World of Payment towards Mobile Payments

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Abstract – Mobile Payment which is developing subclass of a E-payment system proves its importance in our developing economies. M-payment technique which proves its betterness to avoid frauds and supports customer as well as Seller with cashless system. This paper present study about various methods of making mobile payments which is useful for knowing m-payment very well.

Index Terms - *Mobile banking payment system, E-money, E-cash, M –payment*

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I. INTRODUCTION

As mobile phones have become commonplace throughout the world there has been an increasing focus on their potential use for making payments. Adoption of mobile payments in our country prove its benefits very well .Mobile payments are a natural evolution e-payment schemes that will facilitate mobile commerce. A mobile payment or m-payment can be defined as any payment where a mobile device is used to initialise, authorize and confirm an exchange of financial value in return for goods or services.[1] Mobile devices may include mobile phones, PDAs, wireless tablets and any other device that connect to mobile telecommunication network and make it possible for payments to be made. Mobile payments techniques replaces the use of cash, cheques, debit cards and credit cards. It can also be used for payment of electricity bills, mobile recharge, and insurance premiums with access to account-based payment instruments such as electronic funds transfer, Internet banking payments.

Mobile Payment Characteristics
A mobile payment service has following characteristics: [3]
a)Simplicity and Usability: The m-payment application must be user friendly that it should be quickly adaptable by its users with little or no learning .The customer must also be able to personalize the application to suit his or her convenience.

b)Universality: M-payments service must provide for transactions between customer to customer (C2C), or from a business to a customer (B2C) or between businesses (B2B).

The coverage should include domestic, regional and global environment.

c)Interoperability: Development of the applications should be in phase with existing standards and allow the systems to be forward as well as backward compatible.

d)Security, Privacy and Trust: A customer must be able to trust a mobile payment application provider that his or her credit or debit card information may not be misused. As well as customers privacy details should not reveal, it should be foolproof, resistant to attacks from hackers and terrorists. This may be provided by using public key infrastructure security, biometrics and passwords protection for authentication.

e)Cost: The m-payments should not be costlier than existing payment systems.

f)Speed: The speed at which m-payments transactions are executed should be acceptable b both the parties customers and Sellers.

g)Globally Availability: To become widely accepted the m-payment application must be available globally, word-wide.

Mobile Payment Solutions
Mobile payment solutions can be available in three different models: [3]
1.1) Bank account based
1.2) Credit card based
1.3) Telecommunication company billing based

1.1 Bank Account based M-Payment

In this model as Banks and Telecommunication operators both have several million customers , they both collaborate to provide an m-payment solution as it is profitable for both industries. In this model, the bank account is linked to the mobile phone number of the customer. When the customer makes an m-payment transaction with a seller, customer account is debited with appropriate amount and the amount is credited to the seller's account.

1.2 Credit Card based M-Payment

In the credit card based m-payment model, the credit card number is linked to the mobile phone number of the customer. When the customer makes an m-payment transaction with a seller, the credit card is charged and the appropriate amount is credited to the seller's account.Although India as a developing economy has limited number of Credit cards so, depending upon these model limited number of M-payments supports.

1.3 Telecommunication Company Billing of M-Payments

Customers may make payment to seller's by using his or her mobile phone and this may be charged to the mobile phone bills of the customer. The customer then pay the bills to telecommunication company.This may be further classified into prepaid airtime (debit) and postpaid subscription (credit).

II.   TECHNOLOGIES FOR M-PAYMENTS

The mobile technology provides various ways for implementing m-payments which are described as below :

2.1 Short Message Service (SMS)

This is a text message service that enables short messages that can be transmitted from a mobile phone. Short messages are stored and forwarded by SMS centers. SMS can be used to provide information about the status of one's account with the bank or can be used to transmit payment instructions from the phone.

2.2   Unstructured Supplementary Services Delivery (USSD)

[*99# - National Unified USSD Platform (NUUP)] Unstructured Supplementary Service Data (USSD) is a technology unique to GSM. USSD provides session-based communication. USSD is session oriented transaction-oriented technology while SMS is a store-and-forward technology. To use this technology you have to link your mobile phone number with your bank account, You will get your Mobile Money Identifier (MMID) and Mobile PIN (MPIN) upon registration, Remember your MMID and

MPIN, Dial *99# from your phone and select appropriate options depending upon requirements and proceed with the transaction. Turnaround response times for interactive applications are shorter for USSD than SMS.

2.3   WAP/GPRS

General Packet Radio Service (GPRS) is a mobile data service available to GSM users. GPRS provides packet-switched data for GSM networks. GPRS enables services are provided to its users. It will connect 34 world's largest Mobile Network Operators (MNOs) & all Credit and Debit card applications hosted on the Universal Integrated Circuit Chip to targets 1.5 billion customers worldwide.

2.4 Phone-based Application (J2ME/BREW)

The client m-payment application can reside on the mobile phone of the customer. This application can be developed in Java for GSM mobile phones and in Binary Runtime Environment for Wireless for CDMA mobile phones. The user has the option of accessing a menu selection program, in order to register his account and later carrying out an inquiry and transfer of money. The Java based application solution is much easier to use because it is menu driven & provides user with the effective GUI's. Java application is more secure than the USSD based solution.

2.5 SIM-based Application

The subscriber identity module (SIM) used in GSM mobile phones is a smart card with its own processing power and memory. The information in the SIM can be protected for security purpose using some cryptographic algorithms. This makes SIM applications relatively more secure than client applications that reside on the mobile phone, because it helps customer whenever the customer acquires a new handset, only the SIM card needs to be moved.[4] If the application is placed on the phone, a new handset has to be personalized again, which is tedious work for customer which results in waste of time.

2.6 Near Field Communication (NFC)

NFC is the fusion of contactless smartcard (RFID) and a mobile phone.[4] The mobile phone can be used as a contactless card. NFC enabled phones can act as RFID tags or readers. This creates opportunity to make innovative applicatios.

2.7 Dual Chip

Usually the m-payment application is integrated into the SIM card. Normally, SIM cards are purchased in bulk by telecom companies and then customized for use before sale. [3] If the m-payment application service provider has to write an m-payment application in the SIM card, this has to be done in collaboration with the telecommunications

operator. To avoid this, dual chip phones have two slots one for a SIM card and another for a payment chip card.

2.8 Mobile Wallet

A m-payment application software that resides on the mobile phone with details of the customer which allows the customer to make payments using the mobile phone is called as a mobile wallet. Customers can multi-home with several debit or credit payment instruments in a single wallet. Several implementations of wallets that are company-specific are in use globally. Used in purchasing items on-line with a computer or a smartphone at a store. An individual's account is required to be linked to the digital wallet to load money in it. Most banks have their e-wallets and some private companies.

1.   Consumer Wallet Limits: Rs.20, 000/month for all. Rs.1 lakh/month with KYC

[DOWNLOA DS THE APP ON SMARTPHONE →

SIGN UP USING MOBILE → LOAD MONEY USING

DEBIT CARD/CREDIT CARD OF NETBANKING →

START USING WALLET TO MAKE PAYMENTS]

2.   Seller's Wallet Limits: Rs.50, 000/month with Self Declaration. Rs.1 lakh/month with KYC

[SHOPKEEPER /SERVICE PROVIDER DOWNLOAD

S THE APP → SIGN UP USING MOBILE→ SELF

DECLARE ITSELF AS A MERCHANT→ START

ACCEPTING PAYMENT]

Basic Requirements to Start Using a Wallet: Bank Account, Smartphone, 2G/3G Connection & a Free Wallet App

III.   NETWORK REQUIREMENTS:

To increase profit in business Telecomm service providers as well as Financial institutions depends on computer networks to connect offices, partners, suppliers and most importantly customer. As the volume of financial transaction increases, the payment infrastructure must increase with it appropriately. Servers must be powerful enough to support the rapidly expanding customer base.The new payment methods should help to decrease transaction time, automate transaction. Communication channels with higher bandwidth need to be established to support the high volume of traffic. To support the real time requirements of most financial transactions, networks supporting high transmission speeds are also needed. The network should be Reliable enough to avoid point of failure.Redundancy is required to avoid failures, redundancy is achieved by having multiple routes for network traffic from the source to the destination, multiple telecommunications circuits and / or alternative communications technologies. In mobile payment, wire less networks begins to implement personal mobility ,service providrs mobility.Personal mobility is the ability of the user to access their required services independent of their attachment point to the terminal . Service provider portability allows the user and/or the terminal to move beyond regional mobile network.[2] The user wil be able to receive his personalized end-to-end services regardless of the current network, within the limits of the visited network's service offerings. This freedom then requires the coordination of a wide range of service providers, compatibility of backbone networks, and network operator's agreements.

IV.   DATABASE REQUIREMENTS

Mobile Payment Systems process large amounts of data every day. To manage this data, techniques must be developed that can store and retrieve the data quickly and efficiently. As the volume increases, the technological infrastructure must be able to scale up appropriately. Powerful database engines are used to support these functionalities. Storage and retrieval performance of data depends not only how the data is logically organized in the database by using relational database but also on the hardware platform on which that system is developed & which is used to store that data. Relational database design is a technique which enables user to organize data in a user friendly manner. The results of relational database design are relations or tables, which can be efficiently stored and retrieved data. Thus, using relational databases is a good choice for providing storage and retrieval support for Mobile payment systems. Designing the database as well as providing controlled access to that database as many users may accessing the same database at a time.

V.   SECURITY REQUIREMENTS

Upon subscribing to an mobile payment system, users are expected to place inherent trust in the system.All steps should be secured/trusted from a technological as well as social perspective. Furthermore, mobile payment should minimize fraud losses and provide user-controlled transaction-specific privacy support.[5] The technologies

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such as mPKI, biometrics, and mobile digital signatures will have to be further advanced in order to be easily integrated into mobile payment architectures.

5.4.1. Need to Ensure Integrity for Payer, Payee and Payment System

This is the very important aspect in designing M-payment system. There is need to ensure that nothing happens without authorization, and nothing happens without generating sufficient pieces of evidence.Ensuring proper authorization is important as it provides provision for signatures, may be given legal status, at the right place for the authorization.

5.4.2. Privacy for Payer and Payee

Users of mobile payment systems need the assurance that their financial information remains confidential throughout the transaction, that only such information that the user considers needed to be disclosed, is actually disclosed. Further, the user needs the confidence that the revealed information, which is considered as confidential but has been disclosed due to the need , is not used by any legal or real receipt entity.

5.4.3. Fair Exchange

In the electronic and mobile world, a party does not always have a physically identifiable place of doing business.[6] After behaving unfairly in the electronic transaction, a party can simply vanish without a trace. In such cases, it may be next to impossible to enforce the penalties of the contract leading to losses for the other party. For example, let a customer buy a product from a seller. The customer pays for the product in some manner. However, once the seller receives the payment the merchant never delivers the product. This causes financial loss for the customer. Thus, any electronic payment scheme must ensure that at the end of the protocol execution, each transacting party receives the other's product or none does.

VI.   CONCLUSION:

With the rapid development of the Internet, information technology and electronics industry Mobile commerce system is developing rapidly. In this paper we have discussed feasibility of mobile commerce and we analyse it for beginning towards next generation of payment system.

In developing economies, the focus has been on encouraging financial inclusion through mobile payments and ensuring appropriate regulation of the new products. In advanced economies, where financial institutions and established payment networks are likely to continue to play a role .The Bank expects to see mobile payments become a tool to

support competition, both between payment systems and between participants in those systems.

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