

**STUDY AND COMPARISON OF MOBILE BANKING APPLICATIONS –
TOWARDS THE TRUST PERSPECTIVE**

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Abstract— Banking sector is one of the most primitive and powerful financial service providers to common man. It has extended its services through various channels to reach its customers and to thereby enhance customer satisfaction. From banks to the upcoming satellite banking, banking channels has witnessed a massive growth. Among the various channels, mobile banking has gained wider popularity with the growing number of smart phone users. Various public sector and private sector banks have launched their mobile applications to improve their customer. This paper presents a study of the various services offered by mobile banking applications and presents a comparison of the applications of various public and private sector banks. Based on the study, this paper aims to determine the level of trust that can be achieved based on the various parameters that are considered for study. It also reveals the space for various banks to improvise their services and also highlights the need for provisioning various other services that can be incorporated to mobile banking applications.

I. INTRODUCTION

Banks have been occupying the prime share in delivering financial services to customers. As a means to enhance the satisfaction of its customers, banking sector is making use of various channels through which it can extend its services. Banking channels are the means by which banks can deliver its services to its customers. Bank is the primitive channel for banking where all the operations are carried out manually. The need for banking channels emerged when the customers found it difficult to search for banks in order to meet their financial needs. The task of handling more number of customers at banks was a cumbersome task for the bankers. The rising need of bankers and the customers was the reason for the emergence of the first alternate to the traditional banking channel, 'Automated Teller Machines' ATM. In India, HSBC bank was the first mover to launch its ATM in the year 1987. Since then ATM had become one of the most preferred banking channel by its customers. The ease of access and 24x7 service availability were the prime reasons for the wider popularity of ATM's. The innovations in technology had seen its steady increase in its pace and had given way to business to adapt the latest technologies to reach its customers. In this way internet banking had slowly emerged and became one of the prime sources of access banking services. With the evolution of internet, internet banking had gained popularity. The fame of the internet banking had not lasted for long. The evolution of smartphones and the increased number of

internet users in the smartphones paved way to mobile banking. The internet service has seen a steady progress by providing with 3G and 4G services and now with 5G to be adopted. Smartphones have invaded the hands of technology users. Business, seeking the customer satisfaction has begun to provide various services through smartphones. Smartphones, being handy aids the customer to avail 24x7 service availability of services which in turn becomes a pressure for the service providers as such. Mobile banking users in India account for over 50 per cent of its population today, according to research by KPMG and UBS. Various public sector and private sector banks are migrating to providing services through mobile banking. The demand of the customers and the technology shift has led to mobile banking being one of the most opted channels among the banking channels that are available.

The features and benefits of mobile banking include

- Account Balance
- Mini Statement
- Self-Fund Transfer
- Beneficiary Payments
- Pay Bills
- Recharge
- Location

These are the current existing features in mobile banking in which the user can use the application for transferring money, balance enquiry, bill pay, find location of bank ATM, request pin change/deactivate account etc. These processes can be done for an individual account holder in a bank.

II. LITERATURE REVIEW

The utilization of mobile banking services has been analyzed and studied in several works. Each work focuses on various perspectives of mobile banking. In the work of T. Laukkanen (1), the importance of customer needs and value creation in predicting the customer behavior is focused. The author made use of interviewing technique to determine the factors that create value for the customers for various features of internet and mobile banking. The work in (2), analyzes the acceptance of mobile banking by users. The parameters that are considered for the analysis include the risk factors and the trust with which the customers accept mobile banking. Technologies, such as GPRS, EDGE, and 3G wireless networks that support faster and easier access to the Internet, have become increasingly ubiquitous, it has modified the consumers' behavioral

patterns in interacting with their financial institutions, consumers are more technologically dependent, which has reduced their uneasiness involving technological innovation(3)(4). In (5) (6), the adoption of mobile banking services in the regions of Brazil and Saudi Arabia was analyzed. Though these works was able to identify the means of value creation for various services, it was inclined more on the customer perspective. The work in (7) is a study on the emerging trends in the mobile financial applications which focus mainly on the banking services and mobile payments. It elaborates on the various types of payment systems and analyses the pros on cons of the latest trends in terms of the banking services offered through mobile banking.

III. THE MOBILE BANKS

Mobile banking has converted the smartphones to handy banks that does not require the customers to move from one place to another in search of banks, ATM's or even desktop PC's to access mobile banking services. The demand from the customers have forced the banking sector to incorporate digitization in the banking sector and with the evolution of smartphones and mobile internet, the popularity of mobile banking has been on the rise. Banks have tried to incorporate numerous services to mobile banking application to achieve increased customer satisfaction. Mobile banking applications has been on the increase in the recent years. Several public and private sector banks have launched their mobile banking applications. Each and every of those mobile banking applications are enriched with features of their own. The various services incorporated by mobile banking applications include

- Viewing Balance

Every mobile banking application is equipped with the facility for viewing the balance of a user account. The balance of any account may be viewed using this functionality. The updates done as a result of transactions are dynamically reflected and hence is one of the most essential and prime feature of the mobile banking applications.

- Fund transfer

Since the emergence of mobile banking, fund transfer is one of the most commonly used features in case of the mobile banking application. Fund transfer option in mobile banking applications, enable the user to transfer money from his/her account to any account. The account to which the funds are transferred may be of the same bank or of a different bank. The fund transfer option is preceded by the addition of the beneficiary to whom the funds are to be transferred. The add beneficiary option in case of the internet banking takes

more time when compared to that of the mobile banking application and hence it is most widely preferred when compared to the internet banking. As in internet banking, mobile banking also supports transactions like IMPS, RTGS and NEFT transactions.

- Bill payments

Bill payments are primarily used for the bill payment of essential services like telephone bills, water bills, mobile postpaid bills etc., several third party applications have been providing this service but since the incorporation of this service to mobile banking, most of the users prefer to use it through their banking applications for various security reasons. In case of mobile postpaid payments, the request is being transferred securely to the mobile service provider. The increase in cyber-attacks, awareness among users, and easiness in accessing the payment services has led to the increase in the popularity of this feature in mobile banking scenario.

- Recharge

The recharge feature in mobile banking applications is primarily used for mobile prepaid payments. This feature does not divert the request to any mobile service providers rather the recharge options of the mobile service providers are displayed in the mobile banking applications itself. Using this option it is feasible to make any kind of mobile prepaid recharges which includes features like full talk time, data recharges etc., The increased need for instant mobile recharge has been a boon to the young population accessing mobile banking applications.

- Pin Change

PIN change is an interesting option that the mobile banking application offers. This feature enables the user to change the PIN number of their ATM/Debit cards without visiting ATM outlets. Banks have taken several steps to achieve increased customer satisfaction. This feature is one such means to enable the user to make changes with respect to the ATM cards as well. In certain banks the user to lock or unlock various banking features which may include locking the usage of various card based payments/transactions, locking the access of mobile and internet banking.

- ATM Location Finder

ATM location finder is one service which is offered by quite few banks. This feature will be much used by the users when they need to locate a nearby ATM of the bank in which the users possess an account. There is a drawback with this feature as this location finder is only capable of indicating the location of the ATM and not the availability of cash or the working condition of the ATM machines. This is one of the least used features in case of the mobile banking.

Apart from these services, several banks offer additional services regarding loan information, provisioning the users to know the current rate of interest, m-passbook where the user will be able to view his digital passbook with the recent transactions in them. There are banks which also provide facilities to lodge complaints regarding a particular service in banks. The following section presents a comparison of various mobile banking application based on the above features.

IV. MOBILE BANKING APPLICATIONS – A FEATURE COMPARISON

Mobile banking has been the trend for the past few years and almost all of the banks have launched their mobile banking applications. The following table presents a list of the various features in mobile banking and their availability in various mobile banking applications.

Criteria ID	Criteria	Criteria ID	Criteria
1	Application name	5	Recharge
2	View Balance	6	Pin Change
3	Transaction	7	ATM Location
4	Bill Payment	8	Join Account

The comparison of various features of the mobile banking applications has emphasized the need for improving the features. For instance among the various services offered by the mobile banking applications, the provision for joint accounts still remain void. The higher utilization of mobile services by the common users has pressured the banks to offer more and more services in order to achieve higher customer satisfaction.

Table 1: Feature based comparison of mobile banking applications

Bank Name	Bank ID	Bank Name	Bank ID	Bank Name	Bank ID	Bank Name	Bank ID
INDIAN BANK	1	UCO BANK	6	HDFC BANK	11	CANARA BANK	16
INDIAN OVERSEAS BANK	2	UNION BANK OF INDIA	7	ICICI BANK	12	CORPORATION BANK	17
STATE BANK OF INDIA	3	VIJAYA BANK	8	IDFC BANK	13	BANK OF INDIA	18
SYNDICATE BANK	4	SOUTH INDIAN BANK	9	KOTAK MAHINDRA BANK	14	AXIS BANK	19
TAMILNADU MERCHATILE BANK	5	KARUR VYSYA BANK	10	CITY UNION BANK	15	BANK OF BARODA	20

V. MOBILE BANKING APPLICATIONS – A TECHNOLOGY BASED COMPARISON

The evolution and growth of the mobile banking applications is not only about the services offered through the application but is also the supporting technology. The successful installation of the mobile banking application is feasible only if the mobile operating system permits the installation of the application. The most common and popular operating systems that are used in the smartphones include Andriod OS, iOS, Blackberry OS etc. There are several factors that has to be considered for the design and utilization of mobile applications.

- Availability:

Mobile applications can be downloaded to the user's smartphone through app stores. App store is a repository where all the mobile applications that is compatible to the smartphone operating system are made available.

For instance, smartphones with an android operating system has the app store that is provided by Google, the Play store. Hence, the utilization of mobile banking applications by the users is facilitated by the availability in the corresponding app stores. Smartphone users download the required applications

from the app stores.

Table 2: App store availability based comparison of mobile banking applications

Bank ID	Application name	Andriod	IOS	Windows mobile	Blackberry OS
1	IndPay	✓	✓	✓	×
2	IOBMobile	✓	✓	✓	×
3	SBI Anywhere Personal	✓	✓	✓	✓
4	SyndMobile	✓	✓	✓	×
5	TMB mConnect	✓	✓	✓	×
6	UCO mBanking	✓	✓	✓	✓
7	U-Mobile	✓	✓	✓	×
8	Vijaya Bank	✓	✓	✓	✓
9	SIB M-Pay	✓	✓	✓	×
10	KVB mPay	✓	✓	✓	✓
11	HDFC Bank Mobile Banking	✓	✓	✓	✓
12	iMobile	✓	✓	✓	✓
13	IDFC Bank Mobile Banking	✓	✓	×	×
14	Kotak - 811 & Mobile Banking	✓	✓	✓	✓
15	CUB Mobile Banking Plus	✓	✓	✓	×
16	CANMOBILE	✓	✓	✓	×
17	CorpMobile	✓	✓	×	×
18	BOI BTM	✓	✓	✓	×
19	Axis Mobile	✓	✓	✓	×
20	M-Connect Plus	✓	✓	✓	✓

- Cost:

The mobile applications that are offered through the smartphones may be free of cost or there may be a need to pay. Freelancing mobile application developers have their source of income only through the paid services that are offered by the app stores and hence there are certain mobile applications for which the users may need to pay for downloading and installing the application. As financial inclusion is being aimed by the banking sector, providing mobile banking applications to customers after payment will not be appropriate. Mobile banking applications are provided free of cost for so that it may reach its customers at a larger extent.

- Ease of installation:

The demand from customers is very high such that the users should be able to download the mobile banking applications without any additional requirements. The applications are designed in such a way that the mobile banking applications may need minimum requirements from the smartphones. Ever since the wider reach of the smartphones and the awareness about the services offered through mobile banking applications, the number of users utilizing the mobile banking applications has been on the rise.

- Security:

It is another important perspective that needs to be considered in case of mobile banking applications. With the increase in cyber attacks, it is the responsibility of the service providers to make the applications resistant to such attacks.

Table 2 presents a comparison of the availability of mobile banking applications in the corresponding app stores for various mobile operating systems. The table not only illustrates the availability of the mobile banking applications in the app stores but also highlights the popularity of the mobile operating systems. It can be observed that the Indian mobile banking applications are focusing more on the customers using applications within India. The Blackberry OS is found among the more population who reside out of India and the space for providing our Indian mobile banking services may be extended there as well.

Based on the study and comparison of the existing scenario in mobile banking applications, it can be observed that several other features like joint account accessing, insurance payments may also be incorporated in the existing mobile banking applications. Moreover, the reachability of Indian mobile banking applications can be better improved by improving their availability in various app stores which means there is a need for constant updations with respect to the technology.

Table 3: Security and Ease of Use based comparison of mobile banking applications

Bank ID	Application name	Security	Ease of use
1	IndPay	✓	✓
2	IOBMobile	✓	✓
3	SBI Anywhere Personal	✓	✓
4	SyndMobile	✓	✓
5	TMB mConnect	✓	✓
6	UCO mBanking	✓	✓
7	U-Mobile	✓	✓
8	Vijaya Bank	✓	✓
9	SIB M-Pay	✓	✓
10	KVB mPay	✓	✓
11	HDFC Bank Mobile Banking	✓	✓
12	iMobile	✓	✓
13	IDFC Bank Mobile Banking	✓	✓
14	Kotak - 811 & Mobile Banking	✓	✓
15	CUB Mobile Banking Plus	✓	✓
16	CANMOBILE	✓	✓
17	CorpMobile	✓	✓
18	BOI BTM	✓	✓
19	Axis Mobile	✓	✓
20	M-Connect Plus	✓	✓

VI. TRUST IN MOBILE BANKING APPLICATIONS

The above sections present a brief comparison and analysis of mobile banking applications based on the features offered by various banks and their availability in the web store. Such a comparison is not sufficient to determine the trust on mobile banking applications by the users. Hence, the trust factor on mobile banking users is determined by the following null(H_0) and alternate hypothesis(H_1).

H_0 : If the number of features, availability of mobile banking applications in the respective app store and the success rate of transactions is greater than 90%, then trust on mobile banking applications among users is high.

H_1 : If the number of features, availability of mobile banking applications in the respective app store and the success rate of transactions is less than 90%, then trust on mobile banking applications among users is high.

Table 4: Comparison of Volume and Value of Transactions recorded
(Source RBI)

Period	Volume	Value
Nov-16	72.3	1244.9
Dec-16	70.2	1365.9
Jan-17	64.9	1206.7
Feb-17	56.2	1080.0
Mar-17	60.8	1499.9
Apr-17	61.0	1443.8
May-17	64.9	1940.7
Jun-17	77.1	1584.7
Jul-17	69.5	1019.2
Aug-17	70.8	1033.0

The success of the mobile banking applications is completely depending on the usage rate of such applications by the users. The following figure shows the volume of transactions that has been recorded through the mobile banking applications. The volume of mobile banking transactions recorded during the period Nov 2016 to August 2017 is illustrated table 4.

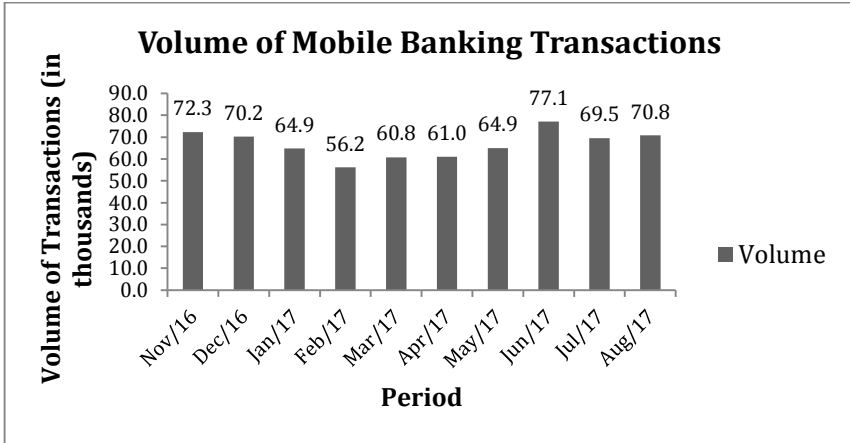


Fig.1. Comparison of volume of transactions recorded during Nov-2016 and August-2017

It is to be observed that the volume of transaction has witnessed variations over a period of time. The changing demands from the customer are the reason for this variation. The changing requirements from the customers make it essential for the banks to incorporate a variety of features in the mobile banking applications. The increase in the number of features must not affect the success rate of the transactions as the success rate is directly proportional to the usage rate of mobile banking applications. It is also important to understand that if the usage rate is more, then that does not mean the success rate of the transactions done through mobile banking is higher. Hence it can be understood that features that are present in the mobile banking applications and the availability of the mobile banking applications in the app store are not the only factors for the acceptance and usage of mobile banking applications by the users. The prime factor behind the utilization and acceptance of mobile banking application is the 'trust' on the technology and the application. Table 4 clearly indicates that the volume and values of the mobile banking transactions are highly correlated and hence the success rate of the transactions also tends to high.

Correlations

		Volume	Value
Volume	Pearson Correlation	1	.018
	Sig. (2-tailed)		.960
	N	10	10
Value	Pearson Correlation	.018	1
	Sig. (2-tailed)	.960	
	N	10	10

Fig. 2 Correlation results of Value and Volume of Mobile banking transactions recorded

The above figure indicates the correlation for the volume and value of the mobile banking transactions recorded for the period November 2016 to August 2017. Based on observed correlation value, it can be deduced that the overall success rate of mobile banking transactions is found to be around 96%. Hence with the currently available features in various mobile banking applications and their availability in the app store, the success rate of the transactions done through mobile banking is around 96%.

The above discussion clearly illustrates the alternate hypothesis can be rejected and the null hypothesis is to be accepted. Based on this, it can be deduced that if the number of features, availability in app store and the success rate is greater than 90%, then the trust factor is more among users for utilizing the mobile banking application.

VII. CONCLUSIONS

Banking sector has several service delivery channels which include ATM's, internet banking, mobile banking etc., The scope for improvement and updation of services has now become a demand from the customers. With the rise in the utilization of smartphones, mobile banking is a banking channel is opted by most of the customers. This paper presents a study and comparison of the features that are available in the mobile banking applications of the commonly used mobile banking apps. The comparison of various apps reveals that several features like joint account access, insurance payment options are yet to be included in the mobile banking applications. Further, the comparison in terms of

availability of mobile banking applications in app stores indicates the level of availability of apps to the customers. It can be observed that the commonly used Indian mobile banking applications are supported in popular mobile operating systems like Android and IOS. Hence the focus of service providers in providing the services should not only be with respect to the frequently used services but also should be capable of providing variety of services. Trust being the prime factor among users for performing financial transactions is being augmented by features, easy availability of applications for installations and the most important success rate of transactions. Based on the comparison and analysis, it can be observed that more the number of features, more will be usage rate and in turn banks can strengthen the technological support achieving higher success rate and it turn gaining higher customer satisfaction. Banking sector is one of the primary financial service providers and thus has the need to update its services both in terms of its features and the supporting technology. This paper provides an insight into the space for improvements in the existing applications and relevant features may be incorporated in the future.

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