



## PRIMARY RESEARCH

# Core Banking Software (CBS) implementation challenges of e-banking: An exploratory study on Bangladeshi banks

Mohammad Anisur Rahman<sup>1,\*</sup>, Xu Qi<sup>2</sup><sup>1,2</sup> Department of Logistics Management, Donghua University, Shanghai, China<sup>1</sup> Department of Management Information Systems, University of Dhaka, Bangladesh**Keywords:**E-banking  
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**Abstract.** Banking and financial sectors all around the world have embraced ICT to facilitate their customers with efficient services and innovative products through multichannel. The central engine that runs the core operations of the banking and financial institution is the Core Banking Software (CBS). The operational efficiency of a bank largely depends on the CBS. Moreover, it determines what a bank can offer in the future. In Bangladesh, ICT embracement has got momentum in the last decade. Some first mover banks in Bangladesh are in the process of CBS upgradation, and some other banks are trying to implement CBS to improve competitiveness, operational efficiency, and regulatory compliance. However, CBS implementation has challenges; improper attention to these challenges may result in poor CBS performance. This exploratory study tried to identify the challenges that commercial banks in Bangladesh encounter in the process of core banking system implementation or upgradation. Factor analysis has been used to analyze data from 153 respondents from seven commercial banks. This study found three primary sources (factors) of CBS implementation challenges: management, technology and vendor. These factors include: consensus on requirements, the role of employees, vendor capabilities and credentials, the software flexibility, user friendliness, capability to meet requirements, employee skill set required and data migration. The findings may help the academicians to explore the factors in other cultures, countries and cross-industry. It will also help the banking practitioners to concentrate on this challenging area to better implement and upgrade the core banking software in future.

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**INTRODUCTION**

Banks traditionally are the intermediaries, which collect a deposit from various entities and provide to those who

need it for profit. But, new generation Banks with the help of technology are not only collecting and disbursing money to different entities but also provide numerous services to various entities which facilitate their business operations.

Banks aim to reduce costs, enhance efficiencies and guarantee customer retention with use of technology (Turnbull, 2007). In banking, the relationships between institutions and their customers are critical (Seybold &

\*Corresponding author: Mohammad Anisur Rahman  
E-mail: [anisur@du.ac.bd](mailto:anisur@du.ac.bd)

Foss, 2001) and technology such as ATMs, POS, SMS Banking, Online Banking and Mobile Banking is the mediator in that interaction. Technological advances enable close and long-term relations with customers (Chairlone, 2009). For these new generation banks the technological gene is called Core Banking Systems (CBS). CBS of a bank, an engine of the e-Banking, determines what a bank is going to offer and how efficiently they can meet it. CBS developers are constantly adding new features to make banks enable and gain competitive advantages in the market. Like ERP, CBS has eliminated the need for different software for various functions (Boot 2009). However, a CBS implementation project is, like all other large IT investment projects, costly, time-consuming and complex. Due to that, only 25% of the CBS projects were successfully implemented and rest 50% experienced cost and schedule overrun and other failed (Adamson, Chan & Handfor, 2003). There are lots of challenges in implementing CBS. The main objective of this study is to pinpoint these challenges. Identifying and mitigating these challenges will definitely result in smoother CBS implementation and/or upgradation that will lead to higher CBS performance and virtually higher customer satisfaction.

## LITERATURE REVIEW

The CBS evolved in the 1970s and has gone through different significant changes over time; the recent CBS has the capacity of real-time processing and multi-channel integration (Kreća & Barać, 2015). The fundamental function of CBS is to perform deposit and lending in a bank (Chairlone, 2009). Abbate (1999) defined a core banking system as “a back-end system that processes daily banking transactions, and posts updates to accounts and other financial records.” Recently Hariharan & Reeshma (2015) has provided the following functional definition of CBS: “Core Banking System is the software used to sustain banks, most common dealings which include providing service loans, opening new accounts, processing cash deposit, withdrawals, calculating interests, client relationship management actions and maintenance of records for the bank’s transactions.” CBS helps to get a comprehensive view and real-time information of their customers (Abbate, 1999). It has become imperative for banks to identify their profitable customers and to make sure they are adequately taken care of with different services and offerings. Zineldin (2009) has identified four core levels of CBS (See Figure 1). Each of the levels of CBS

has incremental functionality than its predecessor. Most of the Banks in Bangladesh have level 2 CBS, except few one with level 4.

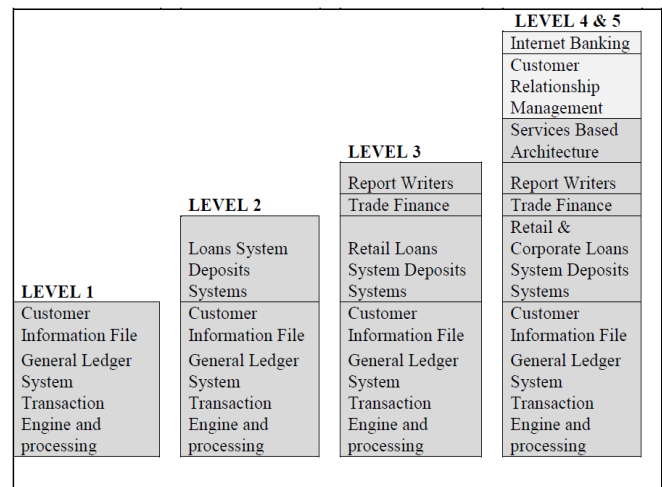


FIGURE 1. Levels of Core Banking Software (CBS)

However, like all other systems, CBS needs to be constantly upgraded for greater efficiency, responsiveness, getting platform independent, adding new module to meet new demand, and for fewer system crashes. There are several key drivers for CBS upgradation (Zineldin, 2009; Blanchard, 2008): upgradation of vendor software and discontinuation of maintenance service for existing software; obsolete technologies that can't meet new requirements; incorporating changes in the business model and new innovative services; and better risk management and compliance. A CBS implementation project is, like all other large IT investment projects, costly, time-consuming and complex. Depending on the size of the institution, such an initiative could cost several hundred million Taka and could take three to five years to complete. A core banking solution, once implemented, should be robust, scalable and future-proof and serve the business interest for at least ten years. Banks need to focus on the main factors, which make the core banking transformation a successful experience. Bogaerts (2011) suggested 4 C's for successful CBS implementation: Componentization, Core, Compliance and Customer Centricity. The key challenges in core banking transformation evolve out of its principal parties involved i.e. the bank and bank management (in our study we used the bank characteristics and management in a single term management), vendors and the CBS itself. The bank management, in the first phase, needs to assess the

**TABLE 1.** Challenges of CBS implementation

No.	Challenge	Description	Source
1	Functionality (Capability of software to meet requirements and expectations)	Different functionalities of Core Banking systems.	(Laudon & Laudon, 2012; Bogaerts, 2011; Haller & Heuberger, 2009; Malan, Pretorius & Pretorius, 2008; Gartner, 2011; Gartner, 2014)
2	Reaching unanimity within the organization on what is needed	Mutual agreement of functional requirements within the implementation team and management.	(Bogaerts, 2011; Gartner, 2011; Gartner, 2014), Own Study
3	Cost and Financial Terms	Information system's project costs also include the cost of hardware, software, and workspace. Project management develops a budget for the project and monitors	(Laudon & Laudon, 2012; Gartner, 2011; Gartner, 2014)
4	Ability of the business to adjust to the new system	How organization business process adjusted with the new system.	(Laudon & Laudon, 2012; Malan, Pretorius, & Pretorius, 2008; Gartner, 2011; Gartner, 2014)
5	Availability of skilled personnel	Whether the organization has essential technical skilled personnel or expert.	(Laudon & Laudon, 2012; Haller & Heuberger, 2009; Malan, Pretorius & Pretorius, 2008)
6	Vendor capabilities and credentials	Whether vendor showed required capabilities and credentials during implementation.	(Laudon & Laudon, 2012; Haller & Heuberger, 2009; Malan, Pretorius, & Pretorius, 2008; Gartner, 2011; Gartner, 2014),
7	System Flexibility	Whether the new system has the ability to accommodate business requirements required by the organization.	(Laudon & Laudon, 2012; Bogaerts, 2011; Haller & Heuberger, 2009; Malan, Pretorius, & Pretorius, 2008; Gartner, 2011; Gartner, 2014)
8	Data migration	Transferring data is called "data migration" which aims to align database structure from the legacy system to the new system. How smooth the data migration was?	(Laudon & Laudon, 2012; Haller & Heuberger, 2009; Malan, Pretorius, & Pretorius, 2008; Gartner, 2011; Gartner, 2014)
9	User friendliness of User Interface	What level of satisfaction that end-user feels about new systems?	(Laudon & Laudon, 2012; Bogaerts, 2011; Gartner, 2011; Gartner, 2014)

requirements of the banks based on the product and services they offer or like to offer in future, its manpower, current and future infrastructure. Once the assessment is done, in the second phase, they have to develop a consensus on the module and capabilities they will be looking in a CBS. Some may want all encompassing CBS, and some may want just a few functions (Zineldin, 2009). Then the management will go for looking for the available CBS in the market to match their requirements. The challenges they face are that often vanilla software does not match their organizational requirements and culture fully, CBS is not flexible and scalable to cope with new changes, lack of skill set to run the system properly and the user interface is boring and unfriendly. In the third phase comes vendor. CBS implementation is the joint effort of Bank management and vendor (Haller & Heuberger, 2009). Vendor related challenges include: whether the supplier has capabilities and credentials to install, migrate data, support CBS; how much vendor is charging for installation and maintenance, etc. Based on the literature review, the challenges are identified and are summarized in the table 1. However, benefits of CBS outweigh its cost and complexities by meeting information needed on-time to meet the requirements of the management, governing, and regulatory bodies, reducing the higher overhead cost of additional man-hours and manual data entry. These complexities often take tolls on customer service (Boot, 2009).

### Banking Sector in Bangladesh

Bangladeshi banking industry started with 6 Nationalized and commercialized banks, 2 State-owned specialized banks and 3 Foreign Banks after independence. A tremendous growth has been seen in the banking industry since independence, especially during last three decades. Banking industry currently includes 56 scheduled banks: 6 state-owned (SCOBs), 2 specialized (SDBs), 39 private commercial (PCBs), and 9 foreign-owned (FCBs); Out of 39 PCBs, 8 PCBs are based on Islamic Shariah (Bangladesh Bank, 2015). All of the scheduled banks in the Bangladesh operated under Company Act 1994, Bank Company Act 1991 (Amended up to 2013). These Banks are operated under the full control and supervision of the Bangladesh Bank, the central bank of Bangladesh. Automated banking operation was first introduced by the foreign banks in Bangladesh. Among Bangladeshi banks, Eastern Bank Ltd. was the pioneer to introduce CBS to run their banking operations (Mia, Rahman, & Debnath, 2007). After that many banks have taken CBS to perform banking

operations. In most of the cases, they look for domestic software developers to supply the CBS. Since 2000 due to the rapid expansion of ICT and to cope with the changing nature of market demand and competition, Bangladeshi banks incorporated foreign expensive CBS that offers more functionality, flexibility, and adaptability. However, still some banks such as Jamuna Bank Ltd., and Islami Bank Ltd. are operating with local CBS; and some banks are on the verge of changing their CBS second time (such as Basic Bank Ltd.) and upgrading their CBS version (EXIM Bank Ltd.). Thus, CBS is indispensable for any bank in Bangladesh and the world per se.

### RESEARCH DESIGN

In view of limited previous research in CBS as well as in Bangladeshi banking industry an exploratory research approach has been undertaken (Zikmund, Babin, Carr & Griffin, 2010; Williams, Onsmann & Brown, 2010). The sample framework of this study was seven commercial banks in Bangladesh: Sonali Bank Ltd., Agrani Bank Ltd., Janata Bank Ltd., Basic Bank Ltd., EXIM Bank Ltd., BRAC Bank Ltd., and Islami Bank Bangladesh Ltd. First four are government owned and rest of the banks are privately owned. Convenience sampling method has been used due to its cost effectiveness and wide applied applicability in information systems research (Azam, Quaddus, Lubna, 2013).

For analysis of the data, Exploratory Factor Analysis has been done with Maximum Likelihood extraction method and Pro maxrotation method. Maximum Likelihood analysis was used because it allows researchers to test the statistical significance of factor loadings, calculate correlations among factors and compute confidence intervals for the item used in the reflective study. Promax rotation is an oblique method of rotation used in there elective study. To collect the data, the structured questionnaire survey method, and face-to-face interview method has been used.

The first part of the questionnaire used to collect demographic data and the second part of the questions used to collect data on different constructs using a 5-point Likert scale ranging from (1) “strongly disagree” to (5) “strongly agree”. A pilot study was conducted and the feedback was used to design and test the effectiveness of final questionnaire. We have distributed 200 surveys questionnaires with 160 returned filled, resulting in an 80% response rate. Seven incomplete questionnaires were excluded from the analysis and thus, we were left with 153 samples.

## FINDINGS

### Demographic Information

The respondents were male dominated (85%). It truly represents the male dominated IT sector of Bangladeshi Banks. Majority of the interviewees (80%) age between 30 to 40 years is having mostly master's degree (83%). About 90% of the respondents have less than 10 (approx.) years

of job experience; while only 10% have more than ten years of employment experience. It happened because the e-Banking services among the Bangladeshi Banks evolved in the last two decades (Mia *et al.*, 2007). The respondents were evenly from private and public banks of Bangladesh. Most of the respondent (51%) were using T-24 core banking software for their banking operations.

**TABLE 2.** Demographics of the respondents

	Descriptions	Frequency	Percentage
Gender	Male	130	84.97%
	Female	23	15.03%
Age (years)	Below 30	13	8.50%
	30-40	123	80.39%
	Above 40	17	11.11%
Education	Bachelor	22	14.38%
	Masters	128	83.66%
	Others	3	1.96%
Service Length (years)	Below 5	60	39.22%
	05 – 10	76	49.67%
	Above 10	17	11.11%
Type of Bank	Private	75	49.02%
	Public	78	50.98%
	T-24	78	50.98%
	Flexcube	30	19.61%
Software Considered	Kastle	23	15.03%
	EIBS	12	7.84%
	Intellect	10	6.54%

### Factor Analysis

The result of the factor analysis shows that the Kaiser-Meyer-Olkin measure of sampling adequacy is 0.746, which is well above the recommended value of 0.5 (Williams *et al.*, 2010), and Bartlett's test of sphericity is significant

( $\chi^2(36) = 356.367$ ,  $p < 0.5$ ). The communalities for each item are all above 0.3 (see Table 4) confirming that each item shared some common variance with other items. These results indicate that these items are factorable.

**TABLE 3.** KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.746
Approx. Chi-Square		356.367
Bartlett's Test of Sphericity	df	36
	Sig.	.000

Factor analysis yield three factors with Eigenvalue more than one and with item loading more than 0.3 (see table 4). All the nine items we considered for the study were loaded and each factor contains three items, which is more than recommended by Williams *et al.* (2010). We name the first factor as software related challenges because its items

related to CBS' functionality, flexibility and user friendliness. Software related factor has internal reliability (Cronbach's Alpha > 0.765) and explains 30.51% of the variances. The second factor we termed as vendor related as the items: vendor capabilities, data migration, and cost are related to the vendor. This factor also has internal

reliability (Cronbach's Alpha >0.711) and explain about 10% of the variances. The third factor we termed as management related factor as it includes management and employee related items of the banks. The third factor is

also internally reliable as it achieved the recommend Cronbach's Alpha of 0.7. All together the three factors explain 49% of the variances.

**TABLE 4:** Factors analysis results

ITEMS	FACTORS			Communalities*
	Software related (1)	vendor related (2)	Management related (3)	
Functionality (Capability of software to meet requirements and expectations)	.704			0.483
System Flexibility	.636			0.578
User friendliness of User Interface	.817			0.591
Cost and Financial Terms		.585		0.411
Vendor capabilities and credentials		.807		0.559
Data migration		.612		0.421
Reaching unanimity within the organization on what is needed			.750	0.546
Ability of the business to adjust to the new system			.493	0.316
Availability of skilled personnel			.724	0.502
Eigenvalues(>1 )	3.257	1.366	1.270	
Percentage of total variance	30.511%	9.933%	8.511%	
Cronbach's Alpha	0.765	0.711	.700	

\*Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser normalization. Factor loading is showing pattern matrix results.

## DISCUSSION

E-Banking is a fad now among banks in Bangladesh and the world per se. The traditional way of banking operations has become obsolete. The banks are shifting from traditional manual systems to e-Banking through the CBS. Our study tried to identify the challenges through literature review and interviewing the IT professionals of the Banks. This study reveals that the source of challenges for CBS implementation: Management related, Software related and Vendor related. Software related challenges seems to have greater power of explaining the variances followed by vendor related challenges and management related challenges.

It means in Bangladesh CBS vendors have more bargaining power than bank management. The reason behind this situation is explained next. The predominant CBS in Bangladeshi banks is Temenos' T24 followed by Flexcube and Kastle. This is because, firstly, the banking industry tried to have a common IT infrastructure so that

they can transact among themselves seamlessly and secondly, the fear and cost of moving to unknown or less known software. Consequently, this weak position of Bank Management took toll on its bank operational performance. Interview with the banking professionals revealed that T24 has become a white elephant for some banks to maintain.

Our study also reveals that IT departments in the Bangladeshi banks are dominated by the males, who are young and educated. It is a common scenario around the world. The IT sector irrespective of the industry is male dominated, young in age and educated.

## CONCLUSION AND IMPLICATIONS

Financial services companies around the world are seeking to embrace or upgrade their core banking systems to improve competitiveness, operational efficiency, and to meet regulatory compliance. However, such initiatives are especially challenging for most institutions. The sources of

challenges include management and organization, these software itself and vendors. Mitigating these three major areas of challenges during implementation can lead to faster and smoother CBS implementation/upgradation and achieve operational excellence. However, IT world is very dynamic and ever changing. There may arise new challenges. Thus, banks should always need to look for these challenges and find ways to mitigate them.

### MANAGERIAL IMPLICATIONS

The managers need to consider all three sources of challenges while choosing, implementing, and upgrading CBS. In the case of software, the most challenging part is CBS' user interface and user friendliness. If the user interface is complex and non-user friendly, it may result in poor performance of the users and virtually of the CBS. The second essential factor is the CBS' functionality; whether it is meeting all the needs of the bank it promised to meet. The most important vendor related challenge is vendor capability and credential. As most of the Banks use

the foreign CBS, which is very complex. Vendor support is essential to fix bugs, training, and maintenance. In the case of management related challenges, the managers always need to look for skilled personnel, who knows and can run the CBS. Like other countries Bangladesh is always in need for skilled manpower in IT sector. This is another reason to choose the same CBS by majority banks. Thus, the manager should choose a CBS that is flexible and capable of meeting management demand and capacity with excellent vendor support.

### THEORETICAL IMPLICATIONS

This study shows that management related, software related and vendor related challenges together can explain 49% of the variation. There might be other factors, which the future researchers can look for. Moreover, there is an avenue for cross-cultural and cross-national study. Lastly, there is a scope to see whether these challenges have any influence on the CBS performance.

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