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Mobile Financial Services - The New Horizon

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Abstract

Mobile financial services are defined as providing financial services via mobile telecommunication devices such as mobile phones. In an increasingly competitive financial services sector, mobile financial services can be seen as an attempt to provide the needed added value for clients by offering more opportunities for conducting different financial tasks. In its simplest form, MFS enables clients to receive information about their account via SMS. Today, mobile financial services enable clients to request their account balance and the latest transactions in their accounts, to transfer funds between accounts, to trade stocks, to pay bills, to send or receive remittance and to receive portfolio and price information. It has the potential to transform the financial and telecommunication sectors.

Currently, the front-end or consumer-facing component is the end-to-end mobile financial services value chain and it is typically supplied or customized by either a mobile financial services vendor or specialized technology unit within a Financial Institute. Technologies available for mobile financial services could be broadly categorized into two environments: Server Oriented and Client Oriented. Applications which are build to be run and function on a Server, away from individual's Mobile is categorized as Server Oriented Technology. An application which is build or being embedded into individual user's SIM or individual's Mobile is considered as Client Oriented Technology.

Mobile financial services are being embraced in an unprecedented speed by both urban and rural communities in Bangladesh. With over 116 million mobile subscribers, mobile technology has the power to redefine the financial services. From April 2013 to November 2013, the number of mobile financial services clients has doubled. Clients' perception that mobile transactions may be unsecure is a fundamental issue to be dealt with to increase mobile financial services. If clients' perception of security issues changes - adoption rates will significantly increase. By providing mobile financial services that are convenient, affordable and reliable, financial

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institutes in Bangladesh have a horizon of 116 million mobile users to reach out!

Introduction

Financial services provided via mobile telecommunication devices such as mobile phone are defined as mobile financial services. Clients interact with a financial institute via mobile device through this channel. The Federal Reserve of United States defines mobile financial services in particular mobile banking as "using a mobile phone to access your bank account, credit card account, or other financial account. Mobile banking can be done either by accessing your bank's web page through the web browser on your mobile phone, via text messaging, or by using an application downloaded to your mobile phone."

Mobile Financial Services

Mobile financial services (MFS) are more flexible and omnipresent than existing channels available in traditional banking. MFS has every potential to transform both financial and telecommunication sector. Bank and non-banking financial institutes would like their traditional customers to migrate from branch or phone services to mobile banking services. MFS has the potential to generate revenue for mobile service providers as well as reducing the costs of providing financial services. Recent progresses in wireless technology and rapid proliferation of advanced mobile phones have been advantageous to mobile financial services. According to Bangladesh Bank, in April 2014, number of mobile financial services clients is over 15 million (www.bangladesh-bank.org).

Today, mobile financial services spawns various types of users and offers a bouquet of facilities tailor made for each customer segment as depicted in the diagrams below:
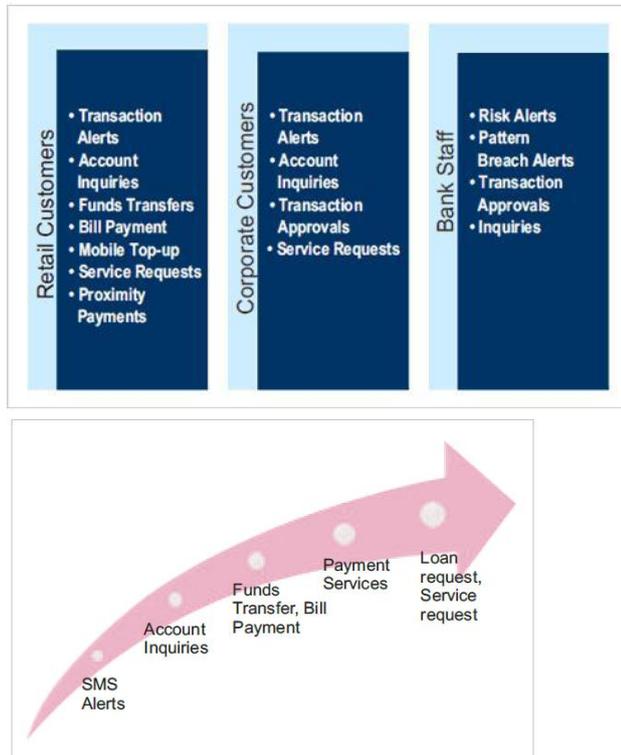
Mobile phones have clearly become ubiquitous and a standard aspect of daily life for many of us. Ongoing innovations in mobile financial services show tremendous potential to change the way clients conduct financial transactions by offering clients new services at a minimum cost. Yet, many people, especially senior citizens, remain skeptical of the benefit of mobile financial services and the level of security provided along with such services.

The Client's Perspective

Mobile financial services are characterized by some unique features that equip it with certain advantages against conventional forms of financial service (Tiwari R, et al 2006):

- **Localization**: Built in positioning technologies are available to offer location based services. Examples include options to search a branch location of a specific financial institution.
- **Ubiquity**: Account holders have options to avail the services to carry out transactions regardless of his/her current geographical location.
- **Immediacy**: Services that are time-critical and demand a fast reaction is now a reality. Stock market information is now available real-time while

customers on move and allow customers to order a broker for real time transaction.

- **Pro-active functionality**: Financial service recipients have the options to choose to receive information on pull and/or push basis, thereby deciding the content and frequency of messages.
- **Instant connectivity**: 'Always online' – that's the magic world for mobile financial services. Mobile devices are constantly online, i.e. in touch with the network ("always-on" feature).
- **Simple authentication procedure**: The SIM - Subscriber Identity Module chip of mobile devices is registered with respective mobile network operator and the owner is, in combination with a national identification card is unambiguously identifiable in Bangladesh.

The features mentioned above make mobile financial services particularly suitable for time-critical situations. Mobile financial services are useful for catering to impulsive decisions, which do not require a very careful thinking. MFS has the power to increase efficiency by contributing to better utilization of time spent while on the move.

The Financial Institute's Perspective
Mobile financial services mainly attract the financial institute for following (Tiwari R, et al 2006):

- **MFS as technology- savvy**: Financial institutes are today confronted with technology-savvy clients who are often on the move. They want to be able to organize financial transactions while on the move irrespective of opening hours. FIs are responding to this change by introducing mobile initiatives (Tiwari R, et al 2006).
- **MFS as distribution channel**: Mobile financial services enhance the number of existing distribution channels and contribute to the business by increasing volume.
- **MFS as a source of revenue**: Mobile financial services can also serve as a source of revenue. Innovative, mobility-centric services can be offered on a premium basis. This would not only help generate additional revenues from existing customer-base but may even attract new clients. SMS alert service is a classic example.
- **MFS as an image-enhancing product**: Mobile financial services can be used as an image enhancing product to gain strategic advantages. The FI may hope to win or retain a positive image and strengthen the brand-reputation of being innovative and visionary. Further, financial institutes can profit from an early-mover advantage by actively shaping technological standards based on one's own strengths.

Mobile Financial Services Infrastructure

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Mobile financial service is seen to be an extension of existing payment infrastructure of a financial institute to mobile phones as a channel for the leveraging of the mobile network and its reach, to deliver banking services to clients. MFS infrastructure thus sits in a similar technical environment to the banks ATMs, POS, branch and internet banking service offerings (Krugel G, 2007).

The core banking system, the system that houses the clients' account and related transaction management and history, would require a mean to translate banking instructions, received from clients, through one of the bank channels such as ATMs or the internet, into a format that the core banking system can process. This translation is normally performed by an Electronic Fund Transfer channel switch. The EFT channel switch would switch transactions from the channel to the appropriate area within the core banking system.
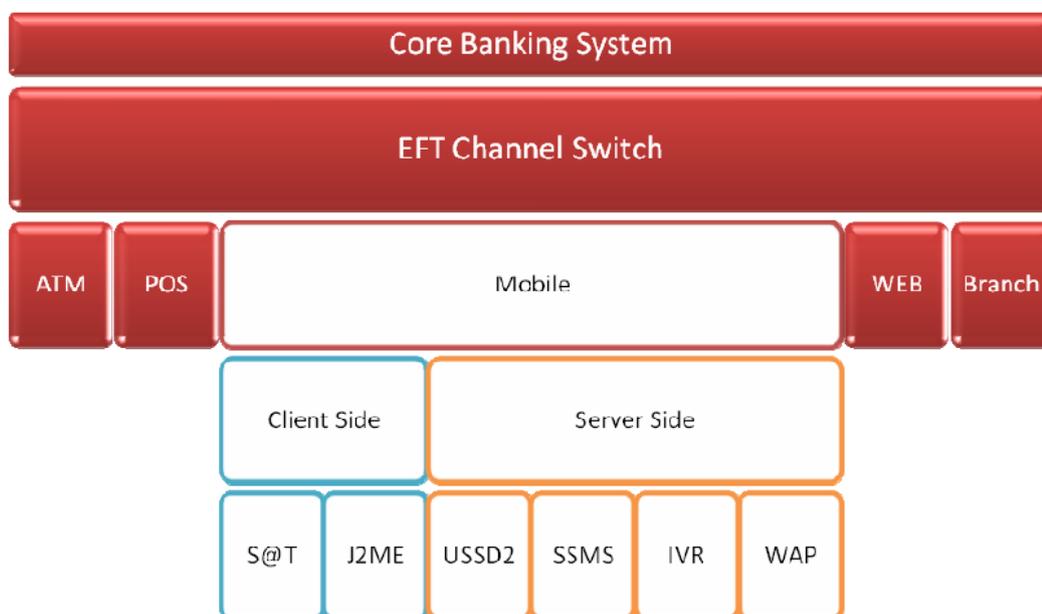
MFS in the overall Financial Service Architecture

MFS channel can be delivered to clients through two application environments. Client-side applications are applications that reside on the clients SIM card or on their actual mobile phone device. Client-side technologies include J2ME. Server-side applications are developed on a server away from the client mobile phone or SIM card. Server-side technologies include USSD2, IVR, SSMS and WAP. The FI would only need

to select one of these bearer channels, or bearer channel strategies, for implementation (Krugel G., 2007). However, in Bangladesh, it would be wise to implement more than one bearer channel in order to manage consumer take up and the risk associated with non-take up of a specific technology. The selected bearer channel does not have an affect on where mobile financial services platform should sit.

Mobile Financial Services Technology
The front-end or consumer-facing component is the end-to-end MFS value chain and it is typically supplied or customized by either a MFS vendor or specialized technology unit within a FI. These MFS Technologies can be categorised into two environments (Asmelash H, 2014):

Server-Oriented Technologies: Server-side technologies are those applications built on a server, away from the consumer's SIM or Mobile handset. Examples of server-side technologies would be SMS, IVR, USSD2 and WAP.

Client-Oriented Technologies: Client-side technologies are those applications, solutions and service offerings built or embedded on a consumer SIM or mobile handset. Examples of client-side applications are S@T and J2ME.

All technologies have differing characteristics and processes. Customers need to register or activate the mobile applications or services with their respective financial institutions. Registration process serves as a first step towards identification of the client to ensure ongoing trust in, and security of, the transaction. There are numerous methods of registering or activating clients in existence, all of which require the endorsement of the FI offering the service.

In server-side applications, client data that enables the processing of transactions, such as account/card details, are typically stored in a secured environment, on a server at a bank or at their allocated service provider/vendor (GSMA Intelligence, 2013).

In client-side applications, the client data is typically stored on the application, or entered by the client, and encrypted by the application in the SIM or handset. Each of the server-side and client-side applications are briefly described below (GSMA Intelligence, 2013):

SMS Banking Solutions

Short Messaging Service (SMS) allows users to send and receive text messages on a mobile phone using the numbered keypad on the handset to input characters. Each message can be up to 160 characters long and sent to and from users of different operator networks. All mobile phones available today support SMS. Indeed, SMS has become a global phenomenon, with billions of text messages sent worldwide every week.

SMS Banking requires a registered client to initiate a transaction by sending a structured SMS (SSMS) message to the Mobile Banking Service. This SSMS requires a tag word identifier to instruct the SMS gateway to submit the message to the correct SMS application. A tag word is the first word in the SSMS. The balance of the SSMS would hold the instruction from the client to the MFS application. E.g.: 'bank_balance_PIN' for a sms based bank balance enquiry

Interactive Voice Response (IVR)

Interactive Voice Response (IVR) is a phone technology that allows a person, typically a telephone caller, to select options from a voice menu and interact with the phone system. A pre-recorded voice prompt is played and the caller presses a number on a telephone keypad to select an option, i.e. "press 1 for yes, press 2 for no". Speech recognition can also interpret the caller's simple spoken answer such as "yes", "no", or more complex words, sentences and business names, or a number as a valid response to the voice prompt. IVR has been used prior to the existence of mobile phones in the form of telephone banking and is still in use today.

Unstructured Supplementary Service Data (USSD)

In its simplest definition, USSD is a menu driven form of SMS where a client would receive a text menu on their mobile as opposed to a string of words. Like SMS, it transports small messages of up to 160 characters between the mobile handset and the network. Unlike SMS, USSD is session based and can provide an interactive dialog between user and a certain set of applications. USSD1 only allows one way communication to the network, USSD2 allows two way communications between user and network.

Wireless Application Protocol (WAP)

WAP is best described as the internet on a mobile phone. WAP offers a consumer a similar experience to that of internet banking. The actual banking application resides at the bank and is secured and monitored in the same way as an internet banking website. A handset would need to be capable (functionality developed/loaded by the handset manufacturer), and have the right configuration (provided by the Mobile Network Operator), in order to support WAP Banking.

JAVA/J2ME

J2ME (Java 2 Micro Edition) is a feature that allows the device to run small, user-installable software applications written especially for mobile devices. Once installed on the mobile, the application sends the data or instruction from the device to the service provider in an encrypted format. The data is typically encrypted prior to leaving the handset and being sent to the service provider or FI. Once received, the service provider or FI would decrypt the message and process the client's instruction.

SIM Based Applications

The SIM Application Toolkit allows financial service provider or FI to house the client's mobile financial services menu within the SIM card. The SIM Application Toolkit (commonly referred to as STK) enables the SIM to initiate actions which can be used for various value added services. Once the application is on the SIM, instructions from the client can be entered, encrypted, and transported by SMS to the service provider or bank. The challenge in SIM based applications is getting the application onto a SIM card that already exists in the market.

Financial Data Security in WAP, J2ME and S@T
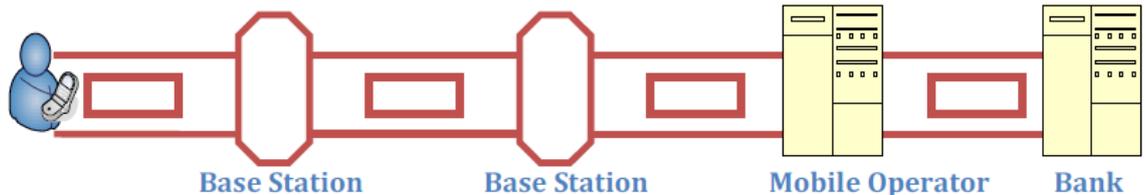
WAP allows for a GPRS session to be opened between the handset web browser and the web application at the bank. This session is protected by the encrypted GSM communication layer and then can be further protected by encryption of the actual banking website that is being accessed. This makes WAP transactions open to similar threats as internet banking, yet further secured in that the FI can establish that the session has been initiated by the client's SIM.

J2ME applications have additional security around the application that is resident on the handset. Thus the data entered into the J2ME application can be encrypted at that point and sent across the GPRS channel. It would only be decrypted at the FI or service provider end. J2ME is however open to certain attacks in that the client needs to establish that the application is being downloaded from the correct source and that the source is not that of a malicious attempt to copy the application in order to obtain sensitive data.

S@T is the most secure method of mobile banking. It allows the bank to load its own encryption keys onto the SIM card with the FI's own developed application. Thus the client's data can be stored on the SIM Card and the client can be authenticated on the handset prior to having to carry any data across the mobile network. The data is also encrypted prior to leaving the handset and only decrypted using the banks encryption keys within the bank.

The following additional steps could be used to mitigate the gaps in the mobile financial services security environment:

- Mobile Subscriber ISDN Number and PIN authentication is used in almost every implementation, creating a form of digital signature that says that the client is initiating the transaction from their SIM card and that they are entering their secret PIN to prove that they are the owner of that SIM card. This is a powerful tool that the mobile operator provides for client authentication.
- The PIN should be client selected PIN, and never stored on the mobile banking platform or application as a PIN but rather as a PIN Offset.
- Dual bearer channel in a single transaction is advised to prevent any possible spoofing or public internet gateway initiated transactions. This would mean that the consumer initiated transaction is on one bearer and the banks response on another. E.g. SMS initiated banking with USSD response. This would mean that the response would go back to the registered mobile phone as apposed to the phone/gateway that initiated the transaction.
- Fraud, behaviour, and spend pattern monitoring of all transactions, ideally real time, as well as spend limits should be in place to cap the FI's exposure.
- Adequate identification of the client at registration.

Regulation of Mobile Financial Services in Bangladesh
Following several years of deliberations and ad hoc permissions on mobile financial services, the Department of Currency Management and Payment Systems of Bangladesh Bank issued "Guidelines on Mobile Financial Services (MFS)" on 22 September 2011 which were subsequently amended on 20 December 2011. These guidelines state that only a bank-led model will be permitted. For Bangladesh Bank this means that a customer's account, termed "Mobile Account", will rest with the bank and will be accessible through the customer's mobile device. This mobile account will be a non-chequing account classified separately from a standard banking account.

Bangladesh Bank has established limits on person to person (P2P) transactions of taka 10,000 per day and 25,000 per month. These amounts are subject to change from time to time at the discretion of Bangladesh Bank. It restricts P2P payments between holders of registered mobile accounts thereby restricting the use of services in which the recipient cashes out a payment without opening a mobile account.

Till June 2012, seventeen banks have been granted permission to introduce MFS by Bangladesh Bank. Ten banks have launched MFS and of these five are licensed to offer a range of service beyond inward foreign remittances. NBFIs can easily introduce mobile financial services in the form of Marketing, SMS alert, DPS collections, monthly installments repayments etc.

Conclusion
The evolution of mobile technology has the potential to empower clients and expand access to financial services for previously underserved populations. The prevalence of mobile phone access among minorities, low-income individuals, and younger generations creates the possibility of using mobile technology to expand financial inclusion to previously underserved populations.

Mobile financial services are poised for significant growth in adoption in the near future, with usage likely increasing to one in three mobile phone users by 2015. From April 2013 to November 2013, the MFS client base doubled. A significant fraction of mobile phone users appears to be interested in using mobile to make mobile payments. Clients' perception that mobile transactions are un-secure is currently one of the primary impediments to adoption. If clients' perception of security issues changes - adoption rates will significantly increase. By providing mobile financial services that are convenient, affordable and reliable, financial institutes in Bangladesh have a horizon of 116 million to reach out!

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