Original Article
ISSN (Online): 2582-7472

ShodhKosh: Journal of Visual and Performing Arts
March 2024 5(3), 424–429

THE EMERGING TECHNOLOGIES OF DIGITAL PAYMENTS AND ASSOCIATED SERVICES

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DOI

10.29121/shodhkosh.v5.i3.2024.2032

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

The interaction between finance and technology, facilitated by the internet, has sparked the rise of digital payment technologies. These technological advancements in the payment industry serve as the basis for achieving financial inclusion. However, despite the continuous progress and potential of transitioning towards digital payments and connecting the population to the pervasive digital landscape, there are critical issues that must be addressed in order to establish a more harmonious, inclusive, and sustainable cashless society. This study aims to provide a comprehensive literature review on the emerging digital payment technologies and the challenges they entail. Through a systematic review of existing empirical studies, this research proposes a state-of-the-art classification of digital payment technologies, encompassing four categories: card payment, e-payment, mobile payment, and cryptocurrencies. Furthermore, the paper identifies key challenges in digital payment technologies, which can be broadly categorized into social, economic, technical, awareness, and legal themes. The classification and categorization of payment technologies, along with the associated challenges, can serve as a valuable resource for both researchers and practitioners in understanding, clarifying, and developing a cohesive digital payment strategy.

Keywords: Digital Payment Technology, Banking Cards, USSD, UPI, Mobile Wallet, AEPs, Banking Prepaid Cards, Point of Sale, Internet Banking, Mobile banking, Micro ATMs

1. INTRODUCTION

The financial landscape is undergoing a significant shift as cash-based transactions are being replaced by electronic-based transactions. This transformation is largely driven by the widespread connectivity of ICT, which has greatly impacted the financial business market and its operations. The global economy has experienced substantial changes due to the increasing trend of digitalization and internet usage. As a result, a wide range of financial technology (FinTech) applications have emerged, allowing consumers to move away from traditional cash-based payment systems. Digital payments have become increasingly prevalent in people's everyday lives. These advancements in the financial sector have led to the development of numerous digital payment technologies, enabling individuals to use digital apps for sending and receiving money. Consequently, the payment system is rapidly transitioning from physical forms of currency, such as coins and paper money, to digital payment methods that offer convenience, speed, and cost-effectiveness.

Despite the existence of numerous studies on digital payments that address various aspects such as business models, technological infrastructure, and technology adoption, there is a noticeable gap in research that offers a comprehensive

synthesis and universal classification of digital payment technologies and the challenges they entail. Previous studies have mentioned certain forms of payment technologies, but they tend to focus on a single mode of payment. For example, one study classified block chain technology-based crypto currencies, while another focused on mobile payments. Moreover, the challenges associated with these technologies were primarily discussed within the context of adoption studies. This study aims to bridge these gaps by providing an overall understanding and up-to-date overview of the scattered knowledge on emerging digital payment technologies and their associated challenges. It seeks to answer overarching research questions: (1) What are the emerging digital payment technologies?

2. BANKING CARDS

Banking cards provide consumers with enhanced security, convenience, and control compared to alternative payment methods. In addition to their versatility, with options such as credit, debit, and prepaid cards, they also offer significant flexibility. These cards incorporate two-factor authentication, ensuring secure payments through the use of a secure PIN and OTP. Examples of card payment systems include RuPay, Visa, and MasterCard. Payment cards empower individuals to make purchases in physical stores, online, via mail-order catalogs, and over the phone. By saving time and money for both customers and merchants, these cards facilitate seamless transactions.

How to obtain it: Submit your KYC (Know Your Customer) information to open a new account. Apply for a card with the option of either a debit or credit card. Obtain a PIN.

Activation of Service: Visit an ATM to activate your PIN. Activation may take approximately 3-7 days.

Requirements for Transactions: Use a PoS terminal or an online payment gateway. Present the card physically or provide card details for online transactions. Provide the PIN. Provide the OTP (One Time Password) received on your registered mobile to complete online transactions on merchant websites. Transactions can be done in self-service and/or assisted mode.

Transaction Costs: There are no charges for merchant transactions for the customer. Annual fees and limits on ATM transactions are at the discretion of the banks. Merchants are charged a fee ranging from 0.50% to 2.25%.Cash-out transactions on credit cards are charged to the customer at a rate of 1% to 3.5% of the transaction value.

Services Provided: Our range of services includes the utilization of these cards at various points of sale such as PoS machines, ATMs, micro ATMs, shops, wallets, online transactions, and e-commerce websites. Additionally, our international cards offer the convenience of being used worldwide, allowing for transactions in multiple currencies.

3. UNSTRUCTURED SUPPLEMENTARY SERVICE DATA

The innovative payment service *99# operates on the Unstructured Supplementary Service Data (USSD) channel. This service enables mobile banking transactions using basic feature mobile phones, eliminating the need for mobile internet data. Its purpose is to promote financial inclusion and provide banking services to the under banked population.

The *99# service has been introduced to make banking services accessible to every individual in the country. Customers can access this service by dialing *99# on their mobile phones, which is a common number across all Telecom Service Providers (TSPs). They can then navigate through an interactive menu displayed on their mobile screens to perform various transactions. Some of the key services offered through *99# include interbank account transfers, balance inquiries, mini statements, and more. As of November 30, 2016, *99# service is available in 12 different languages, including Hindi and English, and is offered by 51 leading banks and all GSM service providers (Source: NPCI). This service is unique as it brings together banks and TSPs to provide a direct-to-consumer service that is interoperable.

How to obtain it: Provide KYC (Know Your Customer) information to open a new account. Link their mobile number with their bank account. Register for USSD/ Mobile Banking. Obtain a Mobile Money Identifier (MMID). Set a Mobile PIN (MPIN).

The activation process for the *99# service does not require any additional steps and can be done within 1-2 minutes.

What is required for Transaction: Remember their MMID, Remember their MPIN and dial *99# on their registered mobile number, which can be either a feature phone or a smartphone. Access the service in self-service mode.

Transaction Cost: No charges by the system. Customer charged Rs. 0.50

Services Provided: Check account balance, View mini statement, Transfer funds, MMID services, Account number services, Aadhaar services, Know MMID, Change M-PIN, Generate OTP

4. AADHAAR ENABLED PAYMENT SYSTEM

AEPS is a banking model that enables online interoperable financial transactions at the Point of Sale (PoS) or Micro ATM. This can be done through the Business Correspondent (BC) or Bank Mitra of any bank, using Aadhaar authentication.
To avail this service, you need to follow these steps: Provide your KYC (Know Your Customer) information to open a new account. Ensure that your Aadhaar number is linked with your bank account.
Service Activation: There is no specific activation process required. The service will be activated within 1-2 minutes after linking your Aadhaar number.
Requirements for Transaction: You will need a MicroATM. Remember to carry your Aadhaar card. Provide the name of your bank. Present yourself (as the Aadhaar holder) with your biometrics (finger and/or iris). The transaction can be done in assisted mode if needed.
Transaction Cost: There is no cost to the customer for using this service. The merchant or BC may incur charges or receive payments based on the bank's discretion.
Services Provided:Account Balance Inquiry, Withdrawal of Cash, Deposit of Cash, Transfer of Funds between Aadhaar accounts, Payment Transactions (Consumer to Business, Consumer to Government Transactions).

5. UNIFIED PAYMENTS INTERFACE

Unified Payments Interface (UPI) is a revolutionary system that consolidates multiple bank accounts into a single mobile application, allowing users to access various banking features, seamless fund routing, and merchant payments all in one place. Additionally, UPI facilitates "Peer to Peer" collect requests, which can be scheduled and paid according to individual requirements and convenience. Each participating bank offers its own UPI App for Android, Windows, and iOS mobile platforms.
To avail of this convenient service, you will need the following: A bank account, A mobile number linked to your bank account, A smartphone with internet connectivity A debit card for resetting your MPIN (Mobile Personal Identification Number) To activate the UPI service, follow these steps: Download the UPI App from your bank, Complete the registration process online by providing your account details, Create a virtual ID, Set your MPIN, This entire process should take approximately 5-7 minutes.
For conducting transactions using UPI, you will require: A smartphone with internet connectivity. Only the registered device can be used. Use your registered MPIN for authentication. Transactions can be conducted in self-service mode.
Services Provided: Account Balance Inquiry, Transaction Records, Send / Transfer Funds, Virtual Address, Account Number & IFSC Code, Mobile Number and MMID, Aadhaar (to be activated), Receive Payments, Virtual Address, Link Bank Account, Modify / Set MPIN, Alerts and Account Management.

6. MOBILE WALLETS

A mobile wallet is a digital alternative to carrying physical cash. It allows you to link your credit or debit card information to a mobile wallet application on your mobile device, or transfer money online to the mobile wallet. Instead of using your physical card to make purchases, you can use your smartphone, tablet, or smartwatch to pay. To load money into the digital wallet, you need to link your individual account to it. Many banks offer their own e-wallets, as well as some private companies such as Paytm, Freecharge, Mobikwik, and others.
To get a mobile wallet, you have the option to open a Zero KYC or Full KYC wallet. You can choose between a consumer wallet or a merchant wallet. You will need a mobile number and download an app on your smartphone.
To activate the service, you can load money into the wallet using internet banking or merchant locations. You can use your bank account, all cards, or cash-in to add funds.
For a transaction, you will need a smartphone or internet access. You will use an MPIN for security. The transaction can be done in self-service mode or with assistance.
There may be transaction costs involved. Customers may need to pay a fee of 0.5% to 2.5% for remittances to a bank account. In self-service mode, there may be data charges that the customer may need to pay.
Administrations Advertised: Passbook/Transaction history Balance inquiry Add money to bank account All cards Cash-in Accept money Pay money in another wallet (mobile number) with same supplier, Pay trader, Scanner tag peruser, Oversee Profile and Notices.

7. POINT OF SALE

A point of sale (PoS) refers to the location where sales transactions take place. At a larger scale, a PoS can encompass a mall, a market, or even an entire city. On a smaller scale, retailers view a PoS as the specific area where customers finalize their purchases, typically at a checkout counter. This area is also commonly referred to as a point of purchase.
Necessary requirements for service initiation: Handheld Device with card and/or biometric reader, Merchant Bank account and Internet connectivity via GPRS or Landline Steps for service activation: Complete necessary paperwork with the Bank for the merchant bank account, Deposit a certain amount, Collect the handheld device and Configure and provide training to the operator Requirements for a transaction: Any card, Resident for biometric authentication (AEPS) and Assisted mode Funds Transfer Limit: Regulator has no set limit Merchant's Bank and payee Bank have the discretion to set their own limit Service Available from multiple operators: As per RBI data from August 2016, there are 14.62 lakh operators Interoperable.

8. INTERNET BANKING

Internet banking, commonly referred to as online banking, e-banking, or virtual banking, is a digital payment platform that empowers customers of a bank or any other financial institution to carry out various financial transactions via the institution's website. Different types of online financial transactions are:

National Electronic Fund Transfer (NEFT)

National Electronic Fund Transfer (NEFT) is a cross country installment framework working with balanced reserves move. Individuals, businesses, and corporations can use this scheme to send money electronically from any bank branch to anyone with an account at another participating bank branch in the country. People, firms or corporates keeping up with accounts with a bank office can move finances utilizing NEFT. Walk-in customers, who do not have a bank account, can also make cash deposits at NEFT-enabled branches with instructions for NEFT transfers. Be that as it may, such money settlements will be confined to a limit of Rs.50,000/ - per exchange. NEFT, consequently, works with originators or remitters to start finances move exchanges even without having a financial balance. By and by, NEFT works in hourly clumps - there are twelve settlements from 8 am to 7 pm on week days (Monday through Friday) and six settlements from 8 am to 1 pm on Saturdays.

REAL TIME GROSS SETTLEMENT (RTGS)

RTGS refers to the continuous settlement of funds transfers on an individual basis, without netting. In this context, 'Real Time' means that instructions are processed immediately upon receipt, rather than at a later time. Additionally, 'Gross Settlement' signifies that funds transfer instructions are settled individually, on an instruction-by-instruction basis. It is important to note that the settlement of these funds transfers occurs within the books of the Reserve Bank of India, making the payments final and irrevocable. The RTGS system primarily caters to large value transactions, with a minimum remittance amount of 2 lakh. There is no upper limit for RTGS transactions. Banks have access to the RTGS service for customer transactions from 9:00 hours to 16:30 hours on weekdays, and from 9:00 hours to 14:00 hours on Saturdays for settlement at the RBI end. However, it is worth mentioning that the timings followed by banks may vary depending on the customer timings of their respective branches.

ELECTRONIC CLEARING SYSTEM (ECS)

ECS is an alternative method for effecting payment transactions in respect of the utility-bill-payments such as telephone bills, electricity bills, insurance premia, card payments and loan repayments, etc., which would obviate the need for issuing and handling paper instruments and thereby facilitate improved customer service by banks / companies / corporations / government departments, etc., collecting / receiving the payments.

9. IMMEDIATE PAYMENT SERVICE (IMPS)

IMPS provides a swift and round-the-clock interbank electronic fund transfer service via mobile phones. It serves as a powerful means to instantly transfer money between banks across India through mobile, internet, and ATM. This service is not only secure but also cost-effective from both financial and non-financial standpoints.

1. MOBILE BANKING

Mobile banking is a convenient service offered by banks and financial institutions, enabling customers to perform various financial transactions using their mobile devices, such as smartphones or tablets. This service is facilitated through dedicated software, commonly referred to as an app, which is provided by the respective banks or financial institutions. Each bank offers its own mobile banking app, catering to the Android, Windows, and iOS platforms.

2. MICRO ATMS

The micro ATM is designed as a tool utilized by a million Business Correspondents (BC) to provide essential banking services. This platform empowers Business Correspondents, who may be local kirana shop owners acting as 'micro ATMs', to carry out immediate transactions.

Operating through cost-effective devices known as micro ATMs, this platform will establish a connection between these devices and banks nationwide. This will allow individuals to conveniently deposit or withdraw funds, regardless of their bank affiliation. These devices will rely on mobile phone connectivity and will be accessible at every BC location. Customers will only need to verify their identity in order to perform transactions such as withdrawals or deposits into their bank accounts. The funds will be sourced from the BC's cash drawer. Essentially, BCs will serve as the customers' banks, with the sole requirement of verifying the customer's authenticity using their UID. The micro ATM will support basic transaction types including deposits, withdrawals, fund transfers, and balance inquiries.

3. BANKS PRE-PAID CARDS

A prepaid card operates independently from a bank or credit union account. Instead, you must deposit funds into the card account, commonly referred to as loading money onto the card, before you can utilize it for purchases. On the other hand, a debit card enables you to spend the money available in your bank or credit union account.

Typically, both prepaid cards and debit cards restrict your spending to the amount loaded on the card or the funds in your account. If you attempt to exceed this limit, the transaction will be declined. However, certain bank and credit union accounts, as well as some prepaid cards, offer the option to make overdrafts. Overdrafts allow you to spend more than what is available, but you are then required to replenish the funds. Additionally, an overdraft fee is charged for each transaction that results in an overdraft of your account.

10. CONCLUSION

The progress of digital payments in India has been extraordinary, propelled by the government's efforts to promote a cashless economy and the widespread adoption of UPI. The advent of digital payments has had a favorable influence on the economy, fostering financial inclusion, diminishing reliance on cash, and propelling the growth of the fintech sector. The challenge persists in rural and semi-urban areas to establish a more efficient banking infrastructure, despite the existence of digital payment solutions. This is evident as numerous banks lack branches or ATMs in remote rural regions, compelling individuals to undertake long journeys to towns or cities in order to access cash. But the cash recipients frequently face the inconvenience of traveling long distances to collect their payments, while also being exposed to the risk of theft. In contrast, digital payments in India offer a safe and secure alternative, as they necessitate multiple layers of authentication for any transaction.

CONFLICT OF INTERESTS

None

ACKNOWLEDGMENTS

None

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