A NOVEL AND COMPREHENSIVE E-PAYMENT MODEL WITH A HIGHER END USER TRUST LEVEL

by

MD. NAFIZUL HAQUE

MASTER OF SCIENCE IN INFORMATION AND COMMUNICATION TECHNOLOGY

INSTITUTE OF INFORMATION AND COMMUNICATION TECHNOLOGY
BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY

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The thesis titled “A NOVEL AND COMPREHENSIVE E-PAYMENT MODEL WITH A HIGHER END USER TRUST LEVEL” submitted by Md. Nafizul Haque, Roll No. 0411312017 and Session: April, 2011; has been accepted as satisfactory in partial fulfillment of the requirement of the degree of Master of Science in Information and Communication Technology on 18th October, 2014.

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Signature of the Candidate

Md. Nafizul Haque

Roll No. 0411312017
This Research Work Has been dedicated to

My Family
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<tr>
<td>TCP/IP</td>
<td>Transmission Control Protocol / Internet Protocol</td>
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<td>POS</td>
<td>Point of Sales</td>
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<td>ATM</td>
<td>Automated Teller Machines</td>
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<td>SWIFT CODE</td>
<td>Society for Worldwide Interbank Financial Telecommunication</td>
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<td>CERN</td>
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ABSTRACT

Easy and mobile accessibility of Internet using mobile devices have brought a revolution in the global ICT sector. Noticing the fact, different business organizations have focused on creating new business opportunities through Internet. E-commerce and online shopping have become so popular that business professionals are now considering online marketing and advertising as their principle marketing strategy. But online procurements need to be paid either through cash on delivery or via some online payment systems (e.g., credit/debit cards). Unfortunately, both the processes have considerable uncertainty as involved parties are unknown to each other and any one of the parties has to trust the other party to complete the full shopping cycle. But, this sort of trust relationship is mostly absent in many countries where majority of the people belongs to the middle and lower income group of the society. So, in spite of having ample opportunities, online shopping has so far failed to gain acceptability among the people of middle and lower income groups of the society. Recent research works related to online marketing are so heavily focused on the security issues of online transaction that they ignored this uncertainty of online shopping. In this research work, an effort has been made to develop a novel comprehensive online payment model that ensures a higher level of trust from the end user's perspective. It has been tried to develop an online payment model where both buyer and seller can have control over the complete online buy-sell cycle. So that both buyer and seller can be in a comfort zone where they can have the confidence that buyer will receive the product that he paid for and seller will get the money for what he sold. It has also been tried to address few practical cases that need to be considered during design of the model. Later part of the work, a demonstration has been prepared to get an familiarity with the practical implementation possibility of the model and its impact on the online commercial activities done by the end user.
CHAPTER - 1

INTRODUCTION

It has been widely argued that now, we are living in the communication age. A new era has begun, where establishing communication among people under any circumstances have been put into the highest priority. Seamless communication was the demand of the last decade and it is clearly understandable that it will remain the same for the upcoming decades as well. Internet is the key medium to establish and maintain the communication among the people across the world and so far it is the cheapest and fastest way for worldwide communication. Though the actual idea behind the Internet was to establish a military network for faster, secure and emergency communication during the adverse situations of a war but later it was proven more useful for commercial and everyday use. It was the ARPANET which is widely known as the first Internet developed and used by the U.S military back in the 1960s. But things started to change very rapidly since then. In 1982 greatest transformation happened in the Internet when, the ARPANET had been switched to TCP/IP. In 1990, Tim Berners-Lee, proposed a concept of hypertext-based web of information at the European Organization for Nuclear Research (CERN). It helped user to navigate the information using a simple interface called a browser. He termed it as "World Wide Web" in short www. In the very next year the United States National Science Foundation took out a ban on online commercial businesses operation and the step was put to pave the way for Web-based e-commerce.

Online business or e-commerce has brought new dimension in business arena. According to the statistics, in March, 2014 there were 2.937 million Internet users worldwide, implying 40.7% of total world population and this number is growing exponentially since December, 1995 [1]. So, it is obvious that Internet is now playing a major role in fixing the standard of living in the societies. Accessibility to the systems online regardless of the physical presence, has gained so much popularity among the users that almost every organizations are having or planning to have an online version of their operations and services. Business entities have started to change their marketing strategies and started to consider online advertising as their key marketing strategy. Online operation helps the
organization to operate across the globe for round the clock in 7 days of the week. Moreover, Internet has become a branding platform and a matter of pride among the business organizations to run the business online.

1.1 Overview

E-commerce can be described as a secured and unified platform for communication, information sharing and management on sale-purchase of goods and services. It is nothing but the method of buying and selling of products and services online using electronic platforms. These platforms includes websites, mobile apps etc. It implies a process of conducting transaction over the online or electronic medium. From generic point of view and user's perspective, it is very convenient to do business online from anywhere across the globe, avoiding the physical presence of buyer and seller, in their feasible time.

Though, doing business online without physical presence is comfortable and easier but it lacks security and certainty of the transactions. It has been a long time that credit cards have been the way of shopping online. POS terminals and ATM machines are modified form of doing transaction in shopping malls or hotels. According to the nature of the Internet, it is not secured to share transaction information over the Internet as it might be compromised and severe loss can be done. To minimize the security risk, related professionals and researchers put priority on the security aspect of online transactions and have been succeeded to secure the process to some extent. Till to date various research works are ongoing to make the transaction more secured over the Internet. But, focusing on the security diverted us from thinking the aspect of uncertainty faced by the users of online transaction. In recent days, online transaction occurs on credit basis. In the very beginning, either buyer or seller has to trust the opposite party to complete the transaction and wait for the delivery. Usually either of the two cases happens, either buyer has to clear his payment for the product before receiving the product or seller has to deliver the product for payment before receiving the price of the product. In both the cases involved parties have to go through an interim phase of uncertainty. If anyone breaks his
commitment or any incidence of fraudulence occurs during delivery, any of the parties has to face unnecessary hassles, even a heavy loss. But the reality is, researchers put so much concentration on security aspect of the online transactions that they have overlooked the uncertainty aspect of the online transaction. However, due to this uncertainty among the users, till now online shopping and e-commerce have not got that much popularity among the middle and lower income group of the society. People of low income group of the society are so much concern about their earning that they fear to risk their money where uncertainty is perceived. They are not at all concerned about the security by passing the evident uncertainty.

Apart from that, in developing and under developed countries the no of users of credit cards are very minimal. The Daily Star, a leading newspaper in Bangladesh cited that by the end of 2015 the total credit card users in the country will be 1.5 millions. It is obvious that if the less number of people use the credit cards then less number of people will be able to participate in the online shopping as the users do not have way to pay online. So, in spite of having ample opportunities, online shopping will not be able to achieve the acceptability among the majority of middle and lower income groups of the society which are the major part of the developing or the underdeveloped country. So, yet again technology will fail to serve the people to the maximum only for ignoring the socio-economic impact of the application of the technology.

In this research work it has been tried to address on the socio-economic issues of online transaction and the way of building trust among the users to ensure more user involvement in the activity of e-commerce. To ensure that, we want to propose an online payment model which can be integrated in any form of online transaction minimizing the uncertainty of the online transaction keeping the existing security mechanism identical. We would also like to propose a model which will be able to let us do online shopping without being the owner of a credit card. To demonstrate our model we will consider an online marketing system application and a bank account to evaluate our model in live scenario. Here, certainty and building trust among buyer and seller is our main concern rather than the security aspects of the online transaction.
1.2 Related Research Work

It has been found that several works has been done on e-commerce and major concentration was put in the security of online transactions. It includes the security of the communication channel, encryption methodology of the information during transmit of the information, retrieval mechanisms of secured information, information theft prevention etc. It has been also found that several models were proposed for online payment or transaction procedures, focusing the security part of the online transaction. To the best of the knowledge, any specific model could not be found which, focused on the uncertainty part of the online transaction rather than the security aspect of the online transaction.

Pattnaik [2] proposed an Internet payment system which uses a payment gateway to handle the credit card payment transaction between customers, merchants and banks. To evaluate their model they have built an online travel agency and simulated the model. In their model design they focused on the purchasing part (how customer interact with merchants) and the payment process (how money is settled down). It is applicable for the products or services that can be received by the buyer online instantly but in case of product delivery or receipt, the uncertainty cannot be minimized. Any idea could not be found that both buyer and seller do online business keeping both of their interest even.

Kannen [3] introduced, a process and service oriented framework, which offers a structural and conceptual orientation in the field of electronic payment. According to the authors, the model renders possible an integral view on electronic payment that goes beyond the frame of an individual system. In this work they outlined the necessity for a payment system provider to act as a mediator for the users of the electronic payment systems. They highlighted the trust issue but they mentioned to have a trust on the system rather than among buyer and seller.

In 2001 a publication done by David [4] highlighted that transaction between strangers have grown in tremendous rate. Though online payment is convenient and easy but uncertainty of receiving payment or delivery put buyers and sellers in an uncomfortable zone. In the paper author clearly mentioned that without receiving the money it is not
comfortable for seller to ship the product while the buyer hesitate to pay until the receipt of his intended product in acceptable condition. They need a process or mechanism which will give them surety of payment and product delivery including the transparent refund mechanism for both money and product in case of unavoidable and uncontrolled occurrence which satisfy their change back rights.

Adeyeye [5] did an evaluation of e-commerce and payment method in Nigeria in 2008. In his study he clearly mentioned that prepaid or debit card system is convenient in Nigeria for online transaction as it certifies the availability of fund in buyers account it reduce the uncertainty from seller’s perspective. Though seller's interest has been ensured but we need to focus on buyer's interest as well.

In 2012 Hawedi [6] performed a case study on online shopping and e-commerce in Libya and highlighted the security, protection and trust issues involved in the online transaction but here trust was describe in terms of reliability over the organization or system that users are using for online transaction

Both Singh [7] and Jing [8] highlighted and described the security issues of different available online payment models but in those papers security of completing an online transaction in practical cases were not highlighted.

After analyzing these facts, focus has been put on the trust issue, which needs to be built between buyer and seller to complete an online transaction in reality. This trust does not depend on their relation rather than a system which can give them a platform to build trust through a systematic, organized, regulated process under the supervision of government regulatory authorities. So, in this research work, an online payment model has been developed highlighting the trust issue among buyers and sellers. But the objective is to introduce a payment model to build the trust among buyers and sellers without knowing each other. So that, buyer would believe that he will get the product that he purchased and seller would believe that he will get the money for what he sold. In this context, the concept of e-check during an online transaction in new format has been proposed to minimize the necessity of a credit card to perform the online transactions. Here, it has
been considered that the existing standard security algorithms and mechanisms are matured enough to carry out an online transaction.

1.3 Motivation

Motivation to carry out this research work came from daily life of mass people. Living in a developing country like Bangladesh requires continuous motivation and effort to live better today than yesterday. Technologies and systems are out there but people are scared of using those. People are afraid of take risks because they have to put so much effort to maintain their present and ensure their future. There are several reasons of doing this research work. Those reasons are as follows:

- With the evolution of technology and Internet people are now getting involved more in online activities. It starts from mail corresponds, social activities and ends with online business commonly known as e-commerce. But doing business without monetary transaction is impossible. So, various online payment method has been introduced. But none of them can ensure the equal opportunity for both the involved parties during a business. Any of the involved parties need to sacrifice or trust other to complete the deal. If anyone betray the other party has nothing but to experience it. We want to put an full stop in this kind scenario. We want to ensure the equal play field and transparency during an online transaction for both the involved parties so that both the parties can have full control over the activities.

- In a society like Bangladesh, people are getting busier every day. So, it is becoming difficult for them to do shopping and business ensuring their physical presence. So, majority of the people are trying to find an alternate solution. Fortunately, alternate solution is there and it is online shopping, e-commerce, m-commerce etc. but, unfortunately they are afraid of using this technology due to the lack of comfortable and accountable payment method while they participate in an online shopping activity. Most of the cases buyer has to pay for their purchase before they can receive the product and there is no guarantee that his purchase will be delivered in good condition. It is true that there are certain terms
and conditions are documented during an online transaction to ensure the delivery of the product but in reality it cannot convince a buyer who works hard dawn to dusk to earn his living. This point becomes an important considerable fact when majority of the people of the society belongs to middle and lower income group of the society. So, technology and opportunity is out there but only deficit is, absence of a process which can convince both the parties and motivate them to do online business keeping both the parties interest in tact. We have taken this point in our count and continued our work to develop a method which can satisfy them both.

➢ As we all know, credit card or in some case debit card is the mostly used way to do online payment transactions. But in a country like Bangladesh, it is very difficult to avail a credit card or debit card which has access to do online transactions. A person should have the following criteria to become eligible for credit card -

- A reputable, trusted and permanent job
- Income level and job rank above a certain bench mark. Though it varies from case to case but generally the bar is set pretty high and in most cases average people do not have the ability to meet those criteria
- Solid and clean bank records for over the years
- Last but not the least an undertaking from his employer that he has the ability to maintain the credit card and pay off his dues.

But, realistically majority of Bangladesh people are unable to meet the above criteria and they are been discarded from the application list. Consequences, of that they cannot participate in the online activities. It has been tried to break this shuttle. An effort has been put to introduce a method which can work without credit card. Mass people access to the technology has been ensured to change their lifestyle directly.
These are the facts behind the motivation of conducting the research to find out a way to overcome these hurdles. At the end of the day, we believe that we have found out a way to proceed for the next level.

1.4 Objectives

Like every research work we have headed to a direction keeping specific goal in our mind. We always wanted to ensure equal opportunity for both buyer and seller during an online transaction. Being motivated from our intuition we have set below objectives and considered the possible outcome through our research work.

The objectives of this research are -

a) To develop and to propose an online payment model which will be able to offer a higher level of trust among the end users

b) To incorporate the payment model for all possible practical constraints based on whether the Core Banking System (CBS) is available for update/modify or not.

c) To define and analyze the different trust levels of the model from user's usability perspective.

d) To design an API and detailed standard specifications to create an interfacing between any existing online payments model (e.g., Western Union, PayPal) with our new proposed model.

1.5 Outline of the Thesis

This research work has been organized in the following way in this paper:

Chapter 1 describes the background of the research work along with its objectives, motivation and methodology.
Chapter 2 defines the different key concepts involved in online commercial activities and makes the reader familiar with the concept of online commercial activities and their advantages, disadvantages, future prospects, and challenges.

Chapter 3 gives us the overview of e-commerce and its potential, limitations, and challenges in Bangladesh. This chapter will also provide a brief on the evolution of e-commerce in Bangladesh.

Chapter 4 makes the reader familiar with the new proposed payment model for different online commercial activities. It also describes several practical cases where the proposed model can be applicable for implementation.

Chapter 5 demonstrates the new proposed model and provides the necessary information about the demonstration platform.

Chapter 6 draws the conclusion of the thesis work. This chapter also provides some recommendation to continue this research work in the future.
CHAPTER - 2

ONLINE COMMERCIAL ACTIVITIES AND ITS DIFFERENT ASPECTS

In this chapter focus has been put on the evolution of online commercial activities like e-commerce, m-commerce and its various aspects. This endeavor also includes the opportunities, challenges and limitations of the online commercial activities. At last but not the least I will try to focus on the issues that need to be addressed for online transactions.

In 1991 the Internet world put a giant step towards the modern age, when a computer scientist named "Tim Berners-Lee" succeeded to communicate over the Internet using HTTP at CERN. He is considered as the father of the World Wide Web (WWW). This www is considered as a backbone of all the activities over the Internet. As we all know among all the online activities shopping and marketing are most popular. Capability of doing such activities over the Internet made the Internet more colorful, useful and popular among the general people. As a result e-commerce has been introduced.

2.1 E-Commerce

Generally, e-commerce or electronic commerce is the process of buying and selling of products or services online over the internet. E-commerce is an online process of bill payment or purchasing from a website. But, theoretically, e-commerce represents the process of electronic commercial transactions using Electronic Data Interchange (EDI) and Electronic Funds Transfer (EFT) technologies. These technologies provide users a platform to exchange business information and do electronic transactions. In the late 1970s these technologies became available for industry use and allowed business companies and organizations to send commercial documentation electronically.
The history of e-commerce is not very old but it has brought a revolution in various sectors like Internet, commercial activities, marketing strategies etc. Over the last few decades, networking and computing technology have contributed greatly, linking the global information networks of intellectual, social and financial interactions. This is considered as all new beginning of online commercial activities. E-commerce started its journey in 1991 when the Internet was opened for commercial use. After the inception of commercial Internet, e-commerce had to wait until 1993. Marc Andreesen introduced the first widely distributed web browser named as Mosaic at the National Center for Supercomputing Applications (NCSA) in 1993. In 1994 an important security protocol known as Secure Socket Layer (SSL) was introduced which was able to encrypt messages on both the sending and receiving side of an online transaction. Netscape 1.0 was the first to inherit this protocol. SSL ensured that personal information like names, addresses and credit card numbers could be encrypted as they passed over the Internet and maintains the security of the user and transaction to prevent forgery. In 1994 and 1995, the first third-party services for processing online credit card sales started. In 1995, VeriSign began developing digital IDs, or certificates, that verified the identity of online businesses. Later on it started to certifying that a Web site's e-commerce servers were properly encrypted and secure [10].

The history of e-commerce cannot be fulfilled without the name of the two companies Amazon and eBay. These two companies transformed the e-commerce and began the new era of online commercial activities. Amazon.com started its journey when, Jeff Bezos boxed up the first book ever sold on Internet from his Seattle garage in July 1995 [11]. But, in 1995, emerge of eBay in the industry brought competition in online commercial activities and leveled the e-commerce playing field. Both eBay and Amazon paved the way for today's e-commerce activities. Now, it is possible to buy almost anything online, from any part of the world in round the clock throughout the week at the buyer’s convenience. World Wide Web or WWW can be considered as an online mega store where the participants can interact with each other regarding their target products. It is not necessary that they have to know each other but there buy-sell process can be done easily from array of different products.
Last but not the least the global e-commerce company, PayPal, began its services in 1998. Now, it operates in 190 online markets across the globe. PayPal is an acquired bank that performs payment processing for online vendors, auction sites, and other commercial users. They allow their customers to send, receive and hold funds worldwide in 24 currencies. Currently, PayPal manages 100 million plus active accounts while the actual registered accounts are more than 232 million. It was another necessary advancement and approaches in the online commercial activities that made a way for online monetary transactions.

2.2 M-Commerce:

M-commerce can also be described as mobile e-commerce. The term m-commerce represents the online commercial activities, using the wireless hand held devices like laptops, PDAs, mobile phones etc.
Mobile commerce or m-commerce, involves new technologies, services and business models. It is quite different from traditional e-commerce. Mobile phones impose very different constraints than desktop computers. But they can be used widely with the help of new applications and services. It can be used anywhere around the globe for different purposes, like shopping, searching, bill payment etc. In short it can be described as a market at our finger tip.

The history of m-commerce did not start a long ago. It was in 1997 when m-commerce started its public commercial operation. Coca Cola Company was the first in 1997 to install the two mobile phone enabled vending machines in Finland. They were able to send mobile payments to the vending machines via SMS text messages. In the same year an m-commerce based banking service was introduced in Finland as well. The first m-
commerce Internet platform was launched in 1999 by I-mode, a Japanese company [15]. Wireless Application Protocol (WAP) is the core technology to make m-commerce available for public use. For exploiting the m-commerce market potential, handset manufacturers such as Nokia, Ericsson, Motorola, and Qualcomm are working closely with carriers like AT&T Wireless and Sprint to develop the new generation of smart phones. The main objective is to manufacture more user friendly devices through which online commercial activities can be done easily.

2.3 Electronic Check

Generally it can be said that e-check is the electronic version or representation of a traditional paper check. It is a form of online payment which is designed to perform the same function of a conventional paper check. E-check is comparatively a new payment instrument which combines the security, speed and processing efficiencies of all available electronic transaction methods. It maintains well-developed legal infrastructure and business processes those are followed with paper checks. It is the first ever and only electronic payment method chosen by the United States Treasury for high-value payments over the public Internet.

If a traditional check can be converted into an electronic payment then it has to be processed through the Automated Clearing House (ACH) Network to save time and money because electronic checks contains more security features than a paper check. It has been implemented to protect user’s business and customers. Electronic checks are becoming very popular because they are fast, efficient and secure.
Figure 3: Traditional Paper Check
(Source: http://www.jordanos.com/JFS/index.php?id=19&PHPSESSID=6683dcc2da14baaf16179bdab5511c73, last accessed on 14th August, 2014)

Figure 4: E-Check
(Source: https://www.squirrelcart.com/help/3.4.0/Electronic%20Check.html, last accessed on 24th August, 2014)
In concise way it can be said that e-checks -

- contain the same information like paper checks
- are based on the same legal framework similar to the paper checks
- can be linked and exchanged directly between involved parties
- can be used in all sorts of transactions where paper checks are used today with
  necessary network reach ability.
- enhance the functions and features offered by bank checking accounts
- expand on the usefulness of paper checks by adding value-added information

2.3.1 E-Check Technology

E-checks are designed and developed by Financial Services Technology Consortium (FSTC) integrating significant break-through technologies into the e-check's open architecture [16].

E-check technology is based on software and hardware that was developed by
FSTC members with the intention to minimize the start up expenses, apply universal
industry standards and to provide ubiquity for all the participants.

E-checks are based on:

- the Financial Services Markup Language (FSML)
- strong digital signatures using any available algorithm
- secure hardware tokens such as smartcards
- digital certificates
- banking and business practices

2.3.2 Security of E-Check

E-checks are the most secure payments instrument ever designed or developed. E-checks
are designed with the cutting edge security techniques like -

- authentication
- public key cryptography
17

- digital signatures
- certificate authorities
- duplicate detection
- encryption

Thus, e-checks enhance further banking practices with added security.

### 2.3.3 E-Check work flow

E-Checks maintain the same process flow that a traditional paper check does.

- The e-check issued to the payee electronically.
- The payee "deposits" the Electronic Check in his bank and the payee's bank "clears" the e-check to the paying bank.
- The paying bank validates the e-check and then “debits” the check writer's account for the check.

![E-check Flow](http://www.occis.com/cis/bad/Banking/banking.html)

**Figure 5:** E-check Flow

2.3.4 Advantages of E-Check

E-checks have important new features along with several advantages to offer. Those include -

- the ability of conducting bank transactions but safe enough to use on the Internet
- controlled, but unlimited information carrying capability
- reduction of fraud losses for all involved parties
- automatic verification of content
- traditional checking features such as stop payments and easy reconciliation
- enhanced capabilities. E.g. effective dating
- can be used by all account holders, even where other electronic payment solutions are not appropriate
- enhanced security
- faster and secured settlement of financial obligations
- ability to be used with existing checking accounts
- evolved payment mechanism for banks

Last but not the least it has to be mentioned that e-checks will lead the way to an e-commerce environment for both businesses men and consumers. It is believed that e-check will succeed because it meets the real business needs and it is based on the paper check, which is considered as the most popular non-cash payment choices.

2.4 Credit Card

Credit card offers the electronic way of buying goods and services on credit basis. Basically a credit card is a form of cards with security credentials which is used to guarantee the payment made by the buyer. It is a simple and effective method of selling goods or services without cash transaction. A credit card is a simple automatic way of offering credit to a consumer. It has become the most common method of doing online transaction. The most importantly it can be used beyond the owner’s geographic boundary.
The idea of credit cards considered as a modern day convenience, but the history of credit cards actually started in the early 1900s. Today, there are number of companies to offer credit card facilities but among them major companies like Discover, Visa, MasterCard, and American Express are widely used.

![Common Credit Cards Entities](http://www.gopixpic.com/1024/credit-card-logos/, Last accessed on 27th September, 2014)

*Figure 6: Common Credit Cards Entities*

The concept of using credit to purchase goods and services is not new. Initially, individual retailers, merchants, and other providers used to offer credit sales to its customers before banks started to issued actual credit cards. The first credit card invented was by John Biggins in 1946. It was called the "Charg-It" card. Mr. Biggins was a banker by profession in New York. He proposed an easier and more direct system of credit. If a customer had to use the Charg-It card, a bill for that person's purchase was sent to his bank for review. After review the bank would pay the merchant instead of the customer paying the merchant directly. There were some terms and conditions like; all purchases had to be made locally. But in spite of the terms, the whole process was a success [17].

There are several companies are now operating credit cards across the globe like VISA, MasterCard, American Express etc. Among them American Express is the first to introduce credit card on a small piece of purple plastic. AMEX was the first to use plastic in as a material instead of paper or cardboard.
In recent days, banks and corporations across the globe issue credit cards to people and perhaps it is the most common form of online payment method in the world. Everything can be purchased with a credit card starting from airplane tickets to cosmetics and groceries. The Internet has expanded the usability of credit cards and made them the number one preferred method of payment next to cash [19].

It has been half century that the plastic card has been the standard. But recent developments show alternative forms of payment rising to prominence. Like online services such as PayPal and portable devices having implanted credit card chips in it.

2.5 Online fund transfer

In many developed countries wire transfer among the different bank accounts is a popular method of online payment. This transfer can be done not only the intra bank but also the interbank transaction is also allowed. In some places biller’s billing details remains attached with the bank. During any payment payer can directly perform any wire transfer to the biller against his services or products. For example, in Australia the popular billing method is BPAY. Using this facility people can easily and directly wire transfer their utility bills, house rents etc. It removes their hassles, make the process faster and enrich the online commercial activities.

2.6 Central Bank

A central bank is a bank with a special privilege to control the other financial institutions of the country. It is often termed as a bank of the banks. A central bank is the term used to describe the authority that is responsible for policies to control country’s supply of money and credit. A central bank is responsible for maintaining the financial satiability, ensuring the country’s constant economic growth [22].
There are three key goals of central bank according to the modern monetary policy. They are stated below:

- **Stability of the value of money**
  The first and most important is price stability or stability in the value of money. Today this means maintaining a sustained low rate of inflation.

- **Stability of the economy**
  The second goal is a stable real economy, often interpreted as high employment and high and sustainable economic growth. Another way to put it is to say that monetary policy is expected to smooth the business cycle and offset shocks to the economy.

- **Financial Stability**
  The third goal is financial stability. This encompasses an efficient and smoothly running payments system and the prevention of financial crises.

### 2.6.1 History of Central Bank

The concept of central bank has been emerged in the seventeenth century. The Swedish Riksbank can be recognized as a first central bank. It was established in 1668 as a joint stock bank and was chartered to lend the government funds and to act as a clearing house for commerce. After a few decades, the most famous central bank of the era, the Bank of England, was founded in 1964. Later in Europe, other central banks were set up [21].

The early central banks helped to fund the government’s debt but at that time they were also private entities and engaged in banking activities. They used to –

- hold the deposits of other banks,
- serve as banks for bankers,
- facilitate transactions between banks or providing other banking services.

These factors allowed them to become the lender of last resort in the face of a financial crisis. In other words, they became willing to provide emergency cash to their correspondents in times of financial distress.
2.6.2 Responsibilities of the Central Banks

The central bank has many responsibilities to perform. Among them major responsibilities are –

- To ensure and provide price stability of the country. In other words, it means the responsibility to control the threats of inflation.
- To ensure the growth of the real economy.
- To ensure the financial stability. It means, the central bank must remove the excess liquidity and return to its inflation objective.

2.6.3 Challenges of Central Banks

Central bank has many challenges to encounter. The key challenges that central bank has to face are –

- balancing their three policy goals, which have been set to ensure the stability of the country's financial and economic situation.
- keeping abreast of financial innovations, which can derail financial stability. Innovations in the financial markets are challenging as it attempts to circumvent regulation as well as reduce transactions costs and enhance leverage. Strategies, which are designed to dissipate risk, may have backfired because of the opacity of the new instruments.
- controlling the national reserve intact. Sometimes it gets difficult to combine an explicit target with the country's dual mandate of price stability and high employment.
- handling the effect of globalization. All central banks has to consider the effect of globalization and other supply-side developments, such as political instability and oil price and other shocks, which are outside of their control but which may affect global and domestic prices.
2.7 Central Clearing House

Generally a Clearing House is formed to provide clearing and settlement services among the financial institutions. Generally, a Central Clearing House is formed under the direct authority and administration of the country's central monetary authority. For example, in Bangladesh, Bangladesh Bank is the central bank of the country who monitors all other financial entities across the country. Bangladesh Bank (BB) maintains the central clearing house in Bangladesh under its direct governance.

2.8 Advantages and Limitations of Online Commercial Activities

Online commercial activities have brought new life style and comfort to the mass people. As it has some advantages, it has to face some challenges as well. The advantages and challenges have been described below:

2.8.1 Advantages

E-Commerce advantages can be broadly classified in three major categories:

- **Advantages to Organizations**
  - Using E-Commerce, organization can expand their market to national and international markets with minimum capital investment. It has the ability to operate beyond the national and international borders with the help of Internet. An organization can easily locate more customers, best suppliers and suitable business partners across the globe.
  - E-Commerce helps organization to reduce the cost to create process, distribute, retrieve and manage the paper based information by digitizing the information.
  - E-commerce improves the brand image of the company.
  - E-commerce helps organization to provide better customer services.
  - E-Commerce helps to simplify the business processes and make them faster and efficient.
- E-Commerce reduces paper work in a great scale and thus everyone can contribute to the new promise of the green world.
- E-Commerce increased the productivity of the organization. It supports "pull" type supply management. In "pull" type supply management, a business process starts when a request comes from a customer and it uses just-in-time manufacturing way.

### Advantages to Customers
- E-Commerce can provide support 24 hours of each seven days of a week. Customer can do transactions for the product or enquiry about any product/services provided by a company anytime, anywhere from any location.
- E-Commerce application provides user more options and quicker delivery of products.
- E-Commerce application provides user more options to compare and select the cheaper and better option.
- A customer can put review comments about a product and can see what others are buying or see the review comments of other customers before making a final buy.
- E-Commerce provides option of virtual auctions.
- Readily available information. A customer can see the relevant detailed information within seconds rather than waiting for days or weeks.
- E-Commerce increases competition among the organizations and as result organizations provides substantial discounts to customers.

### Advantages to Society
- E-Commerce helps reducing cost of products so less affluent people can also afford the products.
- E-Commerce has enabled access to services and products to rural areas as well which are otherwise not available to them.
- E-Commerce helps government to deliver public services like health care, education, social services at reduced cost and in improved way.
2.8.2 Challenges of E-commerce

Though the E-commerce has several positive impact in the life style of the people but there are some challenges/disadvantages that it has to face. E-Commerce disadvantages can be broadly classified in two major categories:

- **Technical Disadvantages**
  - There can be lack of system security, reliability or standards owing to poor implementation of e-Commerce.
  - Software development industry is still evolving and keeps changing rapidly.
  - In many countries, network bandwidth might cause an issue as there is insufficient telecommunication bandwidth available.
  - Sometimes, it becomes difficult to integrate E-Commerce software or website with the existing application or databases.
  - There could be software/hardware compatibility issue as some E-Commerce software may be incompatible with some operating system or any other component.

- **Non-Technical Disadvantages**
  - The cost of building E-Commerce application in-house may be very high. There could be delay in launching the E-Commerce application due to mistakes, lack of experience.
  - User may not trust the site being unknown faceless seller. Such mistrust makes it difficult to make user switch from physical stores to virtual stores.
  - It is difficult to ensure security or privacy on online transactions.
  - Lack of touch or feel of products during online shopping.
  - E-Commerce applications are still evolving and changing rapidly.
  - Internet access is still not cheaper and is inconvenient to use for many potential customers like one living in remote villages.

In this chapter we got some overview on the terms and entities involved in the online commercial activities. We also got to know the history of evolution of online commercial activity or e-commerce.
CHAPTER – 3

ONLINE COMMERCIAL ACTIVITIES IN BANGLADESH

E-commerce is already quite popular in Bangladesh and it is increasing day by day. In comparison to other countries of the world, e-commerce came at a later stage in Bangladesh but grew very quickly.

E-commerce or electronic commerce is closely related to computer and Internet. It all started in Bangladesh in 1990s with the boost of the Internet industry. The introduction of Mobile phone into the country in the 90s added new dimension in the e-commerce industry of the country. In new millennium, GrameenPhone introduced affordable mobile services with Internet accessibility through GPRS. Since then the usage of mobile and Internet only continued to grow. In addition the country has also experienced the inauguration of other government and non-government mobile and fixed line operators which has ensured the continuous and uninterrupted Internet access from the remote areas. The launch of 3G is the latest to that continuation.

3.1 Beginning of E-commerce in Bangladesh

E-commerce started in Bangladesh in the late 90s. In the period of 2000 to 2008 the e-commerce sector observed slow growth. There were few e-commerce websites but there were no system for online payment which is the most important condition for e-commerce. Apart from that, high cost of Internet and lower penetration made the people ignorant about the online commercial activities. According to Bangladesh Bank, payments and transactions by credit cards were nearly Tk11 billion in June 2008; one of the lowest in the world [23].

The country had only about 400,000 credit card holders at the end of June 2009. From 2008, things started to look bright as Bangladesh Bank took various initiatives including implementation of e-Payment Gateway [23].
3.2 Bangladesh Bank Opening Up E-Commerce Sector

In 2009 Bangladesh Bank allowed online payment in the country and scenario started change very rapidly in the country. This initiative was the much needed step for officially opening up the e-commerce sector. In November that year, Bangladesh Bank issued a circular where it gave permission for following types of online transaction in the country:

- Online utility bill payment from client’s accounts to recipient’s accounts.
- Online money transfer from online of a client to his/her another account in the same bank.
- Collection of money from/to buyer’s bank account to seller’s bank account for purchase/sale of products under e-commerce system transaction via Internet using credit cards in local currency.
- Issued regulations in 2011 to provide financial services to mass people by a bank or a company that is classified as a bank subsidiary by the central bank. This step opened up the m-commerce sector in Bangladesh.

3.3 Rise of M-Commerce and Mobile Banking in Bangladesh

The first mobile financial service deployments were launched in Bangladesh in mid-2011, and by the end of 2013, they were being used by 22 percent of the adult population of Bangladesh, a fast start for a large country of 160 million inhabitants. In 2013 registered mobile financial services accounts in Bangladesh grew faster than in any other country [24].

Initially Bangladesh Bank (Central Bank of Bangladesh) approved 20 licenses for providing mobile financial services in the country. But among them bKash has gained the most popularity and succeeded to conduct more than 80% of the transactions, happened using the mobile financial services. bKash launched in the second half of 2011, grew to 2 million accounts by the end of 2012, and shot up to 11 million registered accounts by the end of 2013 [24].
3.4 Rise of Freelance Outsourcing

After opening up online transaction, the outsourcing sector of Bangladesh observed rapid growth. Elance and Odesk are the two most popular sites for freelancing jobs. Many Bangladeshi freelancers also use these two sites. In 2013, Bangladesh was ranked 7th and 8th on the list of 180 countries in Elance and Odesk. In 2012, there were only 2,42,268 registered freelancers from Bangladesh which increased to 3,62,948 in 2013. By the first quarter of 2014, Bangladesh has a total of 3,87,114 freelancers. Between 2010 and the first quarter of 2014, a total of 435, 249 jobs had been awarded to Bangladeshi freelancers. SEO, WordPress, PHP, HTML, CSS, Data entry, MySQL, Internet research, social media marketing, and Adobe Photoshop are some of the top paying skills for Bangladeshi freelancers [23].

3.5 E-commerce Boom in 2013

The year 2013 has been an important year in the history of e-commerce in Bangladesh. Some important things took place during this year that would have a long lasting effect in the e-commerce sector.

- Bangladesh Association of Software and Information Services (BASIS) and Bangladesh Bank jointly observed E-commerce Week for the first time in the country. The theme of the week was “Shop Online: Anything. Anytime.” In the opening ceremony, the governor of the central bank of Bangladesh, Dr. Atiur Rahman informed that there were 4.6 million debit and credit card holders and 3 million mobile bank accounts holders in the country [23].

- In February 2013, for the first time a fair on e-commerce was organized in the country. The slogan of the fair was- “Festival for buying and selling at your premise.” A total of 31 public and private E-commerce organizations showcased their products and services at the fair. Though first of its kind, the fair was huge success attracting eighty thousand visitors. The live webcast of the fair which was seen by more than fifty thousand people in Bangladesh and abroad [23].
Bangladesh Bank gave permission to buy products and services online using international credit cards. Buying products and services from abroad using credit card is an important aspect of e-commerce but it was not possible for the Bangladeshi international credit card holders. In May last year, Bangladesh Bank gave permission to buy products from abroad via international credit card.

### 3.6 E-commerce Growth in Bangladesh

E-commerce growth in Bangladesh is very promising. In 2000, e-commerce business was worthy of 11,440 million taka only. But is 2001 it stepped up to 15840 million taka and started to increase year by year. In 2002 the business was worthy of 18,980 million taka. In the period of 2002 to 2004, the e-commerce businesses growth was not very fast but in the year of 2005 the business of e-commerce turned around and was worthy of 22480 million. At the end of the year 2006, the e-commerce business growth was 252000 million taka [26].

### 3.7 Impact of E-Commerce in Bangladesh

The multidimensional activity of e-commerce which Bangladesh can be benefited in business sector, some of them are -

- Expansion of the business.
- Reducing unemployment problems.
- Reducing communication difficulties.
- Access to the international market.
- Competition against exporting in other countries.
- Business in round the clock.
- Helps to enhance the knowledge about business
### 3.8 Challenges of E-Commerce for Bangladesh

E-commerce activities in Bangladesh also have to deal with some obstacles and challenges. Some of them are listed below:

- Absence of adequate strong network infrastructure
- Limitations in Intra-bank and Inter-bank Connectivity
- Local and Global Bank-Client Connectivity
- Absence of automated core banking system
- Acceptance of Bangladeshi currency for currency exchange in foreign countries
- Unavailability of skilled e-Manpower
- Poor regulatory framework

Last but not the least absence of e-culture and mentality associated top it put Bangladesh backward from grasping the advantages of e-commerce.

### 3.9 Future of E-Commerce in Bangladesh

Use of technology in each and every sector has become very common. In recent days it can be hardly found any sector operating without using technology. So it is quite normal that business people will also use technology effectively and efficiently to take the greatest advantages of technology. Internet is one of the largest blessings of technology, which enables people from the distant parts or county to interact or communicate easily. It connected the whole globe in a single platform. A new dimension has been created for trade and commerce, namely electronic commerce (e-commerce) by none other than one and only Internet. E-commerce reflects the marketing, identification, payment and delivery of goods and services done by e-commerce using Internet.

To discover the future of e-commerce in Bangladesh, it has to have a clear idea about the fields where e-commerce are running successfully in Bangladesh. Although this sectors are operating in the country in a very limited scale due to the lacks of adequate customer and manpower but still it has many potentials to be pervasive. If necessary
emphasis can be put with proper regulation, policy and necessary investment then this sector can observe the growth rate better than any sector in the country. It will not only help to develop the business efficiency, it will create many job and business opportunities in the country as well. The sectors with the potential e-commerce implementation possibilities are:

- Online banking
- Hotel booking
- Airline ticket booking
- Readymade garments
- Oil and Gas Sector
- Utility Bill payments
- Education and exam systems

In this chapter an overview has been shared on the progress of online commercial activities in Bangladesh. The situation is very promising but it would have been better. But the good thing is the ball has started to roll and the situation will be much better in near future if necessary emphasis can be put in this sector.
CHAPTER - 4

PROPOSED PAYMENT MODEL FOR ONLINE TRANSACTIONS

It has been clearly visible that online commercial activities are globally on the rise. People feel more comfortable in doing business rather than visiting outside. Availability of Internet and ease of access to the Internet using different portable devices helped people thinking about global activities in smart and faster ways.

4.1 Overview

As we already mentioned, there were 2.937millions Internet users worldwide in March 2014, implying 40.7% of total world population and observing growing an exponential growth since December, 1995 [1]. So, there is no doubt that Internet is now playing a major role in fixing the life-style in the societies. Accessibility to the online systems has gained so much popularity among the users that almost every organization are having or planning to have an online version of their operations and services. Business entities have started to change their marketing strategies and started to consider online advertising and marketing as their key marketing strategy and platform for their advertising and promotions. Online operation helps the organization to operate across the globe for 24hours in 7 days of the week basis. Moreover, it has become a branding platform and a matter of pride to run the business online among the business organizations.

Online business or e-commerce has brought new dimension in business arena. E-commerce can be described as secured unified platform of communication, data sharing, management and sharing of information on sale and purchase of goods and services. It is nothing but the method of buying and selling of products and services online using electronic platforms like websites, mobile apps etc. It implies a process of conducting transaction over the online or electronic medium. From generic point of view and user's
perspective, it is very convenient to do business online from anywhere across the globe, avoiding the physical presence of each other, in their feasible time.

Though doing business online without physical presence is comfortable and easier but it lacks security and certainty of the transactions. It has been a long time that credit cards have been the way of shopping online. POS terminals and ATM machines are modified form of doing transaction in shopping malls or hotels. According to the nature of the Internet it is not secured to share transaction information over the Internet as it might be compromised and manipulation can be done to gain illegal benefits. To minimize the risk of security, related professionals and researchers put priority on the security aspect of online transactions and have been succeeded to secure the process to some extent. Till to date various research works are on going to make the transaction more secured over the Internet. But, focusing on the security diverted us from thinking the aspect of uncertainty faced by the users of online transaction. Now a day's online transaction occurs on credit basis. In the very beginning, buyer and seller have to trust the opposite party to complete the transaction and wait for the delivery. Usually either of the two cases happens: either buyer has to clear his payment for product delivery before receiving the product or seller has to deliver product for payment receipt before receiving price of the product. In both the cases involved party has to go through an interim phase of uncertainty. If anyone breaks his commitment or any incidence of fraudulence occurs during delivery any of the parties has face unnecessary hassles, if not a heavy loss. But the reality is, researchers put so much concentration on security aspect of the online transactions that they have overlooked the uncertainty aspect of the online transaction. However, due to this uncertainty among the users till now online shopping and e-commerce have not got that much popularity among the middle and lower income group of the society. People of low income group of the society are so much concern about their earning that they fear to risk their money where uncertainty is perceived. They are not at all concerned about the security by passing the evident uncertainty.

Apart from that, in developing and under developed countries the no of users of credit cards are very minimal. The Daily Star, a leading newspaper in Bangladesh cited that by the end of 2015 the total credit card users in the country will be 1.5 millions [27]. It is obvious that if the less number of people use the credit cards then less number of people
will be able to participate in the online shopping as the users do not have way to pay online. So, in spite of having ample opportunities, online shopping will not be able to achieve the acceptability among the majority of middle and lower income groups of the society which are the major part of the developing or the underdeveloped country. So, yet again technology will fail to serve the people to the maximum only for ignoring the socio-economic impact of the application of the technology.

In this research work, it has been tried to address the socio-economic issues of online transaction and the way of building trust among the users to ensure more user involvement in the activity of e-commerce. To ensure that, an online payment model has been proposed which can be integrated in any form of online transaction minimizing the uncertainty of the online transaction keeping the existing security mechanism identical. A model has also been proposed, which will be able to let us do online shopping without being the owner of a credit card.

To demonstrate our model we will consider an online marketing system application and a bank account to evaluate our model in live scenario. Banking system of Bangladesh has been considered as a reference but the model has been proposed for any sorts of online commercial activities across the globe. In this research work, certainty and building trust among buyer and seller has been the main concern rather than the security aspects of the online transaction. So, existing security protocols and algorithms has been considered as the best option for continue online commercial activities.

### 4.2 Proposed Payment Model for Online Transactions

It has been mentioned earlier that the main objective of this research work is to build trust among buyers and sellers who participate in online shopping activities without knowing each other. So, there should be a mechanism that need to be applied to ensure the buyer's and seller's interest during an online transaction. In this research work, it has always been a primary goal to have control over the buy-sell cycle starting from payment initiation to product delivery, so that both buyer and seller can take steps in any stage of the buy-sell cycle that violates the agreement of the trading done during the order placement.
For easy understanding of the model let us consider an online application which demonstrates the buying selling process. Our proposed payment system model will be integrated with the application to facilitate the payment system model. The proposed payment model starts working just after the order has been confirmed by the buyer and accepted by the seller.

### 4.2.1 Payment model architecture

In our proposed model we will have buyer, seller, operating bank, central bank, payment system and buy sell process. We will assume the presence of an online buy-sell application to analyze and demonstrate the process flow of our proposed payment model. In general case our model need to be used and accessed using on application that might be web-based application or mobile-based application but necessarily it has to be an online application. Proposed payment model has the flexibility so that, the payment model can be adopted or adjusted according to the application architecture and policy.

In this context, it has been realized that few terms need to define to understand the payment model clearly. The description has been provided below:

- **Core Banking System (CBS)**
  A Core Banking System (CBS) is a software which is used to handle day to day transactions that occurred everyday in a bank. Bank has full ownership of the software and it stores all the data of day to day activities of a modern bank. Practically it is the back-end data processing application for processing all the transactions that have occurred during the day and updated the data of customer account balances to the central servers of the bank. Generally, a CBS includes and handles all the data of a bank's day to day operations like loan and credit information, customer's account information etc.

- **Central Clearing House**
  Generally a Clearing House is formed to provide clearing and settlement services among the financial institutions. Typically, a Central Clearing House is formed under the direct authority and administration of the country's central monetary
authority. For example, in Bangladesh, Bangladesh Bank is the central bank of the country that monitors all other financial entities across the country. Bangladesh Bank (BB) maintains the central clearing house in Bangladesh under its direct governance.

- **Bank**
  Bank is a financial organization which offers several financial services and products to its customers, like Deposits, Saving accounts, Loan and credit services etc. It is a trusted organization supervised and controlled by the central banking authority of a country. In Bangladesh, Bangladesh Bank is the central bank and Pubali Bank and Jananta Bank are the banks, which are controlled by the Bangladesh Bank.

- **Payment System**
  In this research work it has been considered that, the payment system is a process, which is operated by the software application for transferring money to payee from payer. The payment system is used to transfer money among the concerned after the transaction agreement is done.

### 4.2.2 Proposed payment models

As our aim is to build an online payment model which will ensure the trust and control of the users over the total process of transactions, so we have designed our model for six different practical scenarios. They are -

1. Payee and receiver maintains a transaction account in the same bank
2. Payee and receiver maintains a transaction account in different bank
3. Payee and receiver do transaction in global market beyond their national market
4. Seller him-self responsible for delivery of the product to the customer
5. Seller introduces third party organization for the delivery of the product.
6. Integration of an independent existing payment method to the online applications.
For, the sake of clear understanding of the procedure we will consider an instance of buy and sell using our proposed model of online payment addressing the different cases.

4.2.2.1 **Payee and receiver maintains a transaction account in the same bank**

As we already mentioned, for easy understanding of the model let us consider an online application which demonstrate the buying selling process. Our proposed payment system model will be integrated with the application to facilitate the payment system model. The proposed payment model starts working just after the order has been confirmed by the buyer and accepted by the seller.

![Figure 7: Payment system model when buyers and sellers maintain the account with the same bank](image)

**Figure 7**: Payment system model when buyers and sellers maintain the account with the same bank
The complete payment process can be elaborated with the following steps:

**Step 1:** Using any e-commerce application (e.g. web application, mobile apps etc.) a buyer will place an order to the seller.

**Step 2:** The intended seller will accept the order using the same application that buyer used and sent the acceptance notification to the seller using the application.

**Step 3:** After receiving the acceptance confirmation from the seller, the buyer will initiate payment through the system using the application.

**Step 4:** After receiving the seller payment initiation request system will send request to the affiliated Bank with whom system has trust relationship and authorization to initiate transaction request on behalf of the account holder. The request will be to transfer the amount equal to the order value placed to the seller.

**Step 5:** After receiving the request from the trusted system, the core banking system or banking transaction system will transfer the money from the buyer account to the seller account. But this transaction will reflect only in the ledger balance of the account holders (both buyer and seller) but not in the actual balance. The amount will remain freeze until both the buyer and seller agrees to complete the transaction as per their buy-sell agreement. It gives confidence to both buyer and seller. From buyer perspective buyer understands that his money will not go out of his hand until he receives his product that he purchased. On the other hand seller feels that he has the control over the money and buyer will not be able to do any kind of fraudulent behavior upon his product delivery. After the modification of the accounts acknowledgement will be sent to the trusted system from the bank.

**Step 6:** When the system will be notified from the banking system about the arrangements in the mentioned accounts the system will send the notification to both buyer and seller. Upon receiving the notification both buyer and seller will be able to query the bank to check the validity of the notification. Accessibility to the online banking system can be a great tool to check the validity of the transaction.
Step 7: Just after the step 6 the system will send another notification to both the buyer and seller consisting of validation codes. This notification method can be diversified. Different systems can choose different methods. This methods must be secured by default and mechanism is trusted already; like e-mail, text message or even through the application notification system. Here application indicates the approach that used for completing buy-sell process like mobile apps, web application where registration with secured credentials are must, before participating in buy-sell process. Security codes which are part of the payment system model will be generated automatically by the random function declared in the coding part of the system development. Software designer and architect can design and use any secured random function to generate the these codes. Validation code package consists of ACCEPTANCE CODE and WITHDRAWAL CODE for buyers and ACEPTANCE CODE and REJECTION CODE for sellers. Here, one thing need to be noted that ACCEPTANCE CODE indicates that buyer has accepted the delivery and validating the financial transaction from buyer's perspective and WITHDRAWAL CODE will be used to terminate the order as the buyer is not satisfied with the delivery. On the other hand seller will use ACCEPTANCE CODE for accepting the buyer's decision (acceptance or rejection) and REJECTION CODE will be used to deny the buyer's decision. For the buyer and seller alignment and completion of the full buy-sell process flow, Combination of two codes, each from buyer and seller will be required to complete or terminate the buy sell process between buyer and seller. If any of them denies to do so, the transaction will be halted and buy sell process cannot be completed. As we are concentrating on the model of the payment system so detailing in the software coding is beyond the scope of this paper. These codes are all authorization codes which will be used for validation of the different phases of the buy sell process.

Step 8: After receiving the codes seller will initiate product delivery and will be responsible for the delivery of the product/s according to the terms and conditions of the dealings. This delivery can be made by the seller himself or third party can be involved to deliver the products on behalf of the seller.

Step 9: After receiving the delivery, buyer will acknowledge the receipt of the product to the seller with the receiving condition of the product. Products can be damaged or wrong product might be delivered during the delivery and buyer might not agree to accept the
product is such condition. This information should be exchanged between buyer and seller before final transaction take place.

**Step 10:** Whatever the decision is agreed upon between buyer and seller that will be reflected in the step 10. According to the condition of the delivered product buyer will accept or deny the delivery and put the codes in to the system.

**Step 11:** System will relay the buyer's input message acceptance/rejection of the delivery to the seller.

**Step 12:** In this step seller has to accept or reject the buyer's decision to proceed to the next step of the transaction cycle. Acceptance of the buyer's decision by the seller will decide the next transaction phase of the process. If seller rejects the decision of the buyer then they will need to communicate again to settle down the issue.

**Step 13:** After seller's acceptance of the buyer's decision system will sent request to the core banking system accordingly to complete the fund transfer. This request might be to transfer the money from buyer's account to seller's account completely or to withdraw the money back from the seller's account to buyer's account. The decision will depend solely to the input of buyer and seller in step 10 and step 12.

**Step 14:** Upon receiving the request from the trusted system the banking system will process the instruction. This instruction might be to cancel the transaction or to complete the transaction. After completing the task the core banking will send notification message to the trusted system or our application system.

**Step 15:** Upon receiving the confirmation from the core banking system, system will generate notification for both buyer and seller to let the users know about the fund transfer status.
Figure 8: Process flow for the proposed payment model where buyer and seller has account in the same bank

With the completion of step 15 one single process flow of fund transfer will be completed between buyer and seller. For multiple transaction instances the same process flow will be occurred repeatedly. Through these steps both the buyer and seller has the control on every steps of the buy-sell process and probability of fraudulent behavior from both buyer and seller can be minimized to the lowest possible level. These mentioned 15 steps at least gives both buyer and seller a comfort place where both buyer and seller can have a
feeling that they have full control over their assets though they are dealing with completely unknown entity and where probability of the misdeeds is at the maximum level.

4.2.2.2 Payee and receiver maintains a transaction account in the different banks

It is not necessarily will always be true that both buyer and seller will maintain transaction account in the same bank. But there will always be a very high probability that both buyer and seller will maintain in the different banks of their personal choices. But this cannot be a limitation to do online shopping or transactions.

Figure 9: Payment system model when buyers and sellers maintain the account with the different bank

To overcome this blockage we want to use the method of e-check. E-check will be the online version of check transaction that we usually do through our general everyday physical banking process. The detailed proposed e-check design will be discussed in the
next chapter of this paper. Using e-check an user will be able to do financial transaction among the banks under the jurisdiction of the central regulatory or monitoring bank. In our case in Bangladesh this role need to be played by the central bank, the Bangladesh Bank. Our system will have an direct connectivity or access with the central bank along with the authority of initiate transaction request on behalf of its users.

The complete process can be described in details through the below elaboration:

**Step 1:** Using any e-commerce application (e.g. web application, mobile apps etc.) a buyer will place an order to the seller.

**Step 2:** The intended seller will accept the order using the same application that buyer used and sent the acceptance notification to the seller using the application.

**Step 3:** After receiving the acceptance confirmation from the seller, the buyer will initiate payment through the system using the apps and he will issue an e-check in the favor of the seller.

**Step 4:** In this step system will initiate request to the central bank to process the e-check which was initiated by its user. The request will contain the detailed information of the transaction. Those are,

- Transaction id of the transaction
- Receiver's bank information
- e-check number
- transaction amount
- transaction initiation date
- authentication code of the e-check

**Step 5:** Just after receiving the request the Bangladesh Bank will forward the request to the payer's bank for necessary e-check verification.

**Step 6:** Receiving the request from the Bangladesh Bank, payer's bank will verify and communicate with its customer about the request of e-check processing.
Step 7: If the customer authenticate the e-check processing then payee's bank start the clearing and fund transfer formalities. In Bangladesh most of the time this verification is done by over telephonic discussion with proper verification like the credentials that buyer shared with the bank while he opened the account with the bank. The alternate channels like Short Message Service (SMS) or e-mail can be used for verification but it might add additional delay with the processing.

Step 8: In this step buyer's bank will complete all necessary verification and formalities (freeze) of the transaction and request Bangladesh Bank to proceed for the fund transfer (seller). Meanwhile the bank will freeze money from the buyer's account and it will reflect in buyer's ledger balance statement.

Step 9: Now, Bangladesh Bank will inform the Receiver's bank about the fund transfer. Bangladesh Bank will share necessary information for fund transfer with the seller's bank. According to the instruction, the seller will find that the intended receiving amount in his ledger balance statement but cannot make use of it until the total buy-sell process is completed.

Step 10: Bangladesh Bank will notify the system about the transaction processing updates and it is ready for final fund transfer and waiting for the system instruction to about completion of the product delivery.

Step 11: Now, the system will share the validation codes with both buyer and seller. These verification codes are very important and controls the money flow between buyer and seller against buy-sell activities. This notification method can be diversified. Different systems can choose different methods. These methods must be secured and trusted; like e-mail, text message or even through the application notification system. These notification systems can adopt any encryption algorithms of their likings. It completely depends on the developer of the application. In this paper, application indicates the approach that used for completing a buy-sell process, like mobile apps, web application where registration with secured credentials are must, before participating in buy-sell process.
Step 12: After receiving the codes seller will initiate product delivery and will be responsible for the delivery of the product/s according to the terms and conditions of the dealings. This delivery can be made by the seller himself or third party can be involved to deliver the products on behalf of the seller.

Step 13: After receiving the delivery, buyer will acknowledge (auth code) the receipt of the product to the seller with the receiving condition of the product. Products can be damaged or wrong product might be delivered during the delivery and buyer might not agree to accept the product in such condition. This information should be exchanged between buyer and seller before final transaction take place.

Step 14: Whatever the decision is agreed upon between buyer and seller that will be reflected in the step 1. According to the condition of the delivered product buyer will accept or deny the delivery and put the codes in to the system.

Step 15: System will relay the buyer's input message acceptance/rejection of the delivery to the seller.

Step 16: In this step seller has to accept or reject the buyer's decision to proceed to the next step of the transaction cycle. Acceptance of the buyer’s decision by the seller will decide the next transaction phase of the process. If seller rejects the decision of the buyer then they will need to communicate again to settle down the issue.

Step 17: After seller's acceptance of the buyer's decision the system will automatically inform the Bangladesh Bank to settle down the fund transfer.

Step 18: Bangladesh Bank will complete the formalities for completing the fund transfer and settle down the issue.

Step 19: After being notified from the Bangladesh Bank. The system will relay the subsequent notification to its users.

Step 20: At the end the system will generate notification for both buyer and seller that the order has been successfully delivered and closed in the system. The following flow chart will demonstrate the full procedure at a glance.
Figure 10: Process flow for the proposed payment model where buyer and seller has account in the different bank
4.2.2.3 Payee and receiver maintains a transaction account in the different country

If we consider an online trade beyond the national territory then the process will be little bit different from the processes that we described in the earlier sections. The total process flow will remain same in the buy-sell process except the e-check clearing steps. In this case we would require the involvement of the global monetary transaction network.

The figure 11, illustrates the e-check processing flow in case of global transaction. The each has been marked with numbers in the figure and elaborated below:

**Step 1:** Buyer issue an e-check for the order that he placed for the seller in the system.

**Step 2:** System forwards the check to the central bank of the issuer's territory for verification.

**Step 3:** The central bank of the buyer's country forward it to the buyer's bank for necessary verification and ensure the availability of the funds.

**Step 4:** After necessary verification the buyer's bank update the central bank with the verification report.

**Step 5:** According to the verification report received from the buyer's bank, central bank of the country 'X' decide the next step with the e-check. If the check is verified and necessary funds are available then the central bank forward it to the global monetary transaction network for the delivery of the check to the seller's account

**Step 6:** Global monetary transaction network verify the SWIFT code and forward to the country 'Y's central bank to reach the seller's account.

**Step 7:** After receiving the e-check the central bank of 'Y' will send instruction to the seller's bank to deposit the seller's account with the mentioned amount in the e-check.

**Step 8:** Being instructed from the central bank the seller's bank will deposit the intended amount to the sellers account and at the end seller will be able to check the amount/transaction status through his Internet banking subscription.
Figure 11: E-check process flow for an international transaction

This is the process that described for internal transaction but achieve the actual goal of the fair and equal opportunity of online trading the other process flow and authentication system will remain as it is, described in the earlier sections. The flow of authentication codes will not be an issue the system is running online but the bank notification process may vary from country to country according to their internal notification system.

4.2.2.4 Seller is responsible for the delivery of the product

Delivery of the product is one of the major concerns of online shopping. From buyer's perspective it is very difficult to get the right product during the delivery as he saw during the purchase. On the other hand, from seller's perspective it is hard to trust buyer in case of acceptance of the product. If buyer denies to accept the product then seller has to
accept the loss of his investment. Sometimes, this confusion becomes so acute that both buyers and sellers lost interest in doing online shopping. Obviously it has been required to overcome this problem. The proposed payment model has been designed to overcome this problem. The proposed payment model provides full control to both buyer and seller throughout the buy-sell cycle. The following process flow demonstrates the proposed payment model:

![Process flow of the successful delivery of the product by seller](image)

**Figure 12:** Process flow of the successful delivery of the product by seller

It is obvious that question might arise what will be the case if sellers fails to deliver it successfully. In the proposed model it has also been addressed. The following flow diagram demonstrated the case of unsuccessful delivery:
4.2.2.5  Seller introduces third party organization for the delivery of the product

Sometimes the situation may arise where it would not be possible for seller to deliver the products to customer and customer is not willing to take the responsibility of collecting the product from the seller. In such cases third party organization or person can be appointed by the seller for the delivery of the product to the buyer. The proposed payment model has also the provisioning of such cases. The following process flow demonstrates such successful cases.
**Figure 14:** Process flow of the successful delivery of the product by third party

In case of unsuccessful delivery it will follow the exactly the same process flow except the acceptance code the involved parties need to the rejection code.
4.2.2.6 Integration of an independent existing payment method to the online applications

We all know that already there are some online payment mechanisms which are recognized globally, like Western Union. Western Union has been operated worldwide and people have accepted them as a trusted fund transfer gateway. Every country has some local organizations who take care of the fund transfer within the national territory. For example, in Bangladesh they use bKash or post office service for remote fund transfer. In the proposed payment model provides the flexibility to introduce the existing payment mechanisms for the online payment keeping the goal of the model intact. The following process flow diagram demonstrates the process:

**Figure 15:** Process flow of the payment using independent payment gateway
4.2.3 Electronic-Check (E-Check)

Electronic check has been developed in response to the transactions that have arisen in the world of electronic commerce. As e-check is in an electronic format, it can be processed faster and more secured way than a standard paper check. Security features provided by electronic check include authentication, public key cryptography, digital signatures and encryption, among others. This is the first form of Internet-based payment that the U.S. Treasury uses for making large online payments.

The objective of the proposed payment model is to ensure the reliability and security of an online buy-sell process where buyer and seller have an equal opportunity of trading without compromising their own interest. The objective of the proposed model was to ensure that buyers get the actual product what they paid for and seller gets the payment for what he sold. So, to achieve the objective of e-check has been chosen as an option of payment. But the proposed e-check format is relatively different from the existing versions of electronic check that U.S. people are familiar with.

In U.S. when people choose an electronic check as a payment option they need to provide the following information:

- Name of account
- Name of Bank
- Type of Account
- Account Number
- Routing Number
- Check Number (optional)

The below demonstrates a generic format of a widely used electronic check
But according to the idea, the proposal is to reduce this information and make e-check simpler to use. This is possible if the central bank of a country or states takes the responsibility of managing the database of all the banks under its jurisdiction. Our proposed e-check contains only 2 fields to be identified as an e-check and a single field to provide authentication data. Our proposed e-check contains the following fields:

- **Reference Number**

  Reference Number is the unique number for every e-check which should be maintained and governed by the central clearing house or central bank of the respective country. This number maps to the database containing the detailed check, banking and personal information of the issuer. This single number will be able to fetch all the information related to the buyer from the database maintained
by central bank. This responsibility should be maintained by a central entity having the jurisdiction authority over all the banks in the country. In short, reference number is the customer identification number.

- **Check Number**
  Check number represents the check identification number. It will also be issued and mapped against each Reference Number. Both Reference Number and Check Number jointly form an e-check and each e-check will be unique under the same jurisdictional authority.

- **PIN (Personal Identification Number)**
  PIN is used to validate the identity and security matters of the issuer. It is expected and should be maintained that only the issuer of the e-check knows its relevant PIN and liable for the physical security of the e-check.

- **SWIFT Code**
  The acronym SWIFT stands for the Society for Worldwide Interbank Financial Telecommunication. SWIFT code has been used worldwide for international monetary wire transfer. Swift code reveals information about the institution that was assigned this code. Generally, they consist of eight or eleven characters. We will use this swift code whenever we want to do the transaction beyond the boundary of a national transaction. For, international transaction and check issuance we will use this code. So it is an optional field for our check.

It has been believed that the proposed format is user friendly, faster and easy to use. It is better than the existing format, because so much information needed to provide during the existing electronic check placement. In this context we also want to add that to follow this e-check transaction flow, the governing entity has to play a major and vital role for the smooth operation and avoid fraudulent behavior.
4.2.4 Application of the Proposed Model

As we mentioned in earlier sections the main objective of our proposed model is to ensure that buyers and sellers do online trading in a comfortable platform where buyers do not have to worry about their investment in online shopping before they receive their shipment and sellers do not have to risk their products and capital before getting surety of the payment. It builds the trust among buyers and sellers in online platform and it will help the growth of the global online market significantly.

The proposed model will also encourage the middle and lower income group of people to participate in the online trading platform both as a buyer and seller. People from a country like Bangladesh do not get interest to do online trading due to the different bindings in online trading imposed by the regulatory bodies and the unavailability of the credit cards facilities and the trust that required doing business in credit terms. This applies for both buyer and seller. But, our proposed model will ensure their investment from both buyers and sellers perspective and they will be in more comfort zone to do online trading than before. Apart from that direct involvement of the regulatory body like central bank will also minimize the scope of fraudulent activities over the Internet in the field of online shopping.

The e-check model that we proposed is a good way to do online transaction while we buy-sell anything over the Internet. It will help us to go beyond the geographical boundaries and will provide us limitless opportunity to expand border free market. But the good thing is this trade will not be abrupt but will be governed by the regulatory bodies of the each country's central bank and global monetary transaction network control authority. So, each flow of fund will be able to be monitored and fraudulent behavior can be minimized.

Our model can create secondary business and employment source as well. According to our model supply and delivery chain has a very important role to play. Successful delivery will ensure the money flow and the relation between buyers and sellers. It will also play a great role to build the trust of the general people in online shopping platform.
If successful delivery can be ensured then we can count on the trusted online trading platform worldwide.

### 4.2.5 Guideline for the implementation of the model

As a new model has been proposed and it has not been used and implemented earlier, so it will be better to have some guideline for implementation. Again, it has always been very difficult to propose a guideline for the first time. Considering all the aspects the following guideline has been proposed for implementing the new payment model:

- A central organization can be formed to integrate the payment model with the online application. The organization will responsible of running and maintain the system which will follow the payment model. As this system will deal with money transaction so that an association of bank representatives can form this kind of organization. Because bank is the only organization who has this kind of technology along with authority of fund transfer globally.

- Central bank of the country should have the monitoring authorization over the system as online fund transfer is involved in this case. So that, any fraudulent behavior can be traced and action can be taken immediately by the central bank to avoid mishap.

- Lawful interception can be authorized for the organization that is responsible for maintaining the law and order of the society. It can be a great step to avoid cyber crimes.

As the proposed model is novel and has not been implemented anywhere earlier so some regulation controlling authority need to be formed for its proper functionality. Apart from that as the model is related to online money transaction so the chances of fraudulent behavior are very high. So, considering all the facts, requirement of a strict governance is requested.
CHAPTER – 5

DEMONSTRATION OF THE PROPOSED MODEL

Following the discussion in the chapter 4, a demonstration of the model has been prepared. As the proposed model is novel and completely different from any existing payment model so it was difficult to implement the model in the live platform. Moreover, for the demonstration of the model access and modification privilege was required to the core banking system (CBS) of a commercial bank and an interface was required to setup in the central bank. Due to this permission complexity along with sensitivity of the requirement only a demonstration has been possible. But these limited scale demonstration will be able to provide an essence of real time practical experience.

5.1 Demonstration Platform Design

As it was mentioned earlier, the proposed model is very new and it requires live platform for the demonstration which requires access and authorization to modify the core banking software of at least two operating commercial banks. In addition to that it also requires an interfacing with the central bank that governs those particular commercial banks. Apart from that an e-commerce site need to be developed to complete a buy-sell cycle. Practically it is very difficult to arrange these kinds of live platforms for the demonstration. Because -

- The core banking software (CBS) is responsible for all the operation done by a commercial bank. It contains all the detailed information that a bank required to operate its operations like account holders information, account details, transaction history etc. It is not likely that a commercial bank will allow modifying its CBS along with the access permission to its customer information for a demonstration purpose.
- Central bank is the regulatory authority of all the commercial banks inside a national territory. It governs all the activities and formulates policies for all the commercial financial institution under its jurisdiction. So, it is unlikely to
interfacing with this commercial financial institution without having proper justification, testing and analysis of the proposal. It requires time and resource.

Considering these facts, an alternate path has been established. That helped the research to continue its intention of demonstration. It is obviously not possible to develop a full scale and functional CBS for academic demonstration purpose due to time constraints and other logistic issues. So, a small environment has been developed with all the necessary features that can demonstrate the model and give a scope to evaluate the proposal.

For the demonstration purpose following platform has been developed:

- Low scale core banking system of two different banks to observe the transaction status in different stages of the buy-sell cycle
- Central bank interface to relate the other bank and the system
- The systems which will inherit the proposed payment model and conduct online buy sell process.

The demonstration platform has been designed such a way that the platform users will experience reality while they will do online buy sell activities through an e-commerce site. It will cover the necessary features that a user needs to check to complete an online buy sell process according to the proposed model.

**5.1.1 Database Design**

For the demonstration purpose it was required to develop an e-commerce site which performs online buy sell activity. Apart from that, at least two commercial bank interfaces are required to observe the bank's role in the model. Last but not the least a central bank's interface is required to understand the central bank's role in the model. Keeping these requirements in mind a database has been designed which helped to prepare the demonstration. Here, one thing needs to be mentioned that the database has designed only to store data and acted as a store house of the data. All the necessary constraints and controls have been put through the front end of the web application.

In the database design the table has been created to store the following information:
The theoretical database contains the following architecture:

![Database Diagram]

**Figure 17:** Theoretical database for the demonstration of the proposed model

But in practical case during the development phase of the demonstration the database has observed some modification according to the developer tool. The implemented database relation has been showed below:
Figure 18: Implemented database for the demonstration of the proposed model

5.1.2 Software Description

For the system development the following software platform has been used:

- Microsoft .NET Framework 4.5
- Visual Studio 2013 Web Express Edition
- Microsoft SQL Server 2012
- Microsoft SQL Server Manager 2012

5.1.3 Hardware Description

For the system development the following hardware platform has been used:
- Intel Corei3 processor with 2.0 GHz clock speed or equivalent
- 2GB of system RAM
- 3 GB of free hard disk space

5.2 Demonstration of the Proposed Model

After the development of the platform a demonstration has been made. In the demonstration it was tried to make a clear visibility of the model completing a full buy-sell cycle maintaining the objective of the model. The total demonstration has been performed locally and has the provision to demonstrate online. The subsequent screen shots will be able to give an essence of the complete process flow:

1. Log In Screen

The following window provides the access to the system for both buyer and seller. User should choose the user type and after providing the credentials s/he can access to the system. Generally it has been expected that mobile number of the user will be his/her unique id for entering to the system

![Figure 19: System login screen](image-url)
2. **First window after login**

After log in, both buyer and seller will be able to use the system. If buyer log in then he will be able to proceed for shopping but if seller log in he has to wait until any buyer place in order. To avoid the complexity static entries of the products have been used. But in real case dynamic product introduction might be used.

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**Figure 20:** Buyer’s GUI after log in

**Figure 21:** Seller’s GUI after log in
After login seller can identify the orders list which is waiting for him. He can also look at the side notification column to identify new notifications along with the old notifications.

3. **Order placement**

After log in buyer will place order according to his will from the available product list. He needs to choose quantity from the available product list.

![Figure 22: Buyer’s Select items for purchase](image-url)

![Figure 23: Buyer's get notification of the seller's acceptance](image-url)
After this buyer has to wait until the seller accept the order.

4. **Seller accept the order**

As the order has been placed, so seller will get the notification of the order and need to proceed for accept the order to complete the buy-sell process.
Figure 26: Seller accept the order request

Figure 27: Successful order acceptance by seller

Now, the order placement and acceptance has been completed successfully. It is time to proceed for the payment. This is the beginning point of our proposed
model. The subsequent steps will reflect our proposed model and provide an idea on how the model going to be worked and give comfort to both buyer and seller.

5. **Buyer initiate payment**

At this stage buyer will receive notification for payment initiation.

![Figure 28: Notification for buyer to initiate payment](image)

![Figure 29: Payment initiation by buyer](image)
Now, buyer can pay either through bank or third party payment gateway like western union.

![Image of payment option for buyer](https://example.com/payment_option.png)

**Figure 30**: Payment option for buyer

If the buyer and seller have account in the same bank then the system will identify it through the system’s database and notify the bank to proceed. In this case the central bank’s involvement is not required. But if the buyer and seller have account in the same bank then the system will identify it through the system’s database and forward it to the central bank for completing the check clearance process.
Figure 31: Buyer placing e-check for the payment

Figure 32: Buyer knows that the check has been sent to central bank for clearance
6. Central Bank clears the check

After getting the check from the system, the central bank clears the check which is verified from the bank where the buyer has account. If the verification is successful then the system forwards the notification to both buyer and seller.

**Figure 33:** Central Bank approves the e-check

**Figure 34:** Buyer’s Bank verify the e-check
7. Check account balance

When the verification will be complete then system will notify both buyer and seller about the check clearance.

**Figure 35:** E-check verification notification for Buyer

**Figure 36:** Seller gets confirmation of e-check verification
Now the seller gets the request for product delivery. At this point if both buyer and seller check their account balance they will notice that the purchase amount has been frozen from the buyer’s account and seller gets the amount in his account but it cannot be used until he delivers the product as it was purchased.

**Figure 37:** Buyer’s account balance after purchase

**Figure 38:** Seller’s account balance after sales
8. **Product delivery**

After getting the assurance of money seller will proceed for product delivery. On the other hand buyer will receive the delivery. This operation will be done by authentication code which will be generated by the system using the random function. Right paid of authentication codes from both buyer and seller will ensure the correct delivery of the product from correct seller to the correct buyer.

![Figure 39: List of authentication codes for buyer](image.png)
Figure 40: Delivery acceptance for buyer

Figure 41: Acceptance code submission by buyer
**Figure 42:** Acceptance code submission by seller

**Figure 43:** Accepted authentication code for seller
9. Completion of the buy-sell cycle

After all the verification seller handover the product to the buyer and thus the buy-sell cycle process come to an end. Now both buyer and seller get the notification that the order delivery has been completed. At this point it has also been ensured that the both buyer and seller have completed their financial settlement. If both buyer and seller check their account balance then they will be able to see the change in their accounts.

**Figure 44:** Transaction completion notification for buyer

**Figure 45:** Transaction completion notification for seller
Thus a buy-sell cycle has been demonstrated according to the proposed model. The demonstration has been scaled to the minimum only to gather a practical idea about the functionality of the proposed model. There are lots of spaces where the optimization can be achieved in case of live demonstration.
CHAPTER - 6

CONCLUSION AND FUTURE WORK

The e-commerce or online commercial activities have shown a lot of promises but still this sector has lot more to offer to its user. People are getting used to it day by day and they have started to feel the impact of online commercial activities in their everyday lives. But unfortunately it has been observed that the majority of the users of e-commerce belong to the developed countries. The developing countries and under developed countries are still a far way behind in this sector from the developing countries. Digging deep inside, it has been found that people of the developing countries and under developed countries are afraid of uncertainty. They need to push their limit to earn their living and they are very much conscious about the usage of their earning. They always want to ensure the security of their money and surety of their investment. But unfortunately existing online payment methods cannot provide certainty while they do online commercial activities.

It has been observed and experienced from practical lives that existing online transaction model cannot be trusted completely syncing the payment and delivery together. Existing online shopping platform forces either buyer to pay before they get the delivery or sellers have to sacrifice his product. Most importantly, there is no written surety that the buyer will receive the purchased package in good condition and seller will get the money on time that he delivered. Sellers deliver the product before they get payment to achieve the trust of the buyers. In these cases sellers have to maintain their own deliver wing to ensure the proper delivery and return of the product. For this reason he has to involve more capital and thus the cost of the products increase. In most of the practical scenarios buyers have to pay before they receive their products. In case of lost or damage of the product buyer has nothing to do but to depend on the seller's mercy or kindness.

In this research work the uncertainty issue of the online buy-sell process has been addressed. The proposed model has been discussed with practical cases to ensure the elimination of uncertainty of the online commercial activities. In the proposed model it has been showed that how buyer and seller both can have control over the total buy-sell
cycle that occurred between them through the e-commerce site. The proposed model also describes the third party delivery mechanism where the seller will not be able to deliver the product by him-self.

The proposed model also illustrates the new e-check format has been proposed in the model. For the better governance, role of the central bank has also been identified and discussed. The proposed model also showed a way forward if buyer and seller want to do online transaction beyond their national boundary. Last but not the least a discussion and way forward has been defined, if buyer wants to use the existing payment procedure to pay for what he purchased. As an example, western union money transfer mechanism was picked and the model has been described accordingly.

It is believed that the proposed online payment model will be able to sort out the uncertainty problem efficiently and will play a vital role for the expansion of global online market. The model has the flexibility to be adopted by any existing payment mechanism. It can be a key to the implementation of free market economy. Moreover it will be trusted, cost effective and global. People will be able to enjoy the comfort of the advanced technology like e-commerce with security, trust and surety. It can be just the beginning of the new financial model of online commercial activities.

### 6.1 Research Contribution

Developing a new online payment model for online commercial activities is the major contribution of this research work. Apart from that other major contributions through this research work are –

- Six different practical cases have been analyzed and new online payment model have been discussed for each of the cases
- New e-check format has been introduced and use of the e-check in the online commercial activities has been discussed. The role and contribution of e-check into the proposed model has also been elaborated.
Flexibility of the model has been ensured and integration method with existing payment system has been discussed. A demonstration has been prepared to visualize the proposed payment model through the practical approaches.

In the demonstration, the process flow of the models has been shown. Through the demonstration, the practical approach of implementing the model has been verified.

### 6.2 Confines

The conducted research work had to face some limitations during the process. The research work has been conducted considering all the standard parameters. Some of the mentionable issues those have been ignored during the research work are –

- Existing security protocols have been considered as ideal. No security issues have been discussed in the research work.
- No cost benefit analysis of the model have been conducted in the research
- Delivery constraints and limitations for different types of product have not been reflected in the model. E.g. unprocessed raw food items like fish cannot be accepted for delivery in long distance
- The proposed model did not define any clear scope regarding the authority that will actually be responsible for maintaining the system.
- The proposed model requires, having connectivity among the banks, central bank and the system. But in this study no connectivity guideline has been provided.

### 6.3 Recommendations for future work

New ideas and features only can be discovered through continuous research work on the specific issues. The proposed model in this research work is new and has not been deployed commercially in the industry, so there are many scopes and options to make it more robust and efficient. The following areas can be addressed for further works
➢ Standardization of the model according to the industry standards and specification.

➢ Policy formulation and recommendation for the system operation can be optimized

➢ Security and stability of the system in case of high value and high volume transactions

➢ Defining the role of the different entities involved in the model, like central bank, law maintaining authority etc.

➢ Modification of the model according to the delivery constraints of different types of the products.

The above point does not limit the scope of the research work on this topic in the future. It is expected that more research will be conducted on the issue and it can get more mature robust and efficient for the betterment of the general people.


