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E-business and on-line banking in Bangladesh: an analysis

Abstract

E-business has created tremendous opportunity all over the globe. On-line banking can act as a complementary factor of e-business. Bangladesh Bank has recently argued to introduce automated clearing house system. This pushed upward transition from the manual banking system to the on-line banking system. The study has been undertaken to observe present status of the e-business and as its complementary factor on-line banking system in Bangladesh. The article analyzes the data collected from Bangladeshi banks up to February 2010 and also used snowball sampling techniques to gather answer from the five hundred respondents who have already been using on-line banking system on the basis of a questionnaire which was prepared for this study purpose. The study found that dealing officials of the banks are not well conversant about their desk work. The author observed that the country can benefit from successful utilization of e-business as this will help to enhance productivity. Also, monetary gain of both producer and customer may have a feasible and positive impact on raising gross domestic product. E-business, especially with the help of on-line banking, can manage economy of Bangladesh in a better way as customer will be satisfied.

Keywords: e-business, on-line banking, ICT, globalization, customer satisfaction.
JEL Classification: E42, G21, M31, O33.

Introduction

Bangladesh is still lagging behind to avail the opportunity of e-business. However, banking sector as a whole has been introducing on-line banking system which plays complementary role in spreading e-business. Internet has opened a new horizon of e-business, creating immense opportunities for marketing products as well as managing banking organizations internationally. Gradually, wireless Internet system has been creating a new paradigm and electronic fund transfer can have a suitable formation.

E-business can improve the quality of the services, save customers' valuable time, deliver them from the movement from one place to another and improve receiving the goods accurately. E-business brings a new channel of distribution process. But this leads to change in the regulatory issues, cross border trade through emerging new marketing distribution channel. This reduces transaction time, boundary less trade, and accuracy. In developed nations, e-business creates an opportunity to directly selling of the product to the customer without using any intermediaries. This process occurs mainly in the four systems: business to business (B2B), business to consumer (B2C), business to government (B2G) and consumer to consumer (C2C). E-business expedites the process of better customer relationship management. It also helps to attain enterprise resource management as well as "e" to "e" process. As such, on-line banking system can add value and value chain can be created in the e-business process. In turn, it helps to raise gross domestic product of the country.

Governments as well as different international organizations have also identified that underdeveloped banking technology creates hindrance on economic progress of the country. On-line banking system is a way of conducting, managing, and executing banking transactions utilizing information and communication technology (ICT) and electronic communication networks such as the Internet, intranet and extranet. Environment of electronic banking requires authentication procedures for electronic payment system, network environment, computer hardware and software, electronic hardware, legal bindings, etc. The security and authentication of modern banking are very much dependent on cryptography and its applications. Ramakrishnan (2001) argued that many banks have assumed that Internet banking primarily increases information security risks and has not sufficiently focused on the effect on other banking-specific risks. Risk management disciplines have not evolved at the same speed and many institutions, especially the smaller ones, have not been able to incorporate Internet banking risk controls within their existing risk management structures.

As information symmetry and free flow of information are gaining more importance due to globalization process, Bangladeshi companies have to compete in the world market to serve corporate and other clients with round the clock services. Access to computer would be beneficial to Bangladesh like any other country. Social and economic disparity and lack of Internet accessibility which creates digital divide are a great hindrance towards customer dissatisfaction of the business organization which ultimately results in negative customer relationship management. As a result, it creates a negative impact on economic development of the country. E-business process creates an opportunity for doing business through arranging real time sharing business. Organizations can take help of transaction process through e-business solutions from around the world where on-line facility can be available.

Due to advancement of technology, business process of the globe is gradually becoming complex for which e-business, especially in the banking sector, can supersede the traditional business process. Through e-business the country can compete with the changing global business trend and on-line banking can facilitate e-business.

1. Literature review

Buffam (2000) depicted that companies that build the better e-business solutions will outperform their competitors. Companies that build the best e-business solutions will transform themselves into zero-latency enterprises. Companies that choose not to embrace e-business, or do so ineffectively, will underperform or be driven out of business.

Turban et al. (2000) argued that following points of managerial issues are very important: Focus of Electronic commerce management; Sales promotion; Purchase process reengineering; Just-in-Time delivery; New electronic intermediary business; Provision of solutions; and Business ethics.

Rahman (2001-2002) observed that issues relating to electronic fund transfer require security, availability, authenticity, non-repudiability and audibility. He suggested for appropriate control and efficient security measures and also for proper utilization of audit trail in the e-commerce system.

Ali (2003) argued that Bangladeshi companies and organizations have several problems to start full swing e-business. These include limited resources, backwardness in technology, managerial inefficiency, socio-infrastructural problem such as corruption, default culture law and order situation, rampant corruption, strike etc. which penetrate for a long time.

Ali, Mohsin, and Yasmeen (2004) observed that maximizing e-business efforts to focus on information dissemination, knowledge transfer, and technical assistance is required. Steps need to create appropriate knowledge among various procedures of e-business.

Huda, Momen and Ahmed (2004) commented that the banking sector in Bangladesh is clearly recognizing the importance of information technology to their continued success.

Hoq, Kamal and Chowdhury (2005) argued that a key reason why e-commerce, especially the business-to-business segment, is growing so quickly is its significant impact on costs associated with inventories, sales execution, procurement, intangibles like banking, and distribution costs. If these reductions become pervasive, e-commerce has the potential to be the application that ushers in the large productivity gains. Achieving these gains is, therefore, contingent on a number of factors, including access to e-commerce systems and the needed skills. However, what is unique about e-commerce over the Internet and the efficiency gains is that it promises the premium placed on openness. To reap the potential cost savings fully, firms must be willing to open up their internal systems to suppliers and customers. This raises policy issues concerning security and potential anti competitive effects as firms integrate their operations more closely.

Uddin and Islam (2005) observed that the multifarious projections of ICT in human life plead a winning case for institutional integration of ICT related components in rural support programs taken by Governments and NGOs.

Chaffey (2006) dealt with strategy and applications of e-business and e-commerce in a logical but robust manner. He stressed that e-business and e-commerce were very important for management implications as such a bridge to link leading edge research and professional practice was required.

Mia, Rahman and Debnath (2007) observed that the latest development in marketing financial services by banks is on-line banking, where banks have now put themselves in the World Wide Web to take advantage of the Internet's power and access to cope with the accelerating pace of change of business environment.

Pires and Stanton (2007) commented that policy wise government must recognize that the ability of countries to engage in e-commerce is tied both directly and indirectly to their attractiveness for FDI.

Ahmed and Islam (2008) observed that adopting e-banking services, banks in developing countries are faced with strategic options between the choice of delivery channels and the level of sophistication of services provided by these delivery channels.

Shamsuddoha (2008) argued that currently in Bangladesh, banking industry is mature to a greater extent than in the earlier period. It has developed superb image in their various activities including electronic banking. Now modern banking services have been launched by some multinationals and new local private commercial banks. Electronic banking is one of the most demanded and latest technologies in banking sector.

Ahshan (2009) argued that on-line transaction would boost the gross domestic product (GDP) growth and thus, help Bangladesh achieve the Millennium Development Goals (MDGs). In the era of globalization, the Internet makes the world smaller and e-commerce facilitates marketing and shopping from home. E-commerce facilitates

business with customers over the internet. In e-commerce, customers can buy goods and services over the Internet.

Islam and Yang (2009) observed that service quality satisfaction and informational trust had important mediating effects on the Balance score card performance process. These two mediating roles explain that, when an institution creates and raises the levels of service quality satisfaction and informational trust, the results lead to a favorable customer interaction relationship and thus, could help the institution achieve higher levels for Balance score card performance measure.

Nyangosi, Arora, Singh (2009) argued that banking through electronic channels has gained increasing popularity in recent years. This system, popularly known as 'e-banking', provides alternatives for faster delivery of banking services to a wide range of customers. The overall result indicates that customers in India and Kenya have developed positive attitudes and they attach much importance to the emergence of e-banking.

Shah and Clarke (2009) focused on human, operational, managerial, and strategic organizational issues in e-banking. They argued that e-banking management can help to expedite doing business through using electronic medium.

Rahman (2010) who is the Governor of Bangladesh Bank argued that Bangladesh Bank has achieved a historic milestone in the trade and business arena, departing from conventional banking with the introduction of e-commerce recently; a giant stride towards digital Bangladesh.

From the aforesaid literature review, it is evident that on-line banking can act as a complementary towards e-business. With the help of e-business the country can create opportunities as this will help both producers and customers. But these theoretical observations may not be feasible in this country. As such, the study seeks to evaluate whether the country has proper infrastructure for doing e-business. What are the statuses of e-business and on-line banking of the country? Does on-line banking really works as a complementary to e-business in Bangladesh? The study intends to examine foresaid questions.

Objectives of the study.

The study has been undertaken with the following objectives:

i) To examine infrastructural situation of the country to prosper e-business and on-line banking system in Bangladesh.
ii) To observe present status of on-line banking in Bangladesh.
iii) To evaluate customer relationship management derived from the on-line banking system.
iv) To provide some recommendations so that e-business can bring fruitful results in the country.

2. Methodology of the study

The study is based on secondary sources and primary sources. As such, the study has reviewed different published articles, books, newspapers and websites. However, exact references are mentioned in this article. The study will also collect related information regarding present status of the on-line banking through field visit in forty eight banks (forty seven banks after the merger of two banks on January 3, 2010) head offices and IT and MIS Department. Moreover, we also visited Central Bank, i.e. Bangladesh Bank to collect related information. The study collects data on the following points: services provided by the banks, software used by the banks, vendor's name and bank's name (see Table A of the Appendix).

Moreover, the study also did a survey through preparing a questionnaire. For collecting data from the respondents, the study used snowballing sampling technique which is also known as a chain referral sampling type. Snowball sampling technique is used to discover and enlist "hidden populations", who may be difficult to locate. The survey was conducted on the basis of 500 customers' comments, those have been using on-line banking system. The data on the respondents who are the customers of the following banks: Sonali Bank Ltd., BASIC Bank Ltd., Dutch Bangla Bank Ltd., Standard Chartered Bank, Trust Bank Ltd., Prime Bank Ltd., Uttara Bank Ltd. are given in Table B of the Appendix. These customers are from Dhaka and Chittagong cities. On-line banking is mainly concentrated in the Dhaka city. However, in Chittagong city on-line banking system is also being expanded. Out of 500 respondents, 381 are from Dhaka city while 119 persons are from Chittagong city.

Observations through field study were obtained and are being reported at the present status of the on-line banking system. Time period of the study is up to February 2010. This study did not use any sort of correlation or regression analysis as it is mainly based on qualitative nature.

2.1. Present status. Bangladeshi companies and organizations are facing the problem of starting full swing e-business. Network is a mode of communications with the computers. Networks of computers can be classified in the following way: local area network, metropolitan area network, and world wide area network. Multiple computers are connected through telephone lines, cable systems, and wireless technology is also required. According to a report published in The Daily Star (April 4, 2010), Bang-

ladesh ranked 118th in the global Network Readiness Index in 2009-10 up from 130th a year ago, showing an upward trend in the information and communication technology sector. In South Asia, India ranked 43rd, Sri Lanka 72nd, Pakistan 87th and Nepal 124th in the 'Global Information Technology Report 2009-2010' released by The World Economic Forum (WEF) on April 3, 2010. As such, Bangladesh has to go long way to develop its network for arranging Digital Bangladesh by the year 2021 and public and private cooperations and strategic alliances are required to develop e-business system in the country.

Electronic Payment Systems for e-business are characterized by broad geographic presence and acceptance by a large number of merchants or programs. Participants in an electronic payment system may include users, financial institutions, business personnel, industrialists, merchants, third party processors, etc. WiMAX stands for Worldwide Interoperability for Microwave Access which offers wireless transmission of data via different transmission modes, from point-to-multipoint links to portable and fully mobile internet access. The Finance Minister recently argued for trial launching of operation of the country's first-ever wireless broadband technology WiMAX. He commented on that entrepreneurs of the telecommunications sector must reach the digital communications system to the doorsteps of the rural people. He hoped that the WiMax technology would be available at every divisional headquarter within a year (Source: http://www.bangladeshinfo.com/gadgets/news_inner.php?nid=2343, July 22, 2009).

Telephone density is awfully little in Bangladesh. It is far much less in comparison with other developed nations of the world as well as neighboring countries. Kabir (2008) depicted that mobile phones (millions) are 36.4, fixed lines (PSTN) (millions) are 1.2, total telecom users (millions) are 37.6, teledensity (%) is 26.8 in the year 2008. Outside Dhaka, at present a few computer network infrastructures have been developed so far. Apart from some educational institutes outside Dhaka, observation finds that most of the LAN setups are Dhaka centric. Bangladesh has been connected to worldwide Internet Super High Way from 2006 through an under sea submarine cable. But this single submarine cable frequently faces disruption resulting in slow bandwidth.

A huge digital divide exists among the city of Dhaka, Chittagong and other parts of the country. Private-public partnership is a crucial issue for information and communication technology (ICT) development and application. Private enterprise and capital can lead ICT revolution in Bangladesh. This, however, would require the government to provide the basic business environment. Rapid growth of ICT is not possible without massive investments in ICT infrastructure and human resource development in the computer and electronics and telecommunication engineering courses through ensuring quality education. Still now call charge of cell phone is not competitive in Bangladesh. Bangladesh Telecommunication Regulatory Commission (BTRC) is not playing due role in the development process of communication sector. Infrastructural problems are creating less scope to implement e-business successfully.

Under the private initiative, Internet was started in 1996 by ISN in Bangladesh. ISN is the first ISP operator in this country. Still now all the Internet service providers have the server abroad, for which they are facing competitive disadvantage, as cost remains high. Security problem is still high in this country. Lack of digital accessible personnel is the real problem for the country. Moreover, some software developers of the country aren't well conversant with the market demand for which they cannot supply application software with faultlessness.

Policy makers of the country are not aware of the benefits of e-business. As such, they don't put significance on proper and systematic development of e-business. In this connection it may be stated that Bangladesh bank is trying to implement automated clearinghouse through utilizing MICR (Magnetic Ink Character Recognizer) procedure. But in developed nations MICR procedure is now replaced by more sophisticated technique such as cheque truncation process.

Total number of banks in Bangladesh is forty seven. Banking sector in Bangladesh, on the basis of utilization of electronic devices, can be subdivided into three groups: i) foreign commercial banks and private commercial banks, especially 2nd (except for few banks) and 3rd generation private banks: fully online banking; ii)1st generation private banks and some 2nd generation private commercial banks: medium range on-line banking system; and iii) nationalized commercial banks, specialized banks and few foreign bank branches of this subcontinent: low grade on-line banking system.

At present, the banks in Bangladesh are using the limited electronic banking services. It is expected that a bank can attain more profit and offer better services to its customers by introducing on-line banking facilities. The foreign commercial banks operating in Bangladesh like Standard Chartered Bank, Citi Corp. N.A. and the HSBC are the pioneers in introducing the electronic banking facilities. They provide ATM, debit card, credit card, home banking, internet banking, phone banking, on-line banking, etc. services.

Among the indigenous banks, the private banks are ahead of the public ones. Prime Bank Ltd., Dhaka Bank Ltd., BRAC Bank Ltd., Dutch-Bangla Bank Ltd., Eastern and Mercantile Bank Ltd. have already stepped towards electronic banking facilities. Apart from these banks, Mutual Trust Bank Ltd. also introduced ATM service. Among the four nationalized commercial banks (NCBs), Janata Bank Ltd. has some access to the electronic banking facilities. Bangladesh Bank, the Central Bank of Bangladesh, is also trying to formulate the wide structure of electronic banking facilities. All of these private banks offer limited on-line banking services. Most of these banks only offer services by providing ATM card. Most of them do not offer wide range of internet banking facilities which is the main advantage of e-banking. Deposit money in any branch and money withdrawal from ATM machine can be considered the best e-banking facilities available in Bangladesh while electronic money transfer starts in a limited edition. Sonali and Agrani Bank Ltd. is also providing on-line banking services on a limited scale. Rupali Bank Ltd. is also developing on-line banking. BASIC bank which is 100 percent public owned but served as private sector banking has a technological advancement. Detailed types of banking services offered by various banks are given in the Appendix.

A broad spectrum of Internet banking services, a subset of electronic finance, is available in Bangladesh with different degree of penetration. The credit card is available from VISA, MasterCard and VANIK. Some foreign banks provide electronic fund transfer (EFT) services. It is at an early stage and used on a very limited scale. Microchips embedded Smart Card is also becoming popular in the country, particularly for utility bill payment. Automated teller machine (ATM) is expanding rapidly in major cities. A group of domestic and foreign banks operates shared ATM network, which drastically increases access to this type of electronic banking service. The network will gradually be extended to other parts of the country.

Last couple of years shows dramatic improvement in the awareness situation in the banking sector regarding the comprehensive application of ICT. Local software companies have been starting competition to supply useful complete banking software with all the basic features of banking module. However, many forms of electronic banking services are not possible to offer in Bangladesh at this moment due to the technology backwardness, infrastructural underdevelopment and legal infrastructure. Those products would be very useful for export-oriented industry to reduce lead-time in export and keep comparative advantage in the international market.

For foreign remittances four nationalized banks and fifteen private banks are working collaboratively with mobile phone service operators. Recently remittance could be sent in Bangladesh by banking channel through account transfer (normally takes 3 working days) or in the form of instance cash (takes 24 hours). Foreign residents can send their money and PIN (personnel identification number) through mobile phones. As a result, money transfer becomes relatively easy, quick and hassle free. But this system is also superseded by mRemittance system. According to Ahemd (April 15, 2010), in a revolutionary step on April 13, mobile remittance service or mRemittance was introduced in the country opening doors to millions migrant workers to help transfer their hard-earned money easily, effectively and most importantly, swiftly. The first ever remittance service for Bangladesh was jointly launched by two local banks – Dhaka Bank Ltd. and Eastern Bank Ltd. – and the country's second largest mobile operator, Banglalink.

Credit card facility can not be extended fully in the country, as common gateway between financial institutions can not be established. Pricing mechanism of the products of country is not competitive, rather it is very volatile. This creates a negative impact on the customers.

The process of digital divide eradication has been started very slowly. Bogora, Kushtia, Barisal and Modhupur village of Tangail were previewed in terms of Internet banking and a complete virtual bank which started on May 2, 2000. This will gradually give the following services: e-marketing, e-shopping mall, e-marriage scheme, e-mail, e-tender, e-voting/polling, search engine, chat, e-commerce, e-stamp, e-Cash, e-music, e-entertainment, e-treatment, e-Advocacy, etc. E-governance can help us to achieve good governance of the country.

If government doesn't take proper incentives to spread the computerization process, then there will be no benefit. The parliamentary members of the country must be aware of the benefits of Information and Communication Technology (ICT), otherwise it can not be successful. It won't bring any dramatic changes in the economy. Entrepreneurship Development Fund (EDF) of Bangladesh bank should be utilized properly. Only a few companies can avail the fund. ICT related companies are trying to develop e-business processes but their activities are limited. If proper procedure of e-business can be developed in the agribusiness sector, especially in the rural areas, through utilizing e-technology then it will be beneficial for the producers of the agricultural commodities.

Acute shortages of human resources interested in doing on-line banking business are also one of the main reasons for lagging behind. However, as legistative situation is deteriorating so there is a positive impact on the e-banking considering the safety of the people.

From the field visit, it was revealed that banking sector requires rapid modification and adaptation to keep harmony with the world business. It becomes more obvious by observing the increased number of customers in some modern banks while others are losing them. In the context of Bangladesh, a country of more than 150 million people, it is to be realized that there is no other option for us but to join the current trend.

According to news report published in the New Nation on August 28, 2009, the government has formulated a policy on the national information and communication technology as part of its announced plan for digitization of the nation. The policy has earmarked activities in three phases, in the short, medium and long-term plans to be implemented within 2021. The government aims at doubling the gross domestic products (GDP) during this time to achieve the goal. The policy details suggest a number of activities including spreading the use of keyboard by functionaries at different levels, encouraging the use of standard code by software sellers, developing a national web-portal and popularizing the use of e-citizen services, paying service charge through mobile phones or ticketing, etc. Land registration, passport renewal, digitization of police case dairy and case position in the court, spreading the use of broadband internet throughout the country and other such essential services may also be brought under the scheme. The new policy will be the common property of all departments and organs of the state targeted to develop a digitized nation within the stipulated time.

The most part of the existing banking system in the country outside Dhaka and Chittagong cities is manual (paper based), that's why it is awkward, slow and error-prone. It, on the one hand, fails to meet the customers' demand and, on the other hand, it causes some significant losses both for the banking authority and traders. Electronic banking solves the above problems. Furthermore, it opens up some other salient aspects such as increased foreign trade and foreign investment. At present, weekly bank holiday in Bangladesh is on Friday and Saturday while in rest of the world it is on Sunday. As such, Bangladesh has only 4 banking days for foreign exchange transactions. Given the preliminary stage of e-business facilities and their limited time period (banks' transaction days), how long we can survive is a debatable question. Bangladesh government should consider this case carefully.

According to a report on "Bangladesh is developing electronic payment infrastructure" (May 20, 2008), the Securities and Exchange Commission (SEC) in Bangladesh proposed IT Consultants Limited (ITC), a manager of Q-cash brand of ATM and different cards, to raise their paid-up capital up to Tk 500 million if the company is to proceed to initial public offerings. The Securities and Exchange Commission (SEC) has asked us to raise the company's paid-up capital to Tk 50 crore from the current Tk 37 crore.

In case the company fails to comply with the SEC requirements to increase the paid-up capital within the time specified, it will have to gain the approval of the SEC again. This measure is believed to extend the sphere of the company's influence. The company began as a private limited business in 2001. But now it is the local leader in electronic payment systems which are developing in the country with increased speed. ITC possesses necessary tools to process transactions for banks and retailers. It has the largest independent network of more than 100 ATMs in the country. There is also a wide network of point-of-sales (POS) centers operated by the company. (Source: http://www.ecommerce-jounal.com/news/bangladesh_is_developing_electronic_payment_infrastructure_0?drgn=1).

According to the report published in The Financial Express (November 3, 2009), Bangladesh Bank gave the ground breaking directives to commercial banks through a circular issued on November 2009, saying that from now on their clients can pay power, water, gas and phone bills from bank accounts and transfer funds within a bank or to other banks. The central bank said that online payments would be treated like any other cash transaction although it reminded the banks that these money transfers would be regulated by the country's strict Anti-Money Laundering Act. The country had only about 400,000 credit card holders at the end of June last year; according to Bangladesh Bank, payments and transactions by credit cards were nearly Tk 11 billion in June 2008 – one of the lowest in the world. However, banks still need massive ICT backbone to ensure that online transaction can not be misused. Meanwhile, Bangladesh Bank started Automated Clearing house on trail basis from November 8, 2009. Bangladesh Bank also declared that the clearing house won't accept any check from April 1, 2010 if size of the check is not as per the guideline of the MICR system. However, in Bangladesh, digital divide between the Dhaka city and the rest of the

country is conspicuous. E-business as a whole is confined among very few business organizations and on-line banking business is expediting process of the e-business of the country.

2.2. Field level study. The total number of different categories of banks is currently forty seven. The Bangladesh Development Bank Ltd. (BDBL) began operations on January 2, 2010 through merger of Bangladesh Shilpa Bank and Bangladesh Shilpa Rin Sangstha. From the field survey we observe that the following banking services are being provided by different banks:

- core banking;
- cluster banking;
- phone banking;
- SMS banking;
- Internet banking;
- various cards;
- ATM shared (VISA/MASTER);
- ATM own (VISA/MASTER);
- EFT;
- SWIFT;
- PC banking;
- POS terminal;
- banking KIOSK; and
- off-line branch computerization.

Details of the field survey regarding software uses, vendor's name and services are given in the Appendix, Table A.

However, foreign commercial banks and private commercial banks are relatively in a better position to provide on-line banking services.

Moreover, when contacted with Bangladesh Bank it was informed that BACH (Bangladesh Automated Clearing House) is yet working in SIT (System Integration Testing) phase. SIT is expected to be completed within the first half of January 2010. In the first phase, only Dhaka will be under this umbrella and all bank branches in Dhaka region must be part of BACH. Bangladesh Bank (BB) in its Dhaka office is using 7 inch * 3.50 inch MICR encoded cheques in BACH. Cheque truncation will be done, some banks will truncate fully (meaning at branch level) while some partially (meaning at a central point). BB will also provide bureau service, if needed by any bank initially. Clearing is for inter-bank transaction. It will be settled by BB after t+1 days.

2.3. Customers' response. Based on the sample of five hundred customers who are habituated in on-line banking system, following results have been gathered.

Table 1. Opinions of customers who are habituated in on-line banking system (respondents who expressed "yes" comment)

Comment	Dhaka (in percentage)	Chittagong (in percentage)
On-line banking services are relatively better than manual system	79%	65%
On-line banking provides good customer service	72%	61%
Just-in-time services in banking can be provided	56%	48%
Bank personnel behave properly	52%	56%
Dealing officer is well conversant about his/her respective desk work	48%	47%
Banking services have technologically improved but their quality worsened	51%	44%

Source: Compiled on the basis of customers' responses.

From the findings above it is observed that impact of on-line banking has a mixed result though most of the customers support that it provides good customer services. This supports our null hypothesis. But the problem is that customers think that while banking services have technologically improved, their quality worsened. In case of the other opinion survey most of the customers are providing "yes" results which also indicates that null hypothesis is correct. However, in the opinion poll survey there is a question regarding dealing officials of the commercial banks whether they are well conversant about their desk work. The reply indicates that 52% and 53% customers of Dhaka and Chittagong cities think that dealing officers of the banks are not well conversant about their desk work.

Now we are showing diagrammatic representations.

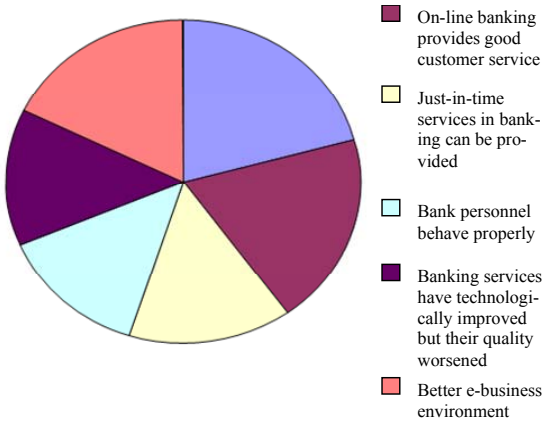

Fig. 1. Comments of customers who are getting on-line banking services

2.4. Analysis of the findings. E-business is still not very much progressed in Bangladesh. Mass awareness is not feasible. The country faces problem of developing human-ware. Without human capital conforming to the international standards, we are not able to compete in the global market and successful e-business cannot be feasible.

The field level study observes that still nationalized commercial banks and specialized banks are lagging behind on-line banking services. Moreover, customers are not satisfied with the quality of the services. Also, they are not very happy with the behavior of the bank personnel. The study also reveals that e-business, especially with the help of on-line banking, can manage economy of Bangladesh in a better way as customer relationship management increases.

Local banking software should be developed properly and must have greater accessibility within and outside the country. Moreover, to produce hardware, especially computer and its accessories, local entrepreneurs are not taking any sort of strategic planning. Bangladesh Bank should adopt latest technology but due to lack of vision they are adopting old technology, i.e. introduction of MICR for Bangladesh Bank automation procedure. MICR system should be substituted by cheque truncation system.

The shortage of technology-based human resources and poor telecommunication infrastructure needs to be overcome to break low equilibrium trap. Bridging the digital divide would provide technology-based human resources, who can contribute to raising gross domestic product (GDP), national savings, investment, creation of employment and moving out from the vicious circle of underdevelopment.

Numerous problems have been identified in on-line banking system in Bangladesh. Some of them are the following:

- Inefficiency and inadequate knowledge of the bank management about the on-line banking.
- Lack of proper strategic plan to gain and retain market share of the indigenous banks.
- Lack of international standard communication channel.
- High cost of establishing on-line banking system.
- Inadequate back and front office management.
- Lack of integrated plan among the banks and the Central Bank authority.
- Inefficient Clearing House facilities.
- Inappropriate software and less trust by the bank authorities on local software.
- Bias of the bank management towards foreign software.
- Legal barriers and appropriate policy framework.

A number of customers taking banking services are not capable of bearing the cost of additional equipments like computer, computer accessories, Internet, etc. in their own organizations or at home. Biometrics should be more strengthened. Using Internet facility is still very costly and people have little knowledge in operating computers. A few cyber cafés are available but in terms of banking purpose customers do not feel safe to use these facilities. As a result, the total number of customers who are habituated in on-line banking systems is limited. In these circumstances investment in establishing e-banking facilities seems profitless.

Although on-line banking has bright prospects, it involves some financial risks as well. The major risk of on-line banking includes operational risks (e.g., security risks, system design, implementation and maintenance risks), customer misuse of products and services risks, legal risks (e.g., without proper legal support, money laundering may be influenced), strategic risks, reputation risks (e.g., in case the bank fails to provide secure and trouble free e-banking services, this will cause reputation risk), credit risks, market risks, and liquidity risks. Therefore, identification of relevant risks, and formulation and implementation of proper risk management policies and strategy formulations and implementations are important for the scheduled banks while performing on-line banking system. Ramakrishnan's (2001) suggestion may be followed for risk management.

2.5. Benefits of electronic business and on-line banking system. Managers at various organizational levels, especially in an underdeveloped country like Bangladesh, will have to play vital roles in successful implementation of e-business. They are the key forces to initiate dedicated strategy to change from the traditional business processes to the technology driven business processes. This not only involves huge costs as a transition period of organizations but also, adaptability of the human being in the new processes to adding values is required. Due to global changing environment and in order to succeed in both world arena and on the domestic market as well as domestic business, organizations are often forced to do business in the electronic ways. Moreover, to succeed over the competitors organizations need to change their strategies and they gradually become bound to adopt e-business. At these stages, successful implementation depends on all the stages of the Hierarchy of the Management, i.e. from the top management level to the level management.

On-line banking system works as a complementary factor of electronic business. Though electronic business has a greater set of field, on-line banking can work as a subset of the e-business. Benefits derived form the e-business largely depend on successful implementation of the business process.

Managing external pressure as well as internal pressure should be coordinated by the management so that e-business can supersede traditional business processes of organizations. Moreover,

transformation process requires huge cost, especially it is subject to organizations of Bangladesh. Greater and cautious resource management, especially financial capability, should be handled by the management of the organizations. Flexible innovative changes processed by the management of the organizations are required for the organizations to succeed in the transformation process. To manage changing processes effectively, socio-economic and cultural environment should be considered as well as labor surplus country-business process reengineering may be designed with the aim that personnel of the organizations will use the technological functionalities which will lead to further enhancement of the organizations. As such, strong motivations by the management towards all levels of personnel of the organizations are required. Managers' functionality to implement e-business is a stressful task for which their mindset should be strong and they should not only treat global considerations but also take domestic conditions into account.

E-business can add value through knowledge management as it helps customers to attain new services. Successful e-business depends on sharing of strategic knowledge for which dissemination of the information and free flow of knowledge around the globe is required. On-line banking can provide twenty-four hour banking facilities. Through electronic data interchange customers are able to draw money from their accounts and transmit money from one branch to another. Letter of credits can be sent through SWIFT and electronic fund transfer from one country to another can be feasible. Actually, on-line banking provides faster and reliable services. Encryption and decryption can be used to send money from one place to another. As such, on-line bank management handles customers in a far better way.

In Bangladesh, decision makers are generally reluctant about advancement of technology. It is difficult for people who do not have much technical knowledge to understand the necessity of new technology adoption. So, the pace of computerization in various offices, business enterprises and sectors is low.

Another problem in initiating e-business is that in our country we are reluctant to accept something new. As such, management prefers to use current business model and they are reluctant to implement something new.

To benefit from e-business, organizations including banks have to invest in software, hardware, infrastructure development, etc. The owners are uncertain about the positive return on investment as transformation from manual system to electronic transaction involves huge costs. This is a great drawback to implement e-business at a full swing. But the organizations are not interested in investing because they consider huge expenses.

In Bangladesh most of the business organizations are being run in a centralized manner. As such, visions, missions, and goals of the top management of various organizations are very important. Top management should change their mindset and like Bangladesh Bank should encourage e-business process. Top management views are reflected to the mid level management and lower level management. Unfortunately, most e-business efforts fail due to lack of visions, missions, goals and strategic leadership in the business processes of the organization.

Discussions and conclusions

With the advent of e-business especially on-line banking system, the distribution channel is also changing. But quality of banking services should meet international standards. To attain more effective and efficient business procedure, Bangladesh has to produce commodities of global standards. Ali, Mohsin, and Yasmeen's (2004) observation may be followed to attain e-business efforts through information dissemination, knowledge transfer, and technical assistances. However, Bangladesh's global Network Readiness Index should be improved.

The respondents' opinion about the on-line banking customers in Dhaka and Chittagong cities revealed that null hypothesis is accepted while alternative hypothesis is rejected. It indicates that on-line banking can provide better customer relationship management. As per findings, behavior pattern of the bank personnel should be improved. Not only technological improvement is desirable but also banking service as a whole should be enhanced. According to Chandrasekhar and Sonar (2008), not only technological progress but also efficiency of the banking services are required because on-line banking customers are not still fully satisfied with the services.

Study on customers' feedback is partially supported by the findings of Nyangosi, Arora, Singh (2009) as they argued that banking through electronic channels had gained increasing popularity in recent years. However, policy makers should consider Shah and Clarke (2009) observation. From the customers' feedback, the study observes that paying attention to human, operational, managerial, and strategic organizational concerns in e-banking is required. Moreover, bank personnel should be well conversant about their respective desk work. This is also applicable to other organizations which are implementing e-business in the country. Otherwise, customer relationship management cannot be improved. Buffam's (2000) comment is more

practical for the companies of Bangladesh as e-business will lead to attain competitive advantage as they can outperform their competitors.

The study is also done to observe different types of services and use of software by the banks. From the field level study we observe that core banking, cluster banking, phone banking, SMS banking, internet banking, various cards, ATM, SWIFT, PC banking, POS terminal, banking KIOSK, offline branch computerization are being provided. From the on-line banking perspective, still foreign banks are providing more on-line banking services than private commercial banks. Then nationalized commercial banks and last being on-line banking services are being provided by specialized banks.

Ahshan's (2009) observation is important for Bangladesh as it will help to enhance economic development. Creation of appropriate personnel/professional can improve the economic situation in the country. As such, stress should be given to develop human ware. E-business can play important role in reducing poverty only when it is effectively utilized for spreading the business both in rural and urban areas, creation of job opportunities, removing middlemen in the business process and one to one direct selling process and increasing both income and saving.

Internet accessibility should be used for poverty reduction. Following should keep more emphasis on e-business: IT firm; Export/Import traders; Export oriented/Potential export business; Facility provided ISP/Internet; Infrastructure development – Government; Ministry of Commerce, Ministry of Law, Ministry of Science & ICT, Export promotion bureau; Telecommunication/Infrastructure; Awareness on IT benefits among the mass. In this respect, Governor of Bangladesh Bank Rahman (2010) rightly points out that a holistic approach needs to be taken by all the stakeholders to reach the ICT facilities to the doorstop of the common people. Actually, e-technology can be utilized with other computer peripherals to enhance communication, skills and understanding and provide a sound basis for implementing e-business. It can be helpful to accelerate the learning process, including the acceleration of the development and application of knowledge and technology. This includes development of the system and infrastructural development and support where the following are required: (a) E-procedure, (b) Browser based system development, (c) Web enable of legacy and/or client server systems, (d) Enterprise application integration, (e) Implementation or use of application server technology. Ahmed and Islam's (2008) observation should be cautiously taken to adopt on-line banking services for which banks in Bangladesh can develop strategies for expediting not only banking business but also providing customers' satisfaction.

Business sector should be encouraged that makes their own investment in the application of ICT in production, trade and services. Procurement and utilization of funds from national sources, both public and private should be pursued. International development and donor agencies should be approached to provide funds to set up necessary infrastructure and development of human resources, conforming to the objectives of ICT policy. Shah and Clarke's (2009) observation about the e-banking can be transformed for successful e-business policy formulation as it depends on human, operational, managerial, and strategic organizational issues. Islam and Yang (2009) rightly observed that service satisfaction and information trust can play positive role in attaining e-CRM and balance score card model which is not only valid for the financial institutions but to a large extent, for business process of the country.

Economy of Bangladesh is still underdeveloped and one of the main reasons for this is that banking system is not properly developed. Technology is one part but personnel should be well conversant with their respective desk-work and behavior pattern should be improved. Government as well as different international organizations have also identified that underdeveloped banking causes some costly obstacles on the way of the even progress of the country. Investors are frequently scared of investing because of sluggish banking system. Hence, making the banking system of Bangladesh as per international standards is of the highest priority. Business processes should be re-engineered.

Banks will have to face stiff competition in the world market with increasing the globalization and the banks will be forced to offer twenty-four hour banking services on-line. Regulatory issues relating to security measures of electronic banking can be improved in the following ways:

- analyzing the potential risks in the electronic payments systems;
- tradeoff between the efficiency of the financial system and the amount of risk incurred;
- competitive pressures that may encourage the banks to engage in competitive deregulation;
- effective provision and arrangement for cryptography and its applications; and
- willingness of more customers to accept e-business as psychological patterns of the customers has been changing.

Global financial system is getting stronger day by day and it is being strengthened by the e-business. Around the globe, consumer market has greater potentialities and producers must be active, otherwise they may lose their share in the marketing

strategies. Customer retention is feasible through arranging e-business, otherwise if switching cost is low and other factors in between two companies are similar then a customer will switch from one company to another where technological advancement is relatively higher. Moreover, rate of call charge of cell phone should be lowered. Hidden cost in cell phone should be removed. However, on-line banking as well as electronic fund transfer are electronic data interchange and not free from risk. Not only security risk, but also cost of transactions may also be raised. In this regard, Rahman's (2001-2002) observation regarding risk should be cautiously handled.

The country can benefit from the successful utilization of e-business. This will help to enhance productivity and customers' satisfaction. Producers will also be rewarded and monetary gain can be attained. E-business, especially with the help of on-line banking, can manage economy of Bangladesh in a better way as customers' satisfaction can be increased.

Recommendations

To implement e-business in Bangladesh successfully, following recommendations are given below:

- Digital Bangladesh may be activated by 2021 to develop the economy of the country. Successful team building with a coherent manner for developing human ware, hardware, software and web ware are required to increase e-business process in a systematic way. Moreover, greater emphasis should be put on security system and on preventing fraud so that any sort of financial transactions including on-line banking payment or any other electronic fund transfer can be properly handled.
- Career path of hardware and software engineers should be properly designed. Otherwise professionals will be de-motivated and they won't work with job satisfaction.
- In Bangladesh, on-line banking systems are yet at a take off stage. The Clearing House operation in Bangladesh should be fully automated system. Banks and business organizations especially corporate houses should have adequate research, skilled manpower and technology driven strategies in this regard.
- Initiatives to develop integrated e-banking software through in house built may be taken. Preference should be given by the bank authority to use local software over foreign software. Common gateway is required so that interbank transactions can be feasible. Bank can charge normal profit to enlarge the market size on the on-line banking products. Banks should have their own strategic plans to implement on-line banking system. Creating awareness and consciousness among the clients of the banks is also required.
- The country needs to develop e-business with the help of ICT facilities. ICT application and development of software are very much dependent on the quality of the workforce, and supportive infrastructure and environment. Upzilla level may be considered as the base unit which may be connected with district and then connectivity with the capital of the country can be done. However, more stress should be given on wire free connectivity for which priority should be given on WiMAX technology.
- Public and private participation (PPP) for e-business should be encouraged for economic development. Spread of on-line banking is a very good initiative. But it is not only sufficient. Business sector as a whole should be focused on using e-business. It should be accompanied with e-governance system and should be moved towards other areas of the "e" to "e" system like e-tender, e-trafficking, e-ticket, e-learning, etc. More stress should be given to the wireless transactions and working environment due to rapid technological advancement.
- E-business should be used both for agricultural sector and industrial sector. Equal importance should be given so that domestic trade and international trade can be effective. Distortion from the market should be driven out and information should be passed systematically.
- E-business can help to improve total quality management. This can also ensure quality assurance of the business sector. As such, business policy formulation and strategies are required and should be properly implemented. Adequate training and technological support should be developed so that trained manpower and technology driven organizations can be created with the help of partnership between government and non-government organizations.
- Quality maintenance of local software should be arranged. Initiatives should be taken to set up hardware industry so that computer and computer accessories can be prepared in the country and easily purchasable for the lower and lower middle class people. Quality education and training in the field of ICT to develop human resources are essential. Moreover, entrepreneurship should be improved for developing hardware and computer peripherals.
- More high-speed fiber optical data communication infrastructures should be well established for speedy data communication for domestic and global high speed communication

system. This will help to attain better e-business including on-line banking system. Competitive situation should be arranged so that e-business management can be improved through efficiency and effectiveness of customer services.

- BTRC as a regulatory body should work with long-term vision, mission and fulfillment of goal oriented strategies. They should work as a facilitator rather not creating hindrance. VOIP should be legalized after examining and finalizing proper rules and regulations in the country.

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Appendix

Table A. Bank's name, services, software use and vendor's name

Service	Software use	Vendor's name	Bank's name
Core banking	Equation	Misys International Banking System Ltd. UK	AB Bank Limited
	STELAR	ERA InfoTech Limited	Bank Asia Limited
			Standard Bank Ltd.
	Flexcube (IBM AIX, Oracle)	Oracle Financial Services Software Ltd., India (Local Representative: Dataedge limited)	Dhaka Bank Ltd.
			Eastern Bank Ltd.
			Citibank N.A. (In-house)
			Dutch Bangla Bank Ltd.
	PC Bank 2000	Leads Corporation Ltd.	First Security Islami Bank
			Social Islamic Bank Ltd.
	HUB Core Bank	In-house	The Hongkong & Shanghai Banking Corporation Ltd.
	Temonas	DataSoft Limited	Janata Bank Ltd.
	Flora Bank	Flora Systems Ltd.	Mutual Trust Bank Ltd.
			Jamuna Bank Ltd.
	A2Z Multiuser Banking System	A2Z Computer Service,BD	National Bank Ltd.
	PC Bank-2000	LEADS Corporation Limited	National Bank of Pakistan
	Micro Banker VPro/5	Data-edge	ONE Bank Ltd.
	Bank Ultimus	Leads Corporation Ltd.	Southeast Bank Ltd.
	eBBS	In-house	Standard Chartered Bank
	ABABIL	Millinum Information System Ltd. (MISL) BD	Al – Arafah Islami Bank
			The City Bank Ltd.
	Finacle	Infosys Solution	BRAC Bank Ltd.
			The City Bank Ltd.
	T24	Temenos Switzerland	EXIM Bank Ltd.
			Prime Bank Ltd.
			Agrani Bank Ltd.
	Flora UBS	Flora System	National Credit and Commerce Bank Ltd.
	Equation Branch Server	Misys International Banking System Ltd. UK	International Finance Investment and Commerce Bank Ltd.
	Equation Branch Automation	DO	
	Trade Innovation	DO	
	Infinity Banking System		Rupali Bank Ltd.
Cluster banking	PC Bank 2000	Leads Corporation Ltd.	First Security Islami Bank
			United Commercial Bank Ltd.
Phone banking	Tele Banking	ERA InfoTech BD	Bank Asia Ltd.
	Call Center Integrated System	In-house	The Hongkong & Shanghai Banking Corporation Ltd.
	Flora Bank Phone Banking	Flora	Mutual Trust Bank Ltd.
	IVR	Suprico	Standard Chartered Bank
	Access	Phoenix Soft Switch, International Acumen	BRAC Bank Ltd.
	CISCO System	LEADS	Dutch Bangla Bank Ltd.
	Telebanking	Flora System Ltd.	Jamuna Bank Ltd.
SMS banking	Mobile Banking Management	SSL Wireless Limited	AB Bank Ltd.
	SMS Banking	ERA InfoTech BD	Bank Asia Ltd.
	Flexcube	Oracle Financial Services Software Ltd., India	Dhaka Bank Ltd.
			Dutch Bangla Bank Ltd.
	SMS Banking	LEADS Corp.	First Security Islami Bank Ltd.
			United Commercial Bank Ltd.
	Win2000	LEADS	Mercantile Bank Ltd.
	Flora Bank SMS Banking	Flora	Mutual Trust Bank Ltd.

Table A (cont). Bank's name, services, software use and vendor's name

Service	Software use	Vendor's name	Bank's name
	Balance query by Cell Phone	Business Automation	ONE Bank Ltd.
	Tagged with Banking	LEADS	Shahjalal Islami Bank Ltd.
	SMS Banking	Upload Systems	Southeast Bank Ltd.
	Mobile Banking	In-house	Standard Chartered Bank
	Web Service, Windows Service	In-house	BRAC Bank Ltd.
	For SMS Banking	Software Shop Ltd.	International Finance Investment and Commerce Bank Ltd.
	O/S WAP	M/S S.S.L	Sonali Bank Ltd.
			City Bank Ltd.
Internet banking	OmniEnterprise	InfrasoftTech Limited	AB Bank Ltd.
	MyBank	ERA InfoTech BD	Bank Asia Ltd.
	Flexcube		Dhaka Bank Ltd.
			Eastern Bank Ltd.
			Dutch Bangla Bank Ltd.
	HSBCnet Advising	In-house	The Hongkong & Shanghai Banking Corporation Ltd. HSBC
	Win+SQL Server	Desktop Limited	Janata Bank Ltd.
	Flora Internet Banking	Flora	Mutual Trust Bank Ltd.
	Web Statement	In-house	One Bank Ltd.
	iBank Ultimus	LEADS	Southeast Bank Ltd.
	iBanking	In-house	Standard Chartered Bank
	Phoenix Soft Access	International Acumen	BRAC Bank Ltd.
	CitiDirect	USA	Citibank N.A.
	TIB(Temenos Internet Banking)	Temenos Holdings Corporation, Switzerland	Prime Bank Ltd.
Various cards	BA's proprietary Debit Card	ERA InfoTech BD	Bank Asia Ltd.
	CARDPRO	BEPS	Dhaka Bank Ltd.
			National Credit and Commerce Bank Ltd.
	Trans Master for Prepaid Credit and Debit Card	Tietonator	Eastern Bank Ltd.
	Proprietary Debit Card, PC Bank ATM Interface	LEADS	First Security Islami Bank Ltd.
	Dabit Card + Credit Card	ITCL, BD	Janata Bank Ltd.
	Win + SQL Server, LEADS		Mercantile Bank Ltd.
	CTL Prime & CTL Online	TSYS International, USA	Mutual Trust Bank Ltd.
	Cardpro	Sungard System, Malayasia	National Bank Ltd.
			BRAC Bank Ltd.
			Prime Bank Ltd.
	VISA Debit Card, VISA Prepaid Card (International), VISA Gift Card		Shahjajal Islami Bank Ltd.
	eCAPS	In-house	Standard Chartered Bank
	VISA (Card-Pro)	BEPS, Bangladesh	Exim Bank Ltd.
	ACCESS Card Management	International Acumen	Standard Bank Ltd.
	Card Suite (AIX, Oracle)	Tleto Enator, Latvia	Dutch Bangla Bank Ltd.
	Q-cash	ITCL	Jamuna Bank Ltd.
	Probashi Agrani Remittance card	Cash Link, BD	Agrani Bank Ltd.
	Tranzware card management system	IT Consultants Ltd., Russia	International Finance Investment and Commerce Bank Ltd.
			City Ltd.
	Finacle		CityBank Ltd.
	Connect24		
ATM shared (VISA/MASTER)	ITCL		AB Bank Ltd.
	STELAR	ERA InfoTech BD	Bank Asia Ltd.
	ITM, Euronet Switzerland	local-CASH LINK Bangladesh	Dhaka Bank Ltd.

Table A (cont). Bank's name, services, software use and vendor's name

Service	Software use	Vendor's name	Bank's name
			Agrani Bank Ltd.
	ITCL, Q-Cash	Singapore	Mercantile Bank Ltd.
	IST switch of DBBL		Mutual Trust Bank Ltd.
	Tranzware, Compass Plus	IT Consultants Ltd., Russia	National Bank Ltd.
			National Credit and Commerce Bank Ltd.
			International Finance Investment and Commerce Bank Ltd.
			Sonali Bank Ltd.
			City Bank Ltd.
	VISA, Q-Cash, OMNIBUS & DBBL switch & ATM Network		Shahjajal Islami Bank Ltd.
	Q-Cash Shared ATM Card		Uttara Bank Ltd.
			National Credit and Commerce Bank Ltd.
	Cardpro	Sun Gard	BRAC Bank Ltd.
			City Bank Ltd.
	Card Management System (CMS) for PC	Cashlink Bangladesh Ltd.	Social Islamic Bank Ltd.
	VISA	ITCL	Jamuna Bank Ltd.
ATM own (VISA/MASTER)	STELAR		Bank Asia Ltd.
	Wincor Nixdorf Protopas	ITCL	Eastern Bank Ltd.
	ATMP 6.0	In-house	The Hongkong & Shanghai Banking Corporation Ltd.
	Q-Cash	Singapore	Mercantile Bank Ltd.
	Under process - CTL Prime & CTL Online, ATM Controller	TSYS International, USA	Mutual Trust Bank Ltd.
	TietoEnator Card Suite	Dataedge	One Bank Ltd.
	ITCL		Shahjajal Islami Bank
	Switching Software	Cynergon Intelisys Ltd.	Southeast Bank Ltd.
	ATM SPARROW/HAWK, CR2		Standard Chartered Bank Ltd.
	Phoenix Soft	International Acumen	BRAC Bank Ltd.
			Standard Bank Ltd.
	IST 7.5	HMA STARware, India Origin - Canada	Prime Bank Ltd.
	Iswitch	Interblocks, Srilanka	United Commercial Bank Ltd.
	IST(AIX, Oracle)	FIS, USA	Dutch Bangla Bank Ltd.
	Tranzware	Compass Plus, IT Consultants Ltd., Russia	City Bank Ltd.
EFT	Feature available on Internet & SMS Banking		Bank Asia Ltd.
	Eldorado	Interblocks (Sri Lanka)	Dhaka Bank Ltd.
			Al – Arafah Islami Bank Ltd.
	Western Union Money Transfer	BRAC Bank	First Security Bank Ltd.
			Bangladesh Commerce Bank Ltd.
	Ease Limited	BD and Desktop Limited, BD	Janata Bank Ltd.
	Through IVR - Servion System	DataEdge	BRAC Bank Ltd.
	Through ATM Own - Phoenix Soft	International Acumen	
	Through Internet Banking - Internet Banking	BRAC Bank	
	Through Mobile Banking - Mobile Banking	BRAC Bank	
	FTI	In-house	Citibank N.A.
	Online Remittance s/w	In-house	Agrani Bank Ltd.
	Money Gram		
	IME		
	RemitOne		

Table A (cont). Bank's name, services, software use and vendor's name

Service	Software use	Vendor's name	Bank's name
	Infinity Remittance		
	Money Gram		International Finance Investment and Commerce Bank Ltd.
	X-press	UAE Exchange, UAE	
	Placid Express	Plasic N.K corporation, USA	
	Coinstar Money Transfer	Coinstar Money Transfer, India	
SWIFT	Messaging, SWIFT		AB Bank Ltd.
	SWIFT Alliance Service		Bank Asia Ltd.
	SWIFT	Syscom Information Systems Limited	Dhaka Bank Ltd.
	SWIFT		Eastern Bank Ltd.
			One Bank Ltd.
			BRAC Bank Ltd.
			Dutch Bangla Bank Ltd.
			Jamuna Bank Ltd.
			National Credit and Commerce Bank Ltd.
	SWIFT	Belgium	First Security Bank Ltd.
			Mercantile Bank Ltd.
			Uttara Bank Ltd.
			Al – Arafah Islami Bank
			Prime Bank Ltd.
			Social Islamic Bank Ltd.
			Standard Bank Ltd.
			United Commercial Bank Ltd.
			International Finance Investment and Commerce Bank Ltd.
			City Bank Ltd.
	Group Messaging Gateway	In-house	The Hongkong & Shanghai Banking Corporation Ltd.
	SWIFT Alliance		Janata Bank Ltd.
			Mutual Trust Bank Ltd.
			Southeast Bank Ltd.
			International Finance Investment and Commerce Bank Ltd.
	SWIFT Alliance	Belgium	National Bank Ltd.
			Agrani Bank Ltd.
			Sonali Bank Ltd.
			Rupali Bank Ltd.
	PC CONNECT	NBP Karaci, Pakistan	National Bank of Pakistan
			International Finance Investment and Commerce Bank Ltd.
	SWIFT Alliance Access 6.0	Cambridge Worldwide, India	Shahjajal Islami Bank
			Bangladesh Commerce Bank
	SAM	In-house	Citibank N.A.
	SAA	SAM SWIFT	EXIM Bank Ltd.
PC banking	PC Bank-2000	LEADS Corporation	Mercantile Bank Ltd.
			National Bank of Pakistan
POS terminal	Q-Cash	Singapore	Mercantile Bank Ltd.
	Under process - CTL Prime & CTL Online		Mutual Trust Bank Ltd.
	Hypercon	Aamra Technology, USA	National Bank Ltd.
	VISA, Q-Cash, OMNIBUS & DBBL switch & POS Network		Shahjajal Islami Bank Ltd.
	Switching Software	Cynergon Intelisys Ltd.	Southeast Bank Ltd.
	TNMS	Aamra Technologies	BRAC Bank Ltd.

Table A (cont). Bank's name, services, software use and vendor's name

Service	Software use	Vendor's name	Bank's name
	STIS	International Acumen	
	Hypercom	Aamra (USA)	Prime Bank Ltd.
	Ingenico	ATCL (France)	Dutch Bangla Bank Ltd.
	ITCL		Jamuna Bank Ltd.
	OS/400, Cash Link		Agrani Bank Ltd.
	Tranzware Online Switching	IT Consultant, BD, Russia	International Finance Investment and Commerce Bank Ltd.
			City Bank Ltd.
Banking KIOSK	ERA- KIOSK-Banking	ERA InfoTech	Bank Asia Ltd.
	International Acumen Ltd.		Eastern Bank Ltd.
	Colors of Bangadesh		Southeast Bank Ltd.
	Customized S/W	International Accumen, BD	Dutch Bangla Bank Ltd.
Offline branch computerization	E-Bank	Ethics Advance Technology Ltd. (EATL), BD	Bangladesh Shilpa Bank
	JBSoft Banking Application	In-House	Janata Bank Ltd.
	Easy Banking	Desktop Limited	
	Flora Bank	Flora	
	BexiBank	Beximco Computers	Janata Bank Ltd.
			Sonali Bank Ltd.
	A2Z Multiuser Banking S/W	A2Z Computer Service	National Bank Ltd.
	PCBANK2000	Leads Corporation	Shahjajal Islami Bank Ltd.
	In-house Developed		Uttara Bank Ltd.
	BexiBank4000	Beximco Computers	Agrani Bank Ltd.
			International Finance Investment and Commerce Bank Ltd.
	IBS	Infinity Technology	Rupali Bank Ltd.
			Agrani Bank Ltd.
			Sonali Bank Ltd.
			Janata Bank Ltd.
	Krantibank	Kranti Associates Ltd.	Agrani Bank Ltd.
	FloraBank	Flora System Ltd.	
	Daffodil bank	Daffodil Computers Ltd.	
	ABLsofT	In-house	
	AgraniSolution	In-house	
	Flora Bank Software	Flora	Bangladesh Commerce Bank Ltd.

Source: Prepared by Filed Observations on 30.12.09.

Table B. Respondents of different banks who are habituated in on line banking system

Serial no.	Name of the bank	Male respondents		Female respondents	
		Dhaka city	Chittagong city	Dhaka city	Chittagong city
1.	Sonali Bank Ltd.	34	8	24	5
2.	BASIC Bank Ltd.	25	9	19	4
3.	Dutch Bangla Bank Ltd.	45	11	27	9
4.	Standard Chartered Bank	52	17	39	12
5.	Trust Bank Ltd.	28	9	21	7
6.	Prime Bank Ltd.	23	12	15	4
7.	Uttara Bank Ltd.	17	7	12	5

Source: Opinion poll survey.