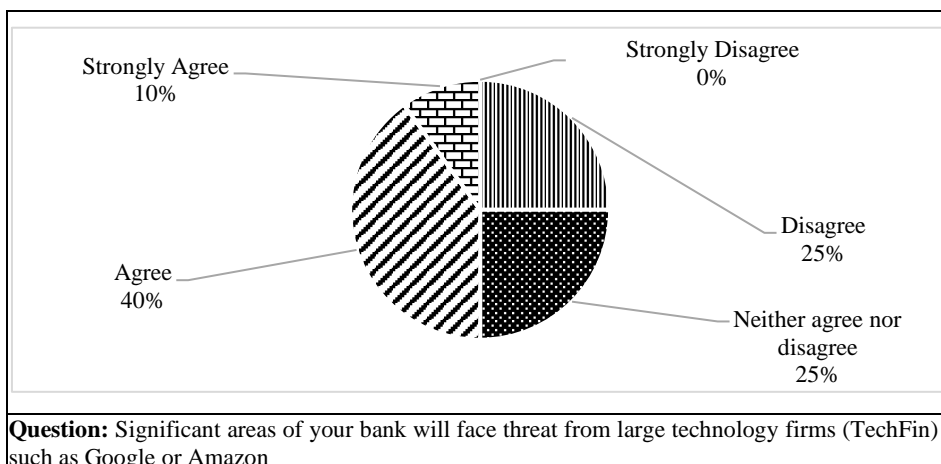
Question: Impact of FinTech in the banking system of Bangladesh and the Impact of FinTech firms/ companies in the banking system of Bangladesh

Source: BIBM Survey

5.4 Threat from Large Technology Firms (TechFin)

According to the survey, 40 percent of the respondents agree, and 10 percent of the respondents strongly agree that TechFin will pose threats to the significant areas of banks. It indicates that large technology firms can appear as a threat to traditional financial institutions. On the other hand, many respondents still disagree that TechFin can bring some threats to the banks.

Figure 12: Threat from TechFin for Banks

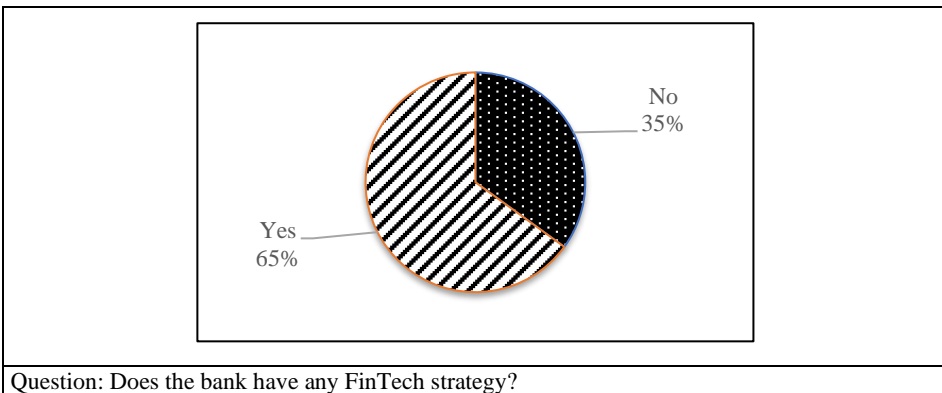


Source: BIBM Survey

5.5 Status of FinTech Strategy in Banks

Figure-13 shows that 65 percent of banks have a FinTech strategy, which means they are ready to face the FinTech wave. However, most of the banks do not have any documented and management approves strategies. Practically, they do not have any short-term, mid-term, or long-term strategic plan to face FinTech ambiance.

Figure 13: FinTech Strategy in Banks



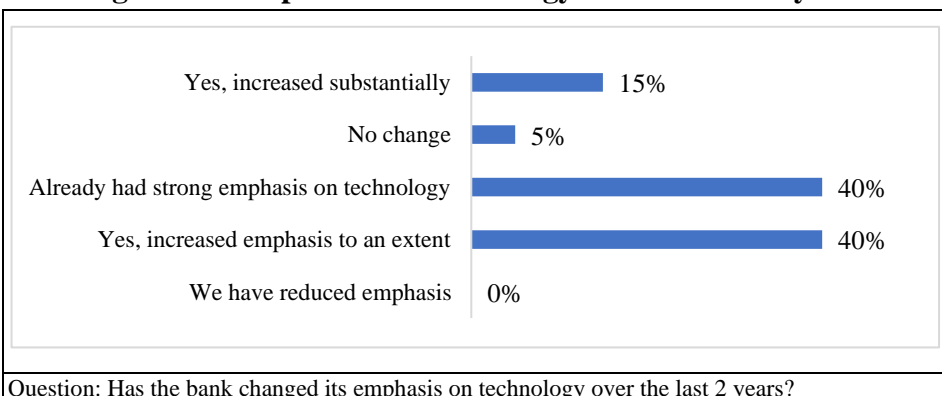
Question: Does the bank have any FinTech strategy?

Source: BIBM Survey

5.6 Emphasis on Technology in Banks

Figure-14 shows that no banks reduced their emphasis on technology. It is a good sign that emphasis on technology is not decreasing. The survey also reveals that 85 percent of banks have already increased their emphasis on technology, which means they are purchasing new technology and trying to improve capacity.

Figure 14: Emphasis on Technology over the Last 2 years



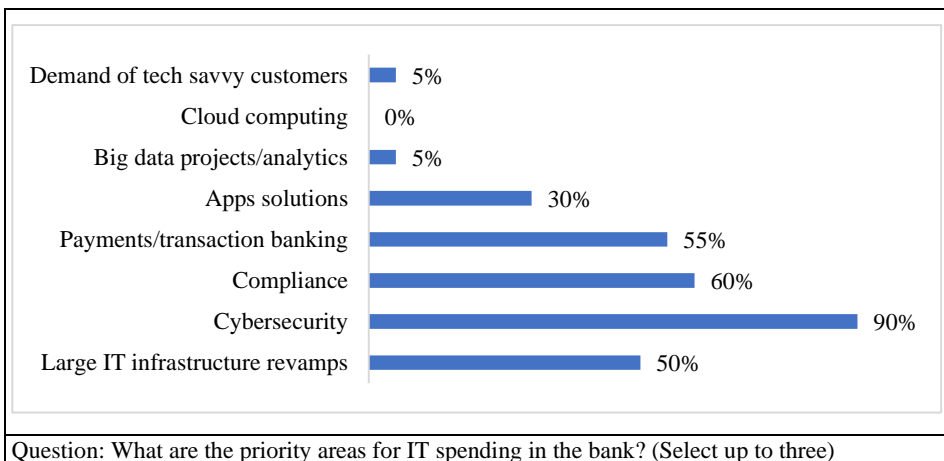
Question: Has the bank changed its emphasis on technology over the last 2 years?

Source: BIBM Survey

5.7 Priority Areas of IT Spending in Banks

According to the survey response, 90 percent of the respondents believe that cybersecurity is the most preferred area for IT spending in the banks. Banks also prefer spending on compliance, payment/transaction banking, and extensive IT infrastructure revamps. The demand for tech-savvy customers, cloud computing, and big data projects can be prioritized for the future of IT in banks.

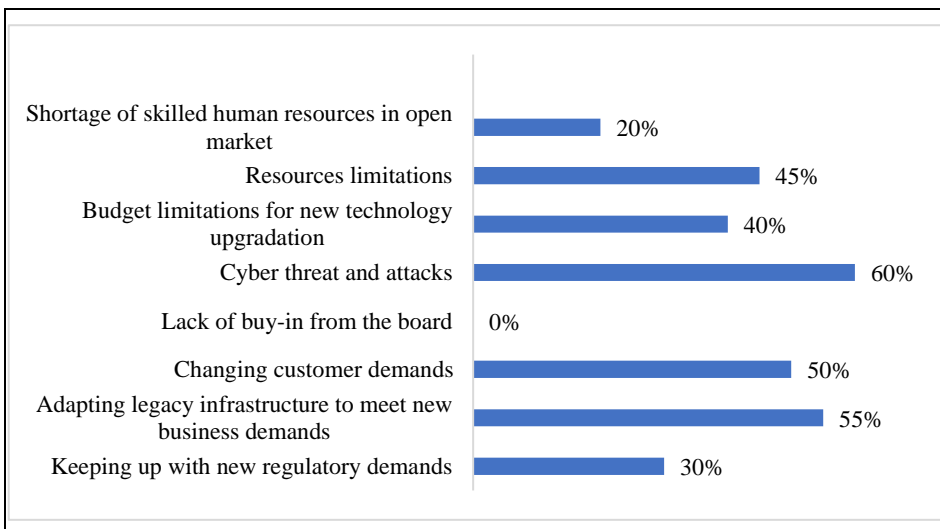
Figure 15: Priority Areas for IT Spending in Banks



5.8 Technological Challenges faced by our Banking systems

The survey reveals that 60 percent of the respondents agree that cyber threat is the biggest challenge for our banks. Another 55 percent and 50 percent believe that adapting legacy infrastructure to meet new business demands and changing customer demands also poses challenges to banks. FinTech firms are taking advantage of full filling customers' demands in various ways where banks face challenges. FinTech firms are identifying customers' pain points and bringing innovative solutions for their customers.

Figure 16: Major Technological Challenges of Banks in Bangladesh



Question: What are the biggest technology challenges faced by your bank? (Select up to three)

Source: BIBM Survey

5.9 Bank’s Attitude towards the Emerging FinTech Firms

Table-7 shows that 40 percent of the respondents are planning to buy technology in the next twelve months. It indicates that banks are taking actions to face the challenges of FinTech and they are not ignoring the power of FinTech firms. Many banks are still monitoring the activities of emerging FinTech firms.

Table 6: Attitude of Banks towards the Emerging FinTech Companies

Facts	Response (in %)
Not interested	0
Expect to buy technology in the next 12 months	40
Looking to invest in FinTech companies	0
Monitoring	25
Have already bought technology	25
Have invested in FinTech companies	0
Partnering with FinTech firms	10

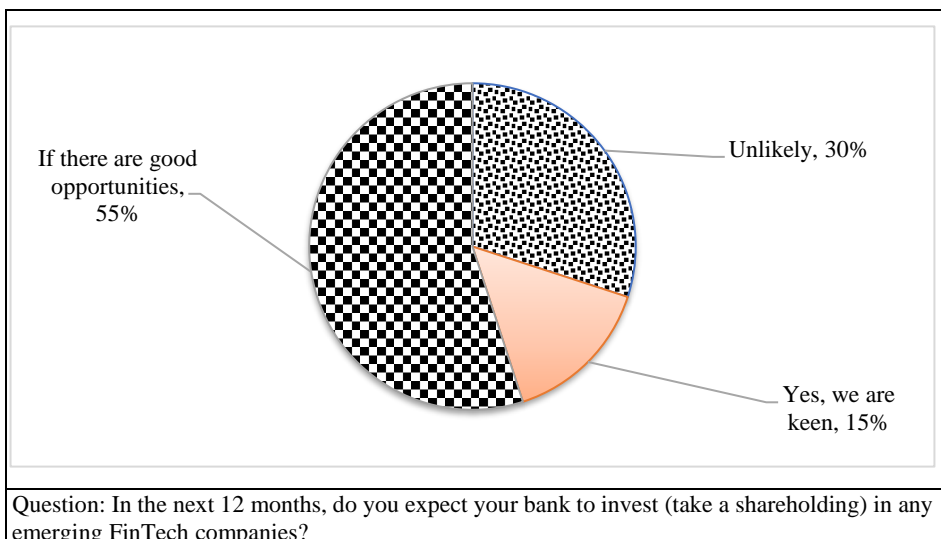
Question: Which of these describes your bank’s attitude towards the emerging FinTech scene, startups and smaller companies offering new technology to financial institutions? (Pick any that apply)

Source: BIBM Survey

5.10 Investment in Emerging FinTech Firms

Most of the respondents are eagerly waiting for good opportunities to invest in the FinTech area. Still, 30 percent banks are not interested to invest in FinTech firms. FinTech is growing faster but there are some risk factors that affect the investment decision of bankers.

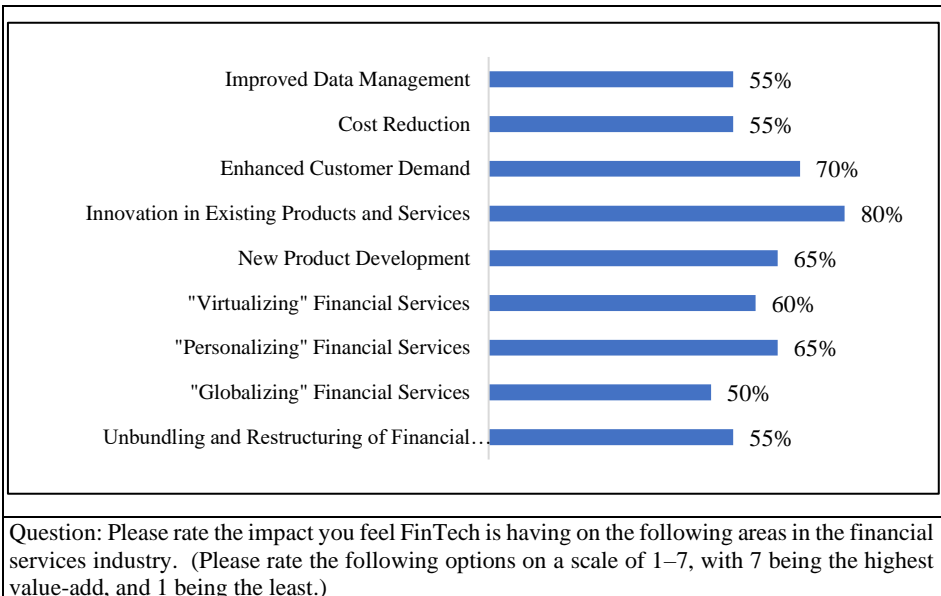
Figure 17: Opportunities to Invest in Emerging FinTech Firms



5.11 Impact of FinTech in the Financial Service Industry in Bangladesh

Financial technology has some positive as well as some negative impacts in the financial service industry. The survey reveals that FinTech will bring innovation in existing products and services. It is also seen that new generation customers have enhanced demands that can be satisfied by bringing innovation. FinTech has the power of innovation. FinTech also has an impact on new product development, virtualizing financial services and personalizing financial services.

Figure 18: Impact of FinTech in the Financial Service Sector



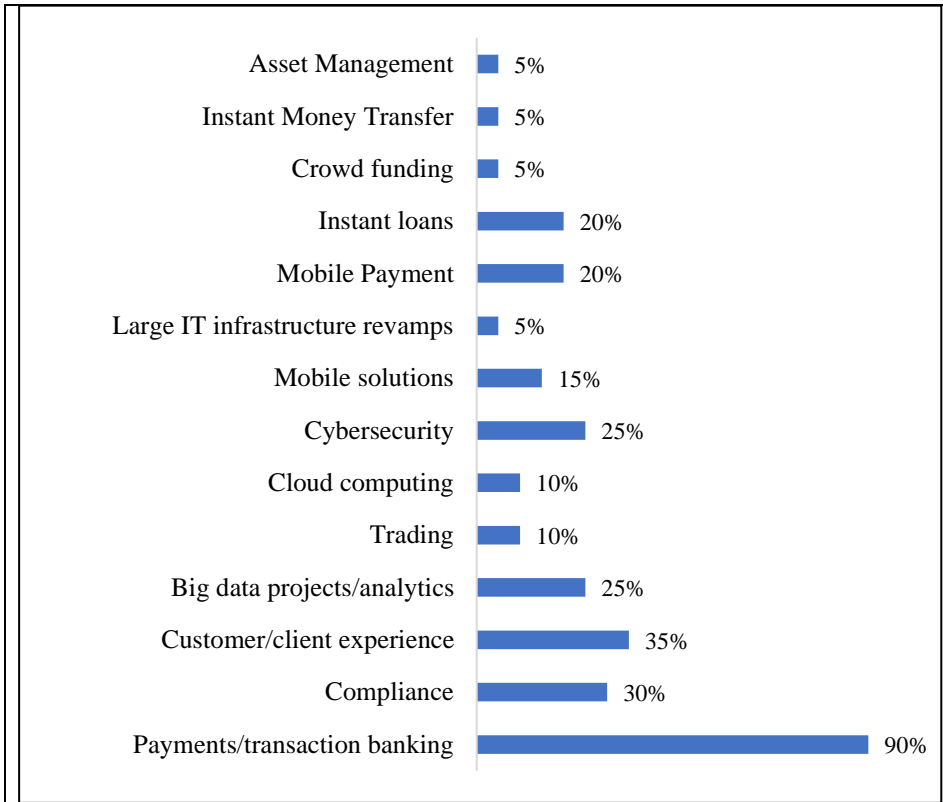
Source: BIBM Survey

Note: The percentages represent banks that have given a rating of more than 5 on a scale of 1–7 for each of the options.

5.12 Banks' Interest in Using Technology from FinTech Firms

According to the survey response, it is seen that banks are mostly interested to use payment/ transaction banking technology from FinTech firms. Banks have also shown their interest in client experience, compliance technologies. Moreover, Cybersecurity solutions from FinTech companies are not up to the mark.

Figure 19: Scope of Using Technology from FinTech Firms



Question: If your bank is interested in using technology from FinTech companies, which areas are the most likely (Please pick top three)

Source: BIBM Survey

5.13 Some Additional Issues Related to FinTech and Banks

Table-8 shows some statements that were asked to the top level IT professional of the bank whether they agree or not. Ninety percent of the respondents believe that in next ten years' finance will be radically transformed by technology. A good number of respondents also believe that the new FinTech companies will strengthen the competitiveness of existing large finance companies. Keeping up with the advancement of technology is a significant challenge for banks.

Table 7: Issues Related to FinTech and Banks

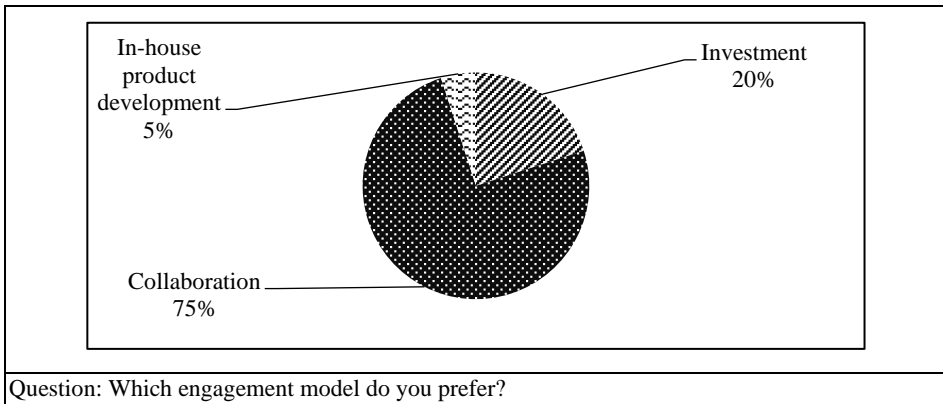
Statements	Response (in %)
The new FinTech companies will strengthen the competitiveness of existing large finance companies	75
It's a good idea for banks to create funds to make strategic investments in innovative FinTech companies	50
Today's large financial groups face a long-term threat from new technology	30
Peer-to-peer lending is a threat to established banks	5
In ten years' time, Bitcoin and other similar electronic currencies will be processed by banks as if they were conventional currencies	25
In ten years finance will be radically transformed by technology	90
Most banks are struggling to keep up with technology	75
The emerging FinTech scene is turning into a bubble	15
Involvement in emerging FinTech scene is good for the image of finance	45
Question: Which of the following statements do you agree with? (Please select all that apply)	

Source: BIBM Survey

5.14 Engagement Model between Banks and FinTech Firms

The survey data reveals that banks and FinTech firms' engagement will bring a win-win situation for both of them. Banks and FinTech companies can engage with each other primarily through the following possible five modes which are investment, collaboration, in-house product development, M & A, and joint FinTech Program. The following figure shows that collaboration is the best approach to engage with FinTech firms.

Figure 20: Banks and FinTech Firms Engagement Models

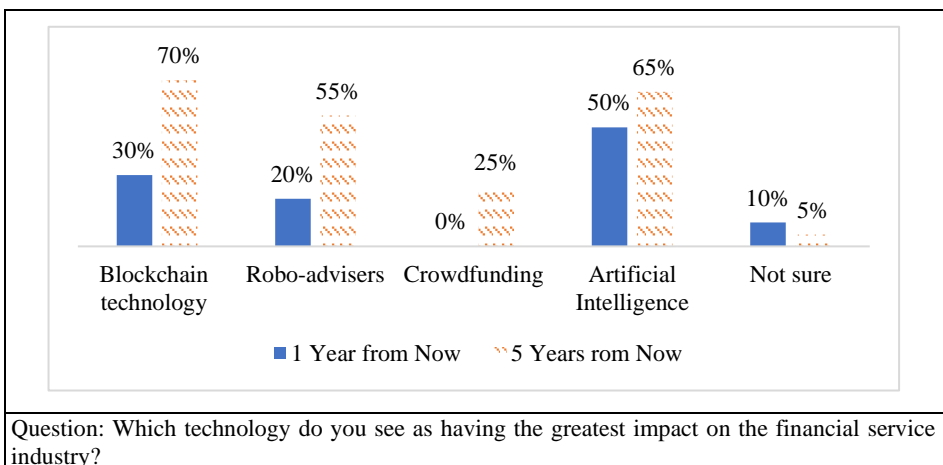


Source: BIBM Survey

5.15 Impact of Some Specific Technologies in the Banking Systems

Some technologies will affect the financial services within one year from now. 50% of respondents think that AI will have a significant impact on the banking industry within one year. Following, 30% of responses show that Blockchain Technology will have a greater impact on the financial industry. Within 5 Years from now, 70% of the respondents think Blockchain technology will take a significant position in the Banking Sector. Following 65% believe AI will also have a dominating position. It is seen from the figure 21 that all the technologies have long term impact in the banking systems.

Figure 21: Comparative Impact of Some Specific Technologies



Source: BIBM Survey

5.16 Strength of Banking Industry for Collaboration

Banks prefer collaboration with FinTech firms. Collaboration is a good solution for both banks and FinTech firms because it helps banks to bring innovation in services with little cost and effort. Established trust is the main strength for banks to collaborate with FinTech firms.

Table 8: Strength of the Banking Industry for Collaboration with FinTech

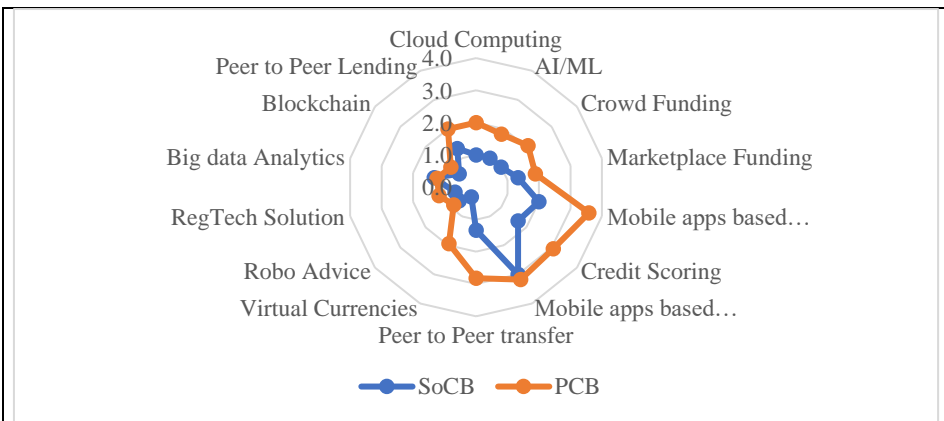
Strength of banks	Response (in %)
Stronger Brand Recognition	50%
Established Trust	70%
Adequate Capital	30%
Knowledge of Regulatory Compliance	55%
Established Distribution Network	45%
Question: According to your opinion, what are the strengths of FinTech firms for collaboration?	

Source: BIBM Survey

5.17 Maturity of Banks with Regard to Adoption of New Business Models and New Supporting Technologies

Figure-22 shows the average maturity of banks with regard to adoption of new business models and new supporting technology. The figure clearly depicts the position of Private Commercial Banks (PCB) with respect to State Own Commercial Banks (SOCB). Both PCB and SOCB are doing well in developing and using mobile apps based MFS. In case of crowd funding, private banks tend to be more approaching compared to the state-owned banks and this one step ahead movement towards crowd funding has made the private banks dominating in the crowd funding market. Surprisingly, the state-owned banks are lacking the credit scoring segment whereas the private banks are over-performing the state-owned banking system. On the other hand, both the private and state-owned banking sectors are still backdated in big data analytics. However, the RegTech solution is far from the reach of state-owned banks and the private banking sector is struggling to cope with the versatile changes in the RegTech problem.

Figure 22: Average Maturity of Banks with Regard to Adoption of New Business Models and New Supporting Technologies



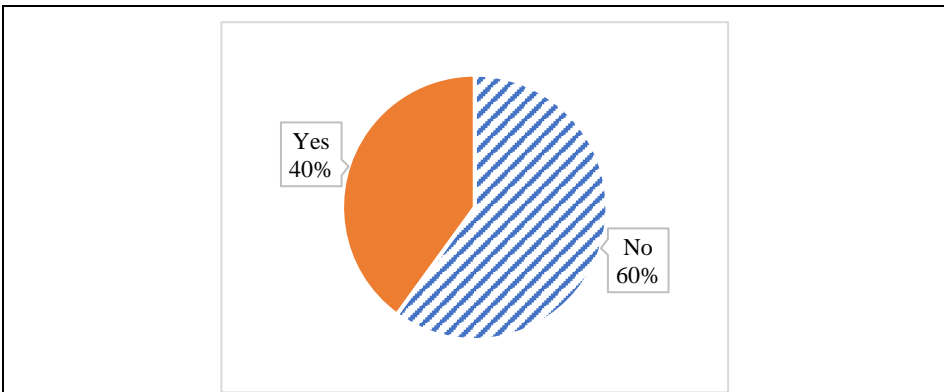
Question: Please put your feedback on the average maturity of banks with regard to the adoption of new business models and new supporting technologies

Source: BIBM Survey

5.18 RegTech Solution in Banks

According to the survey, around two-fifth of the banks stated that they are using RegTech solution to some extent. Another three-fifth of the banks do not use the RegTech solution.

Figure 23: RegTech in banks



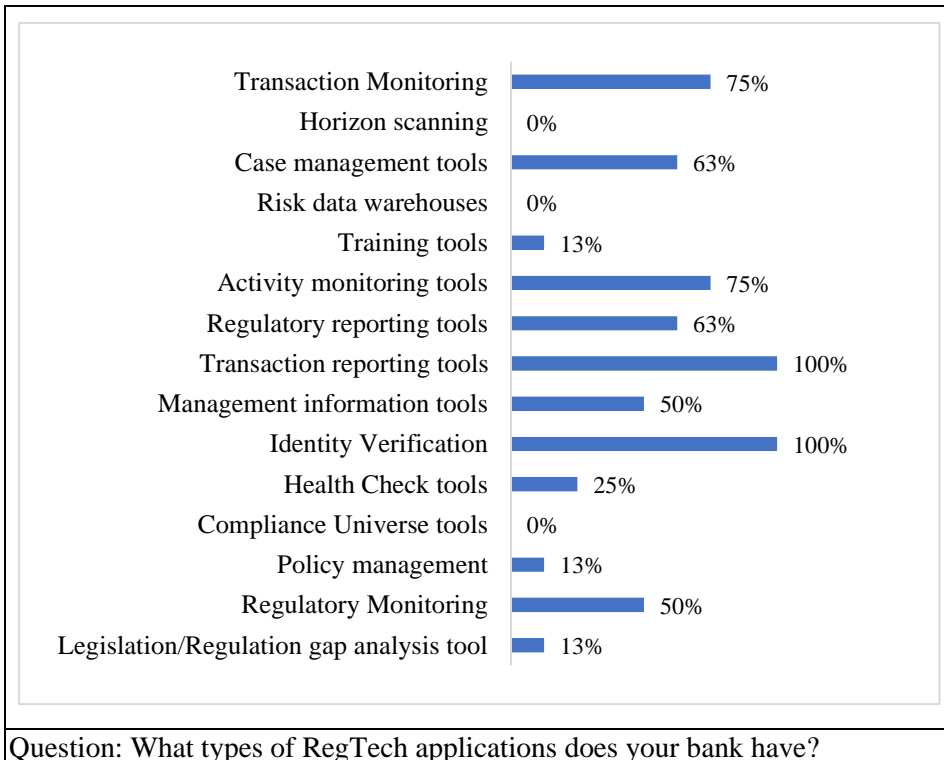
Question: Does the bank use a RegTech solution?

Source: BIBM Survey

5.19 RegTech Applications Used by Banks

Figure-24 shows the applications of RegTech in banks. It is clear from the figure that transaction reporting and identity verification tools are widely used by our banks as RegTech solution. Other than that activity and transaction monitoring are quite popular as RegTech application in banks.

Figure 24: RegTech Applications in Banks



5.20 Strength of Banks over FinTech Firms

Banks have some strengths over FinTech firms. FinTech firms are new in the market whereas banks have long tradition to do business. Box-6 shows some strengths of banks over FinTech firms.

Box 6: Strength of Banks over FinTech Firms

1. Banks usually do not face any funding crisis
2. Sound knowledge of Banking domain and Financial services & products
3. Availability of customer data, Customer's trust and relationship
4. Solid foundation, enough man power, and a sustainable organization
5. Reputation for stability, customer loyalty, and the existing customer base.
6. Good Infrastructure and brand value
7. Long-Term Investment Strategies
8. Robust risk management process
9. Strong Supervision by Regulatory Authority

Source: BIBM Survey

5.21 Weakness of Banks over FinTech Firms

Box-7 shows some weakness of banks over FinTech firms. Although banks have some weakness over FinTech firms. Market size of FinTech firms are not too big but the growth rate is remarkable. They are very innovative and using latest technology to serve customers.

Box 7: Weakness of Banks over FinTech Firms

1. Lack of awareness of emerging technologies
2. Lack of understanding of Technology landscape in Financial domain
3. Culture is not supportive of rapid change, promulgated clear strategy
4. Fear of cyber security breaches in respect of investing and providing FinTech services
5. Perception gap in digital innovation of financial services
6. The complexity of the existing system and legacy systems
7. The incapability of engaging IT resources
8. Regulatory boundaries

Source: BIBM Survey

5.22 Major Challenges to Adopt FinTech in Banks

Banks face some challenges to adopt FinTech. Some of the major challenges are shown in Box-8.

Box 8: Major Challenges to Adopt FinTech in Banks

1. Lack of awareness, technical skill set, and responsiveness to innovative digital technologies
2. Culture doesn't suit to rapid changes
3. Lack of trust component as well as skilled IT professional in Cyber risk domain
4. The fear of Cyber Security Breaches
5. Budget constraints
6. The legacy platform, mindset to change
7. Updated framework and policy support for FinTech services
8. Regulatory boundary

Source: BIBM Survey

5.23 Role of Bangladesh Bank to Promote FinTech in Bangladesh

Bangladesh Bank as the supreme regulator of banks is striving to control the activities of banks. Box-9 shows some roles of BB to promote FinTech in Bangladesh.

Box 9: Role of Bangladesh Bank to Promote FinTech in Bangladesh

1. Formulate policies to easy access to new technologies
2. Arrange training/workshop for skill development
3. BB may form an ecosystem hub for FinTech companies under the supervision of that hub banks can formulate separate rules and regulations for efficiently supervising and monitoring
4. Guideline for immediate technology appearance, clouding, blockchain, etc.
5. Create Awareness of FinTech services through different media
6. Bringing FinTech companies under the regulatory authority
7. Make the licensing process easier and faster
8. Assessing the risk factor of FinTech and guide accordingly by BB

Source: BIBM Survey

5.24 Banks Benefit from RegTech Solution

Banks can enjoy some benefits by using RegTech solution. It helps banks to automate regulatory reporting and standardize regulatory process. Some other benefits are shown in Box-10.

Box 10: Benefits of Banks from RegTech Solution

1. Automation of regulatory reporting and workflow process
2. High efficiency in regulatory compliance at low cost
3. Fulfillment of integrated compliance requirements using RegTech tools
4. Increased efficiency and security in identity verification and Know Your Customer (e-KYC) requirements
5. Through the proper deployment of RegTech solution, transparency, time efficiency and resource efficiency will be increased

Source: BIBM Survey

5.25 Challenges to Implement RegTech Solution in Banks

Box-11 shows some challenges to implement RegTech solution in banks.

Box 11: Challenges to Implement RegTech Solution in Banks

1. Awareness about RegTech among the stakeholders
2. Cost of development and implementation
3. Technology adaptability
4. Limitation of data sources and also incompleteness of data
5. Gap of Management understanding and less priority of implementation
6. Overcoming third party (outsourcing) risk
7. The disparity of data management standards
8. Lack of proper manpower and training
9. Unavailability of efficient and quality RegTech solution
10. Compatibility of existing legacy systems

Source: BIBM Survey

5.26 Role of Bangladesh Bank to Promote RegTech Solutions in Banks

The following box shows some important roles may be played by Central Bank to use RegTech solutions properly and efficiently by the banks and FinTech firms.

Box 12: Role of Bangladesh Bank to Promote RegTech Solutions

1. Bangladesh bank can instruct banks to introduce RegTech in the banking sector for proper and efficient monitoring and regulatory compliance
2. Providing proper guidelines on RegTech to the banking industry and FinTech firms.
3. Imposing must-have features for all financial institutions and should establish a unit composed of the experience risk managers and professionals in the process.
4. BB may instruct to adopt new technologies, application program interface, blockchain, cloud computing, machine learning, big data, data mining & analytics, predictive analysis, and smart contracts

Source: BIBM Survey

6. Findings and Recommendations

One, FinTech and RegTech awareness among top level executives in banks: According to the survey, 67 percent of the respondents have very high level of awareness about FinTech whereas the awareness level is not satisfactory in RegTech. 58 percent of respondents have a moderate level of awareness about RegTech.

Top level executives should change their mind-set to quick adoption of financial technology to cope up with the upcoming challenges channeled from FinTech firms, especially in the area of retail banking/financial services. Banks should develop awareness and reduce perception gap of bank management on technology adaptability issues.

Two, FinTech strategy in banks: The study reveals that 65 percent of banks have a FinTech strategy that means they are ready to face the FinTech wave. But among them, most of the banks do not have any documented and management approved strategies.

Banks should try to give emphasis on the short term and long term strategy formulation. Ironically, FinTech strategy is not documented and well planned in spite of the major challenges faced by the banks. So, the banks should be aware of the strategic planning aligning with the cooperation of the IT professionals to tackle the challenges of the FinTech firms' wave practically.

Three, Bank FinTech engagement model: According to the study, 75 percent of the respondents believe that collaboration is the best model for engaging banks (working/ doing business jointly) with the FinTech firms. FinTech firms and banks can solve both the market and consumer challenges together, not replacing each other.

So, joint initiatives can be equally beneficial for both sides. Banks need to identify the best approaches towards aforesaid collaboration.

Four, Priority areas of IT spending of banks: According to the survey response, 90 percent of the respondents prefer cyber security domain for IT spending in the banks. Banks also prefer spending to compliance, payment/transaction banking and large IT infrastructure revamps.

In order to increase this capital at the compounding rate, the banking segment should increase the privacy issues for both the customers and the banks. Moreover, to create a shield against the strategical attack of the FinTech firms, the banks should initiate innovative services like payment system and most of the services are of IT in nature and so the banks can give significant focus on such IT spending as these will subsequently increase the strength of the banks over the FinTech firms.

Five, Technological challenges faced by banks: The survey reveals that cyber threat is the biggest challenge for our banks. Changing customer demands and adapting legacy infrastructure to meet new business demands are also posing challenges to banks.

It is highly expected that the banks, to be competitive in the market, should be proactive to meet the technological challenges.

Six, Impact of FinTech and FinTech firms in banks: FinTech as a revolutionary stimulus in the banking sector is emerging significantly with different technological elements like API, Blockchain, AI, etc. 70 percent of the respondents believe that FinTech has an impact on the banking system of Bangladesh whether the impact can be positive or negative. On the other hand, 55 percent of the respondents agree that FinTech firms have a high impact on the banking systems of Bangladesh. Though the innovation of the FinTech is quite formidable, it is likely that the banks adopting the FinTech are accepted to reveal positive appearance in the

industry and most of the tech-based elements of FinTech are on the peak of success in the advanced world.

Therefore, Banks should accept the positive impact of FinTech and be aware of the negative impact also. The bankers should be positive with the FinTech and adoption of innovations by the FinTech firms are to be closely observed by the banks.

Seven, Technology adoption is the best solution for banks to win the competition: 50 percent of respondents think that AI will have a significant impact on the banking industry within one year. Following, 30 percent of responses show that Blockchain Technology will have a greater impact on the financial industry.

To upgrade the banking services in the market, it is the urge of the banks to adopt the innovative and automated digital technology services in the current win-win scenario.

Eight, Implementing RegTech Solution by banks: The study finds that 60 percent banks do not use RegTech solution, rest of the banks are using RegTech solution to some extent for the very limited scale of operations. Using RegTech solutions, banks can be benefited in many ways such as automation of regulatory reporting and workflow process, delivery of regulatory and compliance requirements more efficiently and effectively at low cost.

Bangladesh Bank and bank management may take proper and timely measures to implement RegTech solutions in our banking industry.

Nine, Cyber Security Strategy in banks: Cyber-attacks are the biggest concern for businesses in Europe, Asia and North America, according to a new survey (November, 2018) of executives by the World Economic Forum (WEF). Fraudulent Transaction monitoring and Cyber risk management have become a crucial issue for banking and financial sector in providing innovative digital financial services. The recent BIBM study on ITVAPT in banks (BIBM Research Workshop Paper, November, 2019) reveals that some banks of our country have significant technology gap in terms of cyber risk. With the development of FinTech products and services and increasing demand of business collaboration and system

integration between Banks and FinTech firms will also increase the complexity of the existing/legacy systems and accelerate security holes & cyber threats from multiple e-channels of DFS. Our banking sector is still behind from best practices of global standard in conducting cyber security risk assessment, developing and implementing IT risk framework.

Bank management needs to move forward in timely manner for building up comprehensive cyber security strategy when the financial services industry continues to leverage AI and ML.

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Appendix 1: Discussion Summary of the Roundtable on “FinTech and RegTech: Possible Impact on Banking Systems in Bangladesh”

Bangladesh Institute of Bank Management (BIBM) organized a roundtable discussion on “FinTech and RegTech: Possible Impact on Banking Systems in Bangladesh” on December 23, 2019. Mr. S. M. Moniruzzaman, the then Chairman, BIBM Executive Committee and Deputy Governor, Bangladesh Bank as well was present as the chief guest. The research team consisted of Mr. Md. Shihab Uddin Khan, Associate Professor, BIBM; Md. Foysal Hasan, Lecturer, BIBM; Mohammed Ishaque Miah, General Manager, Bangladesh Bank; and Md. Mizanur Rahman, EVP, SBAC Bank Limited.

A K M Abdullah, the World Bank Senior Financial Sector Specialist for South Asia Finance and Private Sector; Mominul Islam, Managing Director and CEO, IPDC Finance Limited; Dr Muzaffer Ahmad Chair Professor of BIBM Barkat-e-Khuda and Supernumerary Professor of BIBM Helal Ahmed Chowdhury were present as designated discussants.

Dr. Md Akhtaruzzaman, Director General, BIBM, chaired the occasion. A number of participants from different banks, media representatives and faculty members of BIBM attended the roundtable discussion.

Dr. Prashanta Kumar Banerjee, Professor and the then Director (Research, Development and Consultancy) of the BIBM, delivered the address of welcome. After the formal address of welcome, Mr. S. M. Moniruzzaman delivered his speech and inaugurated the program. On behalf of the team Mr. Md. Shihab Uddin Khan, Associate Professor of BIBM and Md. Foyzal Hasan, Lecturer, BIBM jointly presented the paper. Other designated discussants commented on the paper after the presentation. Besides, the participants of the workshop raised a number of issues.

Mr. S. M. Moniruzzaman, the then Deputy Governor, Bangladesh Bank as well

He said the Bangladesh Bank closely monitors the growing FinTech firms and gives appropriate directions to them. He added that in recent time, when bitcoin issue was booming, BB took necessary actions to stop using it and to raise awareness among different stakeholders. He also added that BB has taken various initiatives for the smooth operation of e-banking in Bangladesh. BB has developed BACH, BEFTN, NPSB, RTGS infrastructure for smooth payment systems.

Mr. A K M Abdullah, WB Senior Financial Sector Specialist for South Asia Finance and Private Sector.

He opined that banks would never be able to compete with financial technology (FinTech) service providers in providing financial services; it is better to collaborate with them. Collaborations will be good for both banks and FinTechs. He also said that FinTech is a reality, and it is suitable for banks to accept reality as early as possible. Additionally, he opined that there is no point in questioning why FinTech platforms like bKash or Nagad are not strongly regulated as banks are being regulated. Moreover, banks have to think about how they can be evolved and get the highest benefit from FinTech instead of complaining about FinTech's less regulation. He also added that the banking sector in Bangladesh consists

of many diversified groups. There are some banks, which still carry out manual operations.

On the other hand, some banks have already adopted the latest financial technologies. In such a context, no regulator can regulate such diversified groups with one kind of law, and again the regulator cannot introduce separate laws for one market. So banks and FinTechs should stop worrying about regulation and extend competition and collaboration simultaneously for a better market environment.

Mr. Mominul Islam, Managing Director and CEO, IPDC Finance Limited

He said that collaboration is the biggest innovation in the 21st century. Banks and FinTechs will also need collaboration, as there are risks of data breaches and cyber threats. He added that the biggest benefit in (collaboration of) banking and FinTech industries will come in the form of financial inclusion. He mentioned that many FinTech services are yet to be launched, including lending and deposit-related services. He shared the experience of IPDC's new blockchain-based financial service, he said blockchain will change the face of present financial technology services, and everyone needs to get prepared for the change.

Dr. Barkat-e-Khuda, Dr. Muzaffer Ahmad Chair Professor of BIBM

He said that senior management of the banks needs to have the mentality to accept new technologies. He added that more responsibilities lie with technical persons, who must have capabilities to make their senior management understand the need for new technology.

Helal Ahmed Chowdhury, Former Supernumerary Professor of BIBM

He said that people need various financial services. If FinTech provides the financial services that people need, they will go to them. If banks miss the opportunity, they will regret. So, he suggested the banks to grab their share in FinTech business as much as they can.

Comments/ Recommendations from the Participants:

- A comprehensive guideline about FinTech and RegTech is essential from central bank as soon as possible.
- FinTechs and banks need to work together for greater benefits.
- Senior level management needs to be aware about FinTech and RegTech
- Training and seminar should be organized to promote FinTech and RegTech
- There is a gap between business and IT executives. It is important to minimize the gap for facing the challenges of FinTech wave.
- Development of payment and settlement systems is required for ensuring smooth payment systems in Bangladesh.
- An integrated system is required for banks.
- Development of e-payment gateway in Bangladesh.

Comments of the Roundtable Discussion Chair:

Dr. Md. Akhtaruzzaman, Director General, BIBM chaired the roundtable discussion. He opined that collaboration between banks and FinTech companies would be an effective vehicle for establishing modern and innovative banking activities. Looking ahead, he added that in the coming days, banks would move forward to adopt advanced technologies like Artificial Intelligence, Blockchain, Big Data, Internet of Things (IoT) to establish a competitive position in the market. He added that Regulatory Technology (RegTech) will help both regulators and banks to manage regulatory activities more efficiently and effectively which will offer high degree of secure payment systems.

At the end of the program, the chair gave his concluding remarks and expressed his gratitude and thanked to all experts, senior officials from other practitioners, banking community and participants.



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