

LEGAL FRAMEWORK OF DIGITAL PAYMENT SYSTEM IN INDIA: AN ANALYSIS

Dissertation submitted to National Law University and Judicial Academy, Assam in
partial fulfillment for award of the degree of

MASTER OF LAWS/ONE YEAR LL.M. DEGREE PROGRAMME

SUBMITTED BY-

Bhabya Rani

SF0222008

2022-23 and 2nd semester

SUPERVISED BY-

Dr. Monmi Gohain

Assistant Professor of Law



National Law University and Judicial Academy, Assam

(June, 2023)

SUPERVISOR CERTIFICATE

This is to certify that **BHABYA RANI** is pursuing Master of laws (LL.M.) from National Law University, Assam and has completed her dissertation “**LEGAL FRAMEWORK OF DIGITAL PAYMENT SYSTEM IN INDIA: AN ANALYSIS**” under my supervision.

Date:

Dr. Monmi Gohain

Assistant Professor of Law

National Law University and Judicial Academy, Assam

DECLARATION

I, BHABYA RANI, do hereby declare that the dissertation titled “LEGAL FRAMEWORK OF DIGITAL PAYMENT SYSTEM IN INDIA: AN ANALYSIS” submitted by me for the award of the degree of MASTER OF LAWS/ ONE YEAR LL.M. DEGREE PROGRAMME of National Law University and Judicial Academy, Assam is a bona fide work and has not been submitted, either in part or full anywhere else for any purpose, academic or otherwise.

Date: 28th June 2023

BHABYA RANI

UID: SF0222008

National Law University and Judicial Academy, Assam

TABLE OF CONTENT

ACKNOWLEDGEMENT.....	iv
TABLE OF CASES.....	v
TABLE OF STATUTES.....	vi
TABLE OF ABBREVIATIONS.....	viii
CHAPTER 1 – INTRODUCTION.....	1
1.1.Statement of Problem.....	8
1.2.Literature Review.....	8
1.3.Scope and Limitation.....	12
1.4.Hypothesis.....	12
1.5.Research Objective.....	12
1.6.Research Question.....	13
1.7.Research Methodology.....	13
1.8.Research Design.....	14
CHAPTER 2 – EVOLUTION OF DIGITAL PAYMENTS SYSTEM IN INDIA	16
2.1. QR Code Based Payments.....	22
2.2. Merchant Discount Rate.....	23
2.3.Structure of Payments.....	23
2.4. Transition: Cash to cashless payment system.....	25
CHAPTER 3- DIGITAL PAYMENT SYSTEM: CONCEPT.....	28
3.1. Modes of Digital Payments.....	28
3.2.Structure of Digital Payments System.....	33
3.3. Future Prospects of Digital Payments System in India.....	36
CHAPTER 4- UNIFIED PAYMENT INTERFACE FRAMEWORK ANALYSIS.....	42
4.1. Structure of Unified Payments Interface.....	42
4.2. The Unified Payments Interface Ecosystem.....	44
4.2.1. Payment Service players.....	44
4.2.2. Virtual Payment Address.....	45

4.2.3. NCPI Central Mapper.....	45
4.3.Fundamentals of Unified Payment Interface.....	46
4.3.1. Improvements brought by UPI in Digital Payment System.....	47
4.4.Transactions of Unified Payments Interface.....	48
4.4.1. Transacting Parties in UPI.....	48
4.4.2. Transaction Authorization.....	49
4.4.3. Transaction Flow of UPI Payments.....	49
 CHAPTER 5- REGULATION OF DIGITAL PAYMENT SYSTEM IN INDIA.....	 52
5.1. The Payments and Settlement System Act, 2007.....	52
5.1.1. Framework for outsourcing of payment and settlement related Activities by Payment System Operator.....	55
5.2. Reserve Bank of India Regulations Related to digital Payments Systems.....	55
5.2.1. Role of RBI Circular and Master Directions in Digital Payments System.....	55
5.2.2. Consumer Protection- Limited Liability of Customers in Unauthorized E-Banking Transaction.....	56
5.2.3. Master Direction on Digital Payment Security Controls.....	58
5.2.4. Regulation related to Digital Wallet.....	59
5.3.National Payments Corporations of India Regulations Related to Digital Payments System.....	62
5.3.1. Regulatory Framework of UPI in India.....	62
5.3.2. Upper Limit of UPI Transaction.....	63
5.3.3. Functional Responsibilities of Entities in UPI Ecosystem.....	64
5.4. Grievance Redressal Mechanism.....	66
5.4.1. Internal Grievance Redressal Body of banks.....	66
5.4.2. Banking Ombudsman.....	67
5.4.2.1. <i>Banking Ombudsman Scheme, 2006</i>	67
5.5.Cyber Security Laws and Regulations in India.....	70
5.5.1. RBI’S Notification on “Consumer Awareness- Cyber Threats and Frauds”.....	72
5.5.2. Regulatory Framework Relating to Cyber Security.....	73
5.5.2.1. <i>Unauthorized Access to Computer System or Networks</i>	73
5.5.2.2. <i>Denial of Services</i>	75
5.5.2.3. <i>Crime Relating to Data Alteration or Destruction</i>	75

5.5.2.4. <i>Identify Theft and Impersonation</i>	76
5.5.2.5. <i>Skimming</i>	77
CHAPTER 6- COMPARITIVE ANALYSIS OF RGULATIONS RELATED TO DIGITAL PAYMENT SYSTEM BETWEEN INDIA AND USA.....	78
6.1 Money and Payments in United States.....	78
6.1.1. Payment systems.....	79
6.1.2. Cross-border payment systems.....	81
6.1.3. Intermediaries.....	82
6.1.4. Instant Payment.....	83
6.2 Regulatory Framework in United States.....	85
6.2.1. Cyber Security.....	87
6.2.2. Data Privacy.....	88
6.2.3. Consumer Protection.....	89
6.3 Policy Issues in Regulatory System of United States.....	91
6.4 Comparative Analysis of Laws and Regulations.....	95
CHAPTER 7- CONCLUSION & SUGGESTION.....	98
BIBLIOGRAPGY.....	x

ACKNOWLEDGEMENT

This research involves a huge amount of work and dedication. Still implementation would not have been possible if I did not have the support of many individuals and the institute. Therefore, I would like to extend my sincere gratitude to all of them. At the very outset, I express my gratitude to our Honorable Vice-Chancellor of the University, Prof. Dr. V.K. Ahuja for his unconditional support and guidance in making the research. I also express my deep sense of gratitude to my esteemed and highly knowledgeable mentor and guide, Dr. Monmi Gohain, Assistant Professor of Law, NLUJA for her opinion, enthusiasm, guidance, and constant encouragement; without which the research work would not have been possible. I am thankful to my institute National Law University, Assam for their infrastructural support and for providing guidance to mould the research.

I would also like to thank the Librarian, Officials, System Administrator and staff of the NLUJA Library, for their help and co-operation in making the relevant materials required for the study. I would also like to appreciate my University friends for helping me in completing my dissertation work in time. I would like to thank all the authors, critics, writers, Corporate Law experts, Commissions etc. The articles and works produced by them have helped me immensely in writing this dissertation.

I would like to thank my family for playing a very important role in guiding and helping me in all my endeavors, including the writing of this dissertation. They have always given me the liberty and space, so that I can finish my tasks with utmost dedication. Last but not the least; I would like to thank the office bearers of the Post Graduate Department of NLU, Assam.

BHABYA RANI

UID-SF0222008

LL.M. One Year

(2022-23)

TABLE OF CASES

Case Laws
<i>Abhinav Gupta v. State of Haryana</i>
<i>Sandeep Varghese V. State of Kerala</i>

TABLE OF STATUTES

Name of Statutes
1860- Indian Penal Code
1949- The Banking Regulation Act
1970- Bank Secrecy Act
1978- Right to Financial Privacy Act
1978- Electronic Fund Transfer Act
1986- The Consumer Protection Act
1987- Expedited Funds Availability Act
1999- Financial Modernization Act
2000- The Information Technology Act
2007- Payment and Settlements System Act
2008- the Information Technology (Amendment) Act
2013- The Company Act

TABLE OF ABBREVIATION

Number	Abbreviations	Full Form
1.	&	And
2.	Anr.	Another
3.	Appl.	Application
4.	API	Application Programming Interface
5.	ATM	Automatic Tailor Machine
6.	AEPS	Aadhar Enabled Payment System
7.	APBS	Aadhar Payment Bridge System
8.	ARPANET	Advanced Research Projects Agency Network
9.	ASLC	Application Security Life Cycle
10.	BAP	BHIM Aadhar Pay
11.	BBPOU	Bhabrat Bill Payment Operating Units
12.	BBPS	Bharat Bill Payments System
13.	BCSBI	The Banking Code and Standard Boards of India
14.	Bom.	Bombay
15.	BHIM	Bharat Interface of Money
16.	BPSS	Board for Regulation and Supervision of Payment and Settlement System
17.	Cal	Calcutta
18.	CBS	Core Banking Solution
19.	CFPB	Bureau of Central Financial Protection
20.	CTS	Cheque Truncation System
21.	Co.	Company
22.	Corp.	Corporation
23.	Cr.L.J.	Criminal Law Judgment
24.	CVV	Card Verification Value
25.	Del	Delhi
26.	Dist.	District
27.	DPI	Digital Payments Index
28.	DPSS	Department of Payment and Settlement System
29.	EFT	Electronic Fund Transfer
30.	Ed.	Edition
31.	FDIC	Federal Deposit Insurance Corporation
32.	GDP	Gross Domestic Product
33.	HTTPS	Hypertext Transfer Protocol Secure
34.	IFSC	Indian Financial System Code

35.	i.e.	That is
36.	IBA	Indian Banks Association
37.	ICT	Information and Communication Technology
38.	Id.	Ibidem
39.	Inc.	Incorporation
40.	INFINET	Indian Financial NETWORK
41.	IPC	Indian Penal Code
42.	IMPS	Immediate Payment System
43.	IBA	Indian Banking Association
44.	IT	Information Technology
45.	ICT	Information and Communication Technology
46.	IVR	Interactive Voice Response
47.	LLC	Limited Liability Company
48.	Ltd.	Limited
49.	Mad	Madras
50.	MDR	Merchant Discount Rate
51.	MICR	Magnetic Ink Character Recognition
52.	MPIN	Mobile banking Personal Identification Number
53.	MPP	Mobile Payment Provider
54.	MNO	Multi National Organizations
55.	MMID	Mobile Money Identifier
56.	NACH	National Automated Clearing House
57.	NCCMC	National Common Mobility Card
58.	NEFT	National Electronics Funds Transfer System
59.	NETC	National Electronic Toll Collection
60.	NPCI	National Payments Corporation of India
61.	NFS	National Finance Switch
62.	NUUP	National USSD Platforms
63.	OCC	Office of the Comptroller of the Currency
64.	OTP	One Time Password
65.	PPI	Prepaid Payment Instruments
66.	PSO	Payment System Operators
67.	PSP	Payment Service Provider
68.	PMJDY	Pradhan Mantri Jan Dhan Yagna
69.	RTP	Real Time Payments
70.	RTGS	Real Time Gross Settlement System
71.	RBI	Reserve Bank of India
72.	SC	Supreme Court
73.	SFMS	Structured Financial Management

		System
74.	Supp.	Supplement
75.	SIM	Subscriber Identification Module
76.	SMS	Short Message Service
77.	SWIFT	Society of Worldwide Interbank Financial Telecommunications
78.	TPAP	Third Party Appliance Provider
79.	TSP	Telecommunication Service Providers
80.	UPI	Unified Payment Interface
81.	U.S	United States of America
82.	V.	Versus
83.	VPA	Virtual Payment Interface
84.	WAP	Wireless Application Protocol
85.	XML	Extensible Markup Language

CHAPTER 1- INTRODUCTION

A digital revolution is being witnessed by the world wherein internet has become a part and parcel of almost each and everyone's life. This revolution is aided by the change in technology and lifestyle. The basic facilities are provided to every individual in a click and this included banking and banking related services in other words digital banking. In the era of cheap internet services in country, these facilities are not only limited to urban areas as rural population is also enjoying these facilities. There are 692 million active users of internet in India, including 351 million in urban India and 341 million from rural India. When it comes to Smartphone, there are 750 million Smartphone users in India.¹

Prior to 2016, electronic system of money transfers between banks like- RTGS, IMPS and NEFT etc were used in India. But, these systems included complex procedure, rules and physical presence in banks. A variety of studies have been carried out in regard to the future development of payment systems, or some aspects of them. Some are centered on payments systems in general, and whether steps should be taken in the direction of a 'cashless society,' or a 'chequeless society,' the use of 'electronic money,' or something similar, while others emphasize collateral topics, such as clearing systems, extensions in the use of data processing and electronic communications, credit and payment cards, pre-authorization mandates, on-line branch banking, automated bank tellers, and cash dispensers, to name a few. One of the major objectives of digital India is to achieve "Faceless, Paperless, Cashless" status. The digital payments are highly promoted by government of India so that each segment of society can become part of digital payment system. This vision of providing services because it is a convenient, easy, affordable, quick and secured system.

The primary legislation governing the payment system in India is Payment and Settlements System Act, 2007(PSS Act) which regulates the RBI. Section 2 (1) of the PSS Act defines "A payment system to mean a system that enables payment to be effected between a payer and a beneficiary, involving clearing, payment or settlement services or all of them but, does not include stock exchange(as per section 34 of PSS Act). It further

¹ Why digital payment is a public good <<https://www.thehindubusinessline.com/opinion/why-digital-payment-is-a-publicgood/article34093572.ece>> accessed on 20th November, 2022

states in explanation that a payment system include a system enabling credit card, debit card, smart card, money transfer or similar other operations”. All systems except stock exchange caring out either clearing or settlement of payment operations or all of them are regarded as payment systems. System providers are all entities involved in payment or settlement operations. In India, The Boards for Regulation and Supervision of Payment and Settlement Systems (BPSS) oversees the payment systems. In 2005, the RBI established Department of Payment and Settlement Systems (DPSS) specifically for regulation and advancement of payment and settlement system and to provide subsequent legislation of the PSS Act. This Act also provides basis for “netting” and “settlement finality” as other than RTGS all other payment systems in India work on a net settlement basis.

Every proper and efficient payment systems needs appropriate legal framework for its regulation. Some of the basic requirements in this legal ecosystem are broad applicability so that specific issues like- contractual relations and insolvency etc can be dealt and all the participants in the system shall agree to the rules, standards and procedure. The effective functioning of payment system required laws and regulation so, the PSS Act was executed. This specific payment system law in India provides for “the regulations and supervision of payment system in India and to designate RBI as the authority for the purpose and for matters connected therewith or incidental thereto”. The regulatory scope of RBI extends to banks and non-banks providing payment systems services and instruments.

Payment System Operators (PSOs), retail payment organization NPCI, card payments networks, cross- border inbound money transfers entities, ATM networks, PPI issuers, Instant Money Transfer Operators, TReDS platform providers and Bharat Bill Payment Operating Units (BBPOUs) are authorized by RBI under section 4² of PSS Act. The RBI receives its statutory banking for regulating payment system in the country from the PSS Act and the Payments and Settlement System Regulations, 2008.

² Payments and Settlements Act, 2007

There are two regulations executed under PSS Act namely The Board for Regulation and Supervision of Payment and Settlement Systems Regulation, 2008 (BPSS Regulation) and the Payment and Settlement System Regulation, 2008 (PSS Regulation). The BPSS regulation mainly deals with BPSS which is a committee of the Central Board of Directors of the RBI. This mainly includes compositions, power, functions and exercise of power by BPSS as well as meeting, quorum of meetings, constitution of sub-committees and advisory committees by BPSS etc. On the other hand, the PSS regulation deals with form of application for authorization for commencing and carrying on the payment system and grant of authorization, payment instruction and determination of standards of payment systems, document and information required, furnishing account and balance sheet by system provider etc.³

RBI is majorly focusing on digitalization in India i.e. “Less Cash” dependent society. So, demonetization was introduced when majority of population was using cash and up to 86% of currency was declared worthless. Demonetization leads to decrease in GDP in spite of introduction of new currency rapidly.⁴

In 2016, the plan to set out changes in Indian payment system by NCPI was provided. This plan leads to the development of Unified Payment Interface as a framework to facilitate online payments with a set of standard Application Programming Interface (API). This aims to provide single interface for entire NPCI system.⁵ UPI facilitates inter-bank transactions, and enables greater digital payments adoption in country. Multiple bank accounts are added into a single mobile application through UPI for easy fund transfers and payments from one place.

In Indian banking system, major structural changes has been brought through enhanced usage of Information and Communication Technology (ICT). ICT has enabled a variety of electronic payment mechanism, commonly called digital payment services within which UPI has gained popularity. UPI platform is used for sending and receiving money

³< <https://www.rbi.org.in/Scripts/FAQView.aspx?Id=73>> accessed on 15th April 2023

⁴ Rahul Gochhwal, Unified payment interface- An advancement in payment systems, American Journal of Industrial and Business Management [2017] ISSN online: 2164-5175, 1167- 1175

⁵ ibid

without revealing bank account details, using Virtual Payment Address (VPA). These UPI transactions are done only if, user have bank accounts and have registered it on UPI apps like- Google pay, PhonePe, Paytm, BHIM etc.

UPI has universal uses as individuals can make and receives payments through their personal mobiles, pre-authorized multiple recurring payments can be done with one-time secured authentication, through UPI pin payments can be made in one go by the bank sponsored UPI application, this helped in decreasing physical process of transactions. As per present trend, most of the future digital transactions will be low value transaction that is, below Rs. 200.⁶ So, RBI has launched UPI Lite to enable these low value transactions without putting traffic loads on core banking system in real- time.

Participants of UPI ecosystem are NPCI, banks, Bank Account holders/ customers, merchants, Corporate. NPCI is the owner, network operator, service provider and coordinator of the UPI Network. Banks and payment banks with an RBI- approved mobile banking license and IMPS capability are eligible for UPI. Any customer who is on-boarded by a bank with a UPI enabled account and a UPI ID can utilize the services. Participating merchants are those who are on-boarded by their banks to accept UPI enabled payments from customers. UPI also provides the ability for large technology companies, 3rd party processors, and aggregators to connect to banks and provide extensive services to end consumers.⁷

NPCI have various role and responsibilities which include the right to either operate or maintain the UPI network on its own or provide or operate necessary services through third party service providers. It provides and maintain network infrastructure relevant to the operation of the UPI platform, it revises the UPI architecture and its procedural guidelines as and when required, it also issues circular from time to time to disclose major decisions, to relevant stakeholders.

The payment services providers are regulated entity by the RBI under Banking Regulation Act, 1949, should be authorized by RBI for providing mobile banking

⁶ Rahul Gochhwal , Unified payment interface- An advancement in payment systems, American Journal of Industrial and Business Management [2017] ISSN online: 2164-5175, 1167- 1176

⁷ ibid

services. Any bank which wants to participate in UPI as Payment Services Providers (PSP) should ensure that while the bank's technology platform can be outsourced, its function as PSP can't be outsourced.

The clear objective behind promotion of digital payment system is to provide uniform and affordable payment system by leveraging technology and enable financial inclusiveness in the country.⁸ Thus, UPI is introduced to enable low cost and universal payment system for both consumers and merchants (or businesses) to make and receive payments without any POS machines.

India has easy and convenient modes of digital payment, for example- Bharat Interface for Money- Unified Payments Interface (BHIM-UPI); Immediate Payment Service (IMPS); Pre-Paid Payment Instruments (PPIs) and National Electronic Toll Collection (NETC) system is growing with increase in Person-to-Person and Merchants-to-Person which lead to transformation of digital payment ecosystem. During this period the pre-existing system of debit cards, credit cards, National Electronic Funds Transfer (NEFT) and Real-Time Gross Settlement (RTGS) grew at fast pace as well. Year of 2015-16 is marking beginning of digital payments revolution as smart phones were becoming popular. This served the need of Indian payment system: Coverage, Convenience, Confidence (integrity and security), Cost and Convergence. Various payment systems were evolved to cater the requirement of Indian payment system like- EFT, NEFT, NACH, RTGS, IMPS and many more but, they were not interoperable. This gap needed to be fulfilled. The payment system needs to be united and each system shall be interoperable.

In 2016, UPI was launched by NPCI, to fulfill the gap of interoperability and it's architecture helped in creating digital payment revolution in country. It was declared one of the most advanced real-time payments system in the world by many experts. Within 6 years of launch UPI transactions reached upto 780 crore in December 2022, bagging fastest payment system to reach these numbers in world. 950 crores was the overall digital transaction in December 2022.

⁸ Unified payment interface- An advancement in payment systems, Rahul Gochhwal, American Journal of Industrial and Business Management [2017] ISSN online: 2164-5175, 1167- 1176

Digital payment system adoption in India has been equally distributed. The estimates are to reach 80 crore smart phones in 2022 with projection of 1.2 billion smart phones in the year 2026. While examining the data of phonePe, we found digital transactions in 2022 across 19000+ pin codes constituted over 99% of the country. Tier two and three cities where conducting 80% of its transactions, this shows UPI is constructed as per need of Indian consumers.

India was using cash mainly before 2016, but digital payment system successfully became a viable option of cash in country. The volume of UPI transactions reached to 15 lakh with value of 708 crore in December 2016 to volume of 780 crore and value of 12, 82, 055 crore in December 2022. This is a remarkable growth of over 5200 times in volume and 1800 time in value within 6 years.

The RBI constructed composite Digital Payments Index (DPI) to track digitization of payments and to capture its extent across the country. 2018 was taken as base year by RBI-DPI, i.e DPI score for march 2018 was to set at 100. 153.47 And 207.84 was the DPI for March 2019 and march 2020 respectively while 349.30 was index of march 2022 against 304. 06 for September 2021. This clearly establishes the trend of growth in UPI. The UPI growth volume increased due to peer-to-peer transactions. In 2018, 12% was the share of merchant payments and by 2021 it grew upto 45%. Previous year this share grew up to 54% UPI volumes.

This increase as been largely driven by the rapid proliferation of QR code based payments that are now accepted by crores of merchants across India. the QR code based acceptance stood at 75% of the 4 crore estimated business to consumer merchants in 2020.

Digital payment was preferred during pandemic due to which it grew especially for merchant payments with consumer as an alternative of cash payments. The increased digital payment acceptance amongst merchants further drove customer adoption to increase growth. More than 50% jump in monthly transaction volumes across UPI, BBPS, and NPCI operated system, built to make recurring bill payments interoperable is

shown in NPCI data. In fact the BBPS system has billing transaction volume grow from 3.5 Crore in April 2021 to 10 crore in December 2022 as per the NPCI data.

In 2016 the FastTag system started with 30 Lakh transactions (for a value of Rs 88 Cr.) in December 2016 had grown to 11 Crore transactions (for a value of Rs 1841 Cr.) in February 2020 before the pandemic induced lockdowns caused a drop in volumes. But it recovered in December 2021 with 24.2 crore in volume (3679 Crore in value).

There have also been several other innovations in the ecosystem to make payments accessible and convenient, while also enabling greater financial inclusion. This includes-

- a. “Auto-pay” option with UPI is allowing businesses to set and request recurring payments from consumers. This has become convenient option for businesses so, became very popular. 2.7 lakh auto-pay registrations were there in August 2021 which is reached up to 74 lakh registrations in December 2022. NCPI has recently ordered to increase maximum allowed recurring mandate to Rs. 15,000, this will help in accelerating it further specially in case of loan and EMIs.
- b. On boarding for UPI is aadhaar-based which makes this process delayed. Earlier, valid debit card was mandatory to set up a user’s UPI PIN in registration process. This made the process restricted in some way. Now, the aadhaar on boarding for UPI removes this restriction, and allow more users to be part of ecosystem securely.
- c. UPI international is facilitating safe and easy transactions internationally. Indians do not need forex card or foreign currency for making payments to international merchants’ outlets. This can be done through Indian bank account as it is launching soon in UAE, Singapore, Mauritius, Nepal and Bhutan. As UPI international gains acceptance abroad, one can expect innovations that drive down the cost of cross border transactions.

Also, NCPI has enabled UPI for international phone number. This will allow Indians to use UPI from their phone while travelling outside the country as long as they have Indian bank account

The regulatory framework and legislation relating to digital payment system of India and U.S is analyzed to understand the effective and efficient regulation of new system. This

comparative analysis will give us the clear perspective on issue and solution for resolving the same. Both democratic nations are moving at fast pace for development of digital payment system and environment for same. The laws relating to cyber security, data privacy, consumer protection, regulation of digital payment system will be compared between the nations.

1.1. Statement of Problem

The advancement of science and technology lead to dependence on internet wherein any kind of banking transactions can be carried out very effectively as well as easily by way of cards and mobile banking. This provides for ease of doing money transfers without visiting respective banks. So, digital payment system also carries within itself certain associated risks and legal issues pertaining to huge transactions risk, digital banking frauds, data protections, security risks as well as issues relating to proper regulation of transactions.

The structure of digital payment system includes various players in different categories like- banks, airtime sales agents, retailers, utility companies, regulators, international financial institutions etc. in ecosystem of digital payments system, as co-existence of all these players are important but, the roles of each are not properly defined.

The risk of stolen identities are a major concern in online transactions as with each transaction enough data is shared to the other party which includes- payer and payee identities, their geographical location, time and date of transactions, purchased item, it's value and transactions value.

1.2. Literature Review

- ❖ S. Sahayaselvi in her article An Overview of Digital Payments; discussed various types of Digital Payment system and how digital revolution in India made cashless transaction an easy option. This paper also helpful for the researcher as it describes the benefits and drawback of digital transactions. Also it discusses in

detail various modes of digital payment transactions that are offered by various financial institutions, digital payments operations while dealing with online transactions.

- ❖ Deepti Kumar, Timothy A. Gonsalves & Ashok Jhunjhunwala in their article Mobile Payment Architectures for India, provides detail discussion on mobile payments as an alternative payment method to cash. The researcher understood the development of the digital payments architecture. This paper describes interoperability in digital payment system which later became as important feature of Indian product UPI. They also discussed the advantages of mobile payments over traditional payment system which helped researched in understanding the need for development of digital payments system and its proper operation. This paper mainly delves into technical aspect of same.
- ❖ B. Angamuthu in his paper Growth of Digital Payments in India, discussed the growth of digital payment system in India across categories with data of several years. This is helpful for researched as digital payment system offers convenience, ease of transactions and security while transacting but, this all can only be justified if data showcase the growth of this system.
- ❖ Lakshmi Kumar and Swati Dutta in their article Role of Mobile Money in Replacing Cash: A Study among Migrant Workers in South India, empirically studies the role of mobile money in replacing cash among migrant workers in South India. this paper helped researcher in understanding financial inclusion in outskirts of the country after development of digital payments. Also, the requirement of proper regulation of the system so that the poor, uneducated and rural population of the country won't be adversely impacted.
- ❖ NPCI's Product Booklet of Unified Payment Interface, This includes all the basic information about UPI. The genesis of UPI is specified here, including the background, real-time payments, types of transactions supported by UPI, business uses, on-boarding users etc. this booklet was beneficial in understanding the basics of UPI and its ecosystem.
- ❖ Lahiri Amartya in his article The Great Indian Demonetization, discussed about the whole story of demonetization in country and the motive behind the same in

context of preparedness of RBI. Also, whether the objectives of demonetizations are achieved by the country or not. The aspects related to intellectual and historical context of demonetization are also dealt by author. This helped in specifying the evolution of UPI in India.

- ❖ Gopalan Sasidharan and Rajan S. Ramkishen in their article *The Great Monetary Gamble in India- Modi's Lee Kuan Yew Moment?*, discussed the monetary experiment of gigantic scale on November 8, 2016 that resulted in the withdrawal of the legal-tender character of Rs.500 and Rs. 1000 currency. This paper made me understand the demonetization and how it impacted or lead to growth of digital payment system in India.
- ❖ Gochhwal Rahul in his article *Unified Payment Interface- An Advancement in Payment System*, traced the evolution of payment systems in India and examines the technology behind UPI focusing on its architecture and security system. The API based architecture has enabled development of innovative solutions for consumers and businesses. This paper has helped in understanding the architecture of UPI and its functioning.
- ❖ A. Mahesh & Bhat Ganesh in their article *Digital Payment Service in India- A Case Study of Unified Payment Interface*, discussed about remarkable growth of UPI and its progression in retail digital payment over the years with support of secondary data. This also examines the position of UPI in digital ecosystem, with an emphasis on identifying UPI's core strengths and growth prospects.
- ❖ Mohapatra Somanjoli in her article *Unified Payment Interface (UPI): A Cashless Indian e-Transaction Process*, discussed about RBI's measures to build 'cash-less' society. The overview of a transformational project initiated recently by the NPCI and includes the comparative study between different UPI apps.
- ❖ Aparna Viswanathan on her book *Cyber Law* gives a comprehensive overview of cyber laws from both national and international perspective. The introductory chapter deals with the examination of political economy of cyber crime in a historical perspective giving the researcher an idea on the different types of cyber crimes. The second chapter helped researcher in understanding the nuances of

2009 amendments to the IT Act, 2000. Further the fifth chapter of the book helped in understanding various cyber crimes and offences under the IT Act, 2000.

- ❖ Kumar Renuka, Kishore Sreesh, Lu Hao and Prakash Atul in their article Security Payment of Unified Payment Interface and Payment Apps in India, analyzed the security of UPI apps as many of these apps used common infrastructure introduced by the Government of India. But, there has been no security analysis of these infrastructure supporting money transfers. This paper is about principled methodology to do detailed security analysis of UPI.
- ❖ Diane Rowland, Uta Kohl and Andrew Charlesworth in their book INFORMATION TECHNOLOGY LAW provides a detailed discussion on cyber crime. The researcher found this book useful in completing the research paper. Chapter four of the book discuss about cyber crime and elucidates on the nature of cyber crime and cyber criminals, computer fraud, computer hacking and content crimes. The book in chapter nine deals with copyright and the internet wherein they discuss about hyperlink, search engines, file sharing and technological protection mechanisms and digital rights management with help of the laws.
- ❖ Board of Governors of the Federal Reserve System's Money and Payments: The U.S. Dollar in the Age of Digital Transformation, discusses the existing form of money; the current state if the U.S. payment system and its relative strength and challenges. This has helped the researcher in understanding the basics of payment system in U.S. as it defines different types of money and its functioning. The recent development in payment system of U.S. is also covered here.
- ❖ U.S. Department of the Treasury Report on The Future of Money and Payments, describe the money and payments in U.S. including recent innovations in money and payments. This paper helped researcher in understanding the policy consideration required for building the future of money and payments, financial inclusion and minimizing risks in U.S.
- ❖ Congressional Research Service's U.S. Payment System Policy Issues: Faster Payments and Innovation, this paper describes the regulations of payments systems in U.S. the federal consumer protection regulation, anti-money laundering regulations and various state licensing regulations. This paper also

discusses the development of interbank Real-time Payments by 2023-24. Researcher understood the current policy and regulatory aspect of the digital payment system in U.S. for comparative analysis of same with Indian regulations.

1.3. Scope and Limitation

The scope of the research paper is to analyze comprehensively the laws and regulations related to digital payment system in India, grievance redressal, cyber security and privacy of digital payments transactions. This paper will analyze the issues relating to specified aspects of digital payments system.

The scope and ambit of the research paper was very wide and due to the lack of time and resources, the researcher have limited the scope of this research. The researcher has limited to the study of various kinds of Digital Payments System in comprehensive sense. Researcher could only study one mode that is UPI's framework and structure in detail.

The laws and regulations related to digital payment system is discussed related to limited issues under few acts, circulars, master directions and regulations. All aspects of same could not be covered within this paper. The comparative analysis between U.S. and India laws and regulations can be done with limited scope. The issues covered are under this head are cyber security, data privacy, consumer protection, grievance redressal and some regulations related to digital payment system.

1.4. Hypothesis

The Inability to provide suitable legal and regulatory framework of digital payments system lies in the inefficiency of the nation to tackle with continuously increasing cyber crimes and implement suitable cyber security practices.

1.5. Research Objective

After identifying the problems, the aim and objective of the research are given as under:

- a. To study how the evolution of digital payment system impacted the Indian society and economy, as we are moving towards cashless economy.
- b. To carefully look into the different categories included in digital payment system and their structure.
- c. To analyze the laws and regulations for digital payment system in India and how it impacts the security of transactions. Specially regulations related to novel product UPI of India.
- d. To comparatively analyze the regulations related to cyber security in digital payment system of India and USA.
- e. To incline the study towards knowing the issues related to regulations and laws of the digital payment system in India and suggesting suitable ways to rectify the issues of system.

1.6. Research Question

- a. How evolution of Digital Payments System transitioning India into cashless society?
- b. What are the various modes included in Digital Payments System and its future prospects?
- c. What is the structured framework of Unified Payment Interface and how it functions?
- d. What are the legal and regulatory frameworks supporting the smooth functioning of Digital Payments System?
- e. How the issues relating to Digital Payments System regulations are comparatively coped by two major democracies in world?

1.7. Research Methodology

The primary method of research used in order to complete this work is Doctrinal research methodology. Here, researcher has focused on material available in various books, articles available online and offline formats. Further in order to enhance this research, author has used the analytical approach where few secondary data, philosophical and

comparative inquiries are made in relation to the topic. Hence, this research work is exclusively a doctrinal research as the sources used to complete this study are secondary sources.

1.8. Research Design

Chapter 1- Introduction

In this chapter researcher has introduced the legal and regulatory framework of digital payment system in India. The basic laws as well as RBI and NCPI regulations related to different aspects of digital payment system is briefly covered.

Chapter 2- Evolution of Digital Payment System

This chapter of dissertation discuss about the history of digital payment system and how it evolved overtime. The introduction of QR based system and MDR are steps taken to reach the present stage of digital payment system. Also, the transition towards cashless society is very significant part of this evolution.

Chapter 3- Digital Payment System: Concept

In this chapter, the detailed discussion on different modes of digital payment system. As well as the performance of various types of digital payment system with data and statistics. This also shows the future prospects of digital payment system in India.

Chapter 4- Framework of Unified Payment Interface

As we all know UPI is unique and original Indian product of Digital Payment System. This chapter talks about its framework and working of UPI. This discuss help us understand why UPI became one of the most used Digital Payment System.

Chapter 5- Regulatory Framework of Digital Payment System in India

This chapter shows different aspects of legal regulations and laws related to Digital Payment System. This mainly covers the PSSAct, RBI regulations, NCPI regulations, grievance redressal laws and cyber security laws related to Digital Payment System.

Chapter 6- Comparative Analysis of Laws related to Digital Payment System between India and United States

In this chapter we have discussed the basics of money and payments, payment systems, cross border payments in U.S. the regulations related to digital payments system and issues of regulations related to digital payment system in U.S. Last part of this chapter consists of comparative analysis of laws and regulations related to different areas of digital payment system.

Chapter 7- Conclusion and Suggestion

This last chapter of dissertation includes conclusion drawn by researcher from all the chapters of dissertation. This covers various aspects on the topic. Suggestion includes the required improvements related to regulations and laws of digital payment system in India drawn by researcher.

CHAPTER 2- EVOLUTION OF DIGITAL PAYMENT SYSTEM IN INDIA

The traditional system of payment has played important role in economy. This system was widely used but, was not cost effective. Cash has played dominant role in Indian monetary system as it has been in use for over 2600 years. Indian cash to GDP ratio has been amongst highest in the world with 12%. Non- cash transaction became more viable after advancement in technology since 1990s. All the electronic payment segments in recent year has shown decent growth in both value and volume of usages. Development of IT sector in India needs to be used in the payment sector of the country as it is not properly shown that's why to transform the payment sector of country the utilization of technology in the payment and settlement system is required. As the traditional payment system had high cost and various other drawbacks so, the alternative was developed.

In the year 1871, the Western Union launched the Electronic Fund Transfer (EFT) in US this can be marked as the beginning of electronic payments. For the first time physical presence was not required for making the payments for goods and services by the customers. Then in 1958, Bank of America launched first modern credit card though which this form of payment continued the service. There was no internet until 1960 when US Advanced Research Projects Agency Network (ARPANET) was launched, this lead to the foundation of internet which we are currently relying on for various usages. Later online banking services were provided to the customer in U.S. the Stanford Federal Credit Union was the first financial institution to provide this service in the year 1994. In 1995, Presidential Bank offered online access to account of its customers for the first time. This development continue to evolve in the sector in late 90s, Paypal became the first payment service provider to be working globally.

In mid-1990s, RBI provided technology based payment and settlement systems which marks the beginning of electronic era in the banking sector. High integrated technology was implemented which includes- Core Banking Solutions (CBS) and Automated Teller Machines (ATM). ICICI bank was the first to offer their clients online banking service in the year 1996. In the Vision Document 2005-08, "setting up of an institution at national

was envisaged to own and operate all retail payment systems in the country as a sound and efficient financial infrastructure for enhancing access to financial services.”⁹ To increase financial inclusion by providing cost effective payment mechanism beneficial for the common people is also an objective of this. To achieve these objectives the Indian Banks Association (IBA) to examine related issues and suggest changes accordingly to establish NCPI working group was set up. In December 2008 the NCPI launched to established proper infrastructure for payments and settlement in country. Booklet released by RBI on Payment Systems titles “Journey in the Second Decade of the Millennium”. This specifies the developments in payment systems in the country in year 2010 to 2020. This period has witnessed the expansion of digital payments, including introduction of wallets. This has impacted the behavior of consumers and resulted in the transformation of the payment ecosystem in India.

“The vision document 2009-12 included the requirement for a domestic payment card system and Point of Sale (PoS) 2 major considerations give rise to switch network for issuance and acceptance:

- a. The Indian banks have to bear the high cost of affiliation with international card associations in the absence of a domestic payment system,
- b. Around 90% of our card-based transactions are routed through a switch located outside the country.”¹⁰

As India lacked presence of domestic card payments processing system due to this banks here had to tie-up with foreign companies like- Mastercard, visa etc. to establish connection between cardholders, issuing banks and merchants. This created a huge gap in domestic market for domestic system of payments. To analyze the feasibility of establishing domestic payments and transactions settlement system IBA appointed a committee, the committee proposed to establish the same to expedite India’s growth in card payments. So, “RuPay” payments card system was launched by NCPI. So, the cost

⁹ K Hari Krishna & Bipin K Deokar, RuPay Card: An alternative [2012] Economic and Political weekly, vol. 47, 12-22

¹⁰ ibid

effective range of payment instrument is offered by RuPay to its customers. ATM card was launched at initial stage on March, 2012.

As per December 2016 report of the Committee on Digital Payments, “only 20% of the total transactions and 5% of personal consumption expenditure are undertaken digitally. As regards the cards, the usages of Debit cards at ATMs have been hovering around 85% of the total volume and around 92% of the total value of debit cards transactions. Their usages of point of sale (PoS) machines accounts for only about 15% of the total volume and about 8% of total value of debit card transactions.”¹¹

The Payment and Settlement System Act, 2007 regulate and supervise the payment system in India. The Act appoints RBI to supervise the payment systems in India. The payment system has been defined under the Act as “a system that enables payment to be effected between a payer and a beneficiary, involving clearing, payment or settlement service or all of them, but does not include a stock exchange.”¹²

NCPI was established as an umbrella organization for operating retail payment systems in India. Several Payment System operators are authorized by RBI including NCPI, CCIL, ATM networks, TReDS platform providers. In 2008, NCPI was established by RBI and Indian Banks Association as an umbrella organization for operating retail payments system in India.¹³ it provides infrastructure to banking system for both physical and electronic payment system. Some retail payment products are IMPS, RuPay card, UPI, NACH, Aadhaar-enabled Payments System and BBPS. It also works for internationalization of RuPay and UPI.

Earlier, cheque or Demand Drafts were only alternative payment options to cash. A centralized payment and settlement system is required to clear cheques. In mid- 1980s Magnetic Ink Character Recognition (MICR) clearing system to clear cheques of Rs. 1 Lakh and more value for safe and effective payment system was implemented. This

¹¹ Research Notes on Digital Payments System <https://loksabhadocs.nic.in/Refinput/Research_notes/English/Digital_Payment_e.pdf> accessed on 20th April 2023

¹² ibid

¹³ ibid

system of high value clearing was discontinued in 2009.¹⁴ After the pilot study, CTS was rolled out by RBI which required only image of cheque for processing payments. Mandatory security features including paper, watermark, void pantograph etc implemented after 2010 standard. Other than mandatory features banks were allowed to include other feature. “Positive Pay System” for cheques was introduced by RBI in January, 2021 in this details like- date, beneficiary’s name, payee and amount in NCPI’s digital Platform must be filled by issuer. These details are required to be cross-checked by banks to prevent any fraudulent activities.¹⁵

RBI standardized the payment system for harmonizing the payments process to achieve efficiency and alignment of the structure-

- a. ***Magnetic Ink Character Recognition (MICR)*** - MICR reader run through 9 digit code printed on cheque and this sorter machine helps in faster clearing of cheque. This 9 digit represents city code, bank code and branch code.¹⁶
- b. ***Indian Financial Network (INFINET)*** - This is Closed-User Group Network for the exclusive use of RBI, Member Banks, and Financial Institutions. It aims at improving efficiency and productivity as well as provides customer services through innovative delivery channels such as internet banking, home banking etc.
- c. ***Structured Financial Management System (SFMS)*** - through SFMS, a secure and common messaging system for intra-bank and inter-bank application was established using INFINET as a communication medium.
- d. ***Indian Financial System Code (IFSC)*** - IFSC code is 11-digit alphanumeric code to identify the destination of the beneficiary bank and branch. It is mandatorily required for fund transfer through RTGS, NEFT, and IMPS.

In last decade, the clear shift towards cashless payment system is noticeable. The same is indicated by RBI data, in 2010-11 paper clearing constituted 60% of the total retail payments which dropped to 3% by volume in 2019-2020, while total retail electronic

¹⁴ ibid

¹⁵ Supra note 11

¹⁶ ibid

payments increased from 18% to 61%. In terms of value, paper clearing comprised 89% of the total retail payment system in 2010-11 which fell to 20% in 2019-20.¹⁷

The increased penetration of mobile phones and the internet in the country has shifted the attribution as it helped in quicker adoption of cashless transactions. The low-value payments dominated the volume as per the reports. The products that afford real-time, instantaneous transfers are the most preferred modes of payments as per data.

Digital payment options evolved over the years for consumer's are-

- a. ***Electronic Clearing Services (ECS)*** - this system was introduced to deal with bulk repetitive payments in the year 1990s. ECS (Debit) was later introduced by RBI for company's faster mode of effecting periodic and repetitive collections of utility payments.
- b. ***National Automated Clearing House (NACH)*** - NCPI launched a centralized ECS for both debit and credit purposes called NACH. Distinctions accounts are identified through Aadhaar and both paper and paperless mandates are offered. By January 2020, all ECS centers fully migrated to NACH and it is more effective. The government uses the APBS i.e Aadhar Payment Bridge System which is one of the components of NACH to transfer benefits and subsidies using Aadhaar number to beneficiaries.
- c. ***Card (debit and credit) Payments***- The number debit cards issued between 2010-11 and 2019-20 rose from 22.78 crores to 82.86 crores, and it raised from 1.8 crores to 5.77 crores in case of credit cards. Only EMV chip and PIN-based cards are made mandatory by RBI since 2019.¹⁸
- d. ***National Common Mobility Card (NCMC)*** - Combination of Debit/Credit card with a prepaid card where the Debit/Credit component can be used online is offered by NCMC after its launch in 2019. Wherever offline payments are permitted the prepaid component is used.
- e. ***RuPay Card***- In 2012, RuPay cards were launched as domestic cards this is helpful in quicker transition to cash less economy in most countries. In 2017, the

¹⁷ Supra note 11

¹⁸ RBI Report, 2020

year RuPay cards were launched it had comprised of only 15% of total cards issued which raised upto 60.36 crore cards in November, 2020.¹⁹ It is also tying with international payment system.

- f. **Real-Time Gross Settlement (RTGS)** - Instant high value (above Rs. 2 Lakhs) inter-bank transactions are facilitated by RTGS. Earlier specific time stamp was provided to conduct RTGS which was later removed in December, 2020 which resulted into 24*7 access of this facility.²⁰
- g. **National Electronic Funds Transfer (NEFT)** - there is no amount ceiling to transfer in a single transaction from one bank account to another in case of NEFT. Although, clearance in this case occurs in half-hourly batches.
- h. **Bharat Bill Payments System (BBPS)** - it offers convenient utility bill payment to customers using online payments or through physical agents.
- i. **National Electronic Toll Collection (NETC)** - Toll collection directly from account of user is facilitated by NETC i.e. FASTag based toll payments. This same is planned to be used as parking charges, fuel purchase etc.

Now, we understand the basic concept of different digital payments system. Let's see further the average growth in volume and value of digital payment transactions across the categories during the period of 2012-13 to 2018-19.

Growth of Digital Payments across categories²¹

MODE	Volume of Transactions (in lakh)	Volume of Transactions (in lakh)	Value of Transactions (Rs. In crore)	Value of Transactions (Rs. In crore)
	Mean	CGR (%)	Mean	CGR (%)
RTGS Customer Transactions	971.93	12.41	78422569	15.37

¹⁹ RBI Report, 2021

²⁰ ibid

²¹ RBI Report, 2013 and RBI Report, 2019

Cheque Truncation System (CTS)	8787.50	22.26	6259320	20.44
Immediate Payment Service (IMPS)	5121.72	213.93	446401	257.16
Credit Cards	9430.24	28.79	302543	30.6
Debit Cards	95308.32	16.18	2685933	13.43
M- Wallet	13992.05	127.73	54035	142.05
PPI Cards	2132.11	72.46	18805	48.44

In the table above, the average growth performance of debit card, M-wallet and credit card in terms of volume of transaction, whereas in case of RTGS, CTS and Debit cards maximum contribution on the average growth performance. This shows both volume and value of digital payments transaction has grown multi-fold in 7 years period taken into consideration. In terms of both volume and value the positive growth of the country is indicated by CGR across the categories during the period of 2012-13 to 2018-19. The highest growth among the listed digital payment system is recorded by IMPS and M-Wallet services with 213.93% and 127.73% of CGR in volume during this period respectively as well as 257.16% and 142.05% of CGR in terms of value respectively.

2.1. QR Code Based Payments

Approximately 750 million²² people are using smart phone in India, which may reach upto 1 billion by the year 2026.²³ The number of smart phone users in India has grown because of its increase in affordability, growth in number of users in rural India and increase in initiatives by government. CAGR is projected of 6% from 2021 to 2026 in use

²² India to have 1 billion smart phones users by 2025 <[²³ ibid](https://www.business-standard.com/article/current-affairs/india-to-have-1-billion-smartphone-users-by-2026-deloitte-report122022200996_1.html#:~:text=%22The%20total%20 cumulative%20shipments %20of,five%20years%2C%22%20it%20said.> accessed on 20th May 2023</p>
</div>
<div data-bbox=)

smart phones in rural India.²⁴ QR code based payments are creating growth in digital payments, especially among customer segments with low financial literacy across India. QR code offers easy digital payments as it requires low infrastructure, two ways and secure transaction flows.

The QR code- based payments became acceptable during pandemic as it is contact-less, quick and easy to use. Example includes- toll tax payments, grocery store payments, mobile app downloads and utility bills. This allows more and more customers across various platforms to make payments. Moreover, regulatory system in India is mainly focused on making all QR code supporting platforms interoperable as well as on open banking.

2.2. Merchant Discount Rate (MDR)

The government took policy initiatives which includes waiver of MDR charges²⁵ for providing financial incentives for promotion of digital payment system, this evidently show intention of government to include digital pathway in financial system. This makes the on boarding of merchants easier for businesses also, adoption of digital payment system become affluent. Although zero MDR adversely impact the payment ecosystem as it discourages survival of gateway entities, efforts in innovation and India's expansion in digital payment system. For ex- RuPay commands the 60%²⁶ of Indian debit card market but, its monthly average transaction volume in 2021 was less than 50%²⁷.

There is lack of initiatives resulting into hesitation of banks in taking initiatives for smooth flow of digital payments. This may lead towards discouragement for promotion of digital payment system. So, this requires reimbursement or reconsideration may be needed to prevent discouragement.

2.3. Structure of Payments

²⁴ ibid

²⁵ <<https://www.thehindu.com/business/nirmala-sitharaman-waives-mdr-charges-for-some-businesses/article30419546.ece>> accessed on 23rd April 2023

²⁶ <<https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=20315>> accessed on 23/04/2023

²⁷ <<https://www.npci.org.in/statistics>> 23rd April 2023

Set of instructions, procedure and rules related to transfer of funds is known as payment system. Structure of payment system as retail or wholesale depends on the payment type. Wholesale payments includes payments between banks, financial market infrastructure and other financial institutions executing smaller volumes in larger payment values and retail payments includes payments between individuals and businesses executing larger volumes in lower payment values. The whole structure is established under central/national bank of the country.²⁸

Front-end and back-end arrangements are involved in a payment system's infrastructure. Banks account and e-money transaction accounts encompassed thorough underlying transaction account represents the source of the funds. Amount can be paid and received as well as value can be stored in these account.²⁹ Though credit facility is not available, no regulatory classification and guarantees are the features varying from bank account. Price and services they offer are also different.

Initiation of a transfer of value is done through payment instruments. Cash and cashless instruments like- cheque, credit transfer, direct debits, cards and e-money based instruments are the two classifications of payment instruments.

A transfer of value is processed through payment instruments. They can be further classified into cash and cashless instruments. E-money is prominent among payment instruments. The various types of e-money based instrument include online money when the payment instruction is initiated via the internet, mobile money when initiated via mobile phone, and prepaid cards. E-money must include these features³⁰-

- a. Serve as a multipurpose medium of exchange
- b. Be accepted as a means of payment by parties other than the issuer
- c. E-money is prepaid

²⁸ The evolution of payments in India <<https://www.microsave.net/2022/09/28/the-evolution-of-payments-in-india-the-state-of-play/>> accessed on 25th April 2023

²⁹ ibid

³⁰ The evolution of payments in India <<https://www.microsave.net/2022/09/28/the-evolution-of-payments-in-india-the-state-of-play/>> accessed on 25th April 2023

The Payment service providers and the payer & payee are connected through the service access point. Due to fewer options to customers relating to use of cash we can track a shift towards digital payment system. Technology is used to facilitate this system and in transfer of money. The funds are being channeled from payer to payees digitally.³¹

Overly and standalone systems are the two types of systems where existing payment instruments like debit and credit cards stored in digital wallet and payment infrastructure to process, clear and settle payment infrastructure to process, settlement and clear payments, existing payment systems are not base of standalone systems as this is a closed loop system. Front end of both systems involves innovative customer interfaces.

2.4.Transition: Cash to Cashless Payment System

Maximum volume of non-cash transaction in the country in total accounted due to use of paper- based instruments which includes cheques, drafts, bills of exchange etc. though this share of paper based instrument is continuously decreasing over a period of time and due to the efforts of RBI electronic system is gaining popularity in country over cash and cheque. We will further see how India delinquently moved towards electronic mode of payments with given socio-economic set-up in country.³²

In developing and under developing economies, the poor populations have very less access to banks and mobile money. The banking network in India was well developed but, was not penetrated in the outskirts of the country till very long. In 2014, banking network comprised of 1,15,082 bank branches and 1,60,055 ATMs out of which only 43, 962 branches (38.2%) and 23, 334 ATMs (14.58%) were in rural areas.³³ Though banks have not succeeded in certain areas but, mobile services have due to link between financial inclusion and information technology. In the year 2013-14, has registered

³¹ ibid

³² Lakshmi Kumar & Swati Dutta, 'Role of Mobile Money in Replacing Cash: A study among Migrant Workers in South India' [2015] Economic and Political Weekly Vol.5, 39

³³ ibid

substantial growth in number of subscribers. Until the end of March 2014; 251.59 million was the recorded internet subscriber base in country.³⁴

In November 2010, NCPI launched the Interbank Mobile Payment System which is a mobile based fund transfer service for users registered. Several banks like- HDFC, ICICI and the SBI in partnership with MNOs have launched their mobile payment service. But, this doesn't lead to widespread acceptance of mobile payment technology among the rural population as the marketing model mainly aimed at acceptance by urban and technologically advanced users. Regulation permitted mobile transactions only for users whose bank account was linked, so that transaction can take place from the same account. Due to this regulation 40% of population was excluded as they didn't have bank account.³⁵

Payments Bank licensing was announced by the RBI on 27th November 2014. Limited ranges of services are allowed to be taken by these banks. Some of those services include- payments and remittance services through various channels, internet banking, payment of utility bills, issuance of debit cards and ATM cards etc.³⁶ this announcement mainly aimed towards rural and poor populations of the country so that basic payment and remittance services as well as small saving account can be provided to them. Lending services are not provided by the payments bank. Under guidelines for Licensing of Payment Banks, a mobile operator needs to set up a separate entity for this purpose, with at least Rs. 100 crore initial paid-up capitals. Several steps related to increase in banking outreach and greater financial inclusion has been taken by RBI. To insure seamless transition in financial inclusion, mobile money system requires several players like- MNOs, Banks, retailers, regulators, international financial institutions etc. to provide its services.³⁷

The mobile money has been used for widespread financial inclusion; even micro financial institutions used it to expand the range of savings. So, there is need to extend data

³⁴ *ibid*

³⁵ Lakshmi Kumar & Swati Dutta, 'Role of Mobile Money in Replacing Cash: A study among Migrant Workers in South India' [2015] *Economic and Political Weekly* Vol.5, 43

³⁶ *ibid*

³⁷ *Supra* note 22

protection and privacy regulations from banks to MNOs. To ensure transparency the central bank can monitor the implementation of guidelines.³⁸ But, the main barrier in financial inclusion is cash. Transaction with cash or physical goods is costly for financial inclusion which leads poor population of country deprived in significant numbers. In rural or low income areas limited numbers of banks are willing to provide the costly infrastructure for collecting low value cash deposits and redeeming saving in small sum of cash. So, electronic system is cost effective means of payments so, this provides the user access to range of financial institutions.³⁹

³⁸ Lakshmi Kumar & Swati Dutta, 'Role of Mobile Money in Replacing Cash: A study among Migrant Workers in South India' [2015] *Economic and Political Weekly* Vol.5, 47

³⁹ *ibid*

CHAPTER 3- DIGITAL PAYMENT SYSTEM: CONCEPT

Payments made through digital modes are called digital payment system. Digital mode is used to send and receive money by both payer and payee. It is also called electronic payment. Digital payment transactions are done online so, it is an instant and convenient way to make payments. Digital payment system currently include Banking cards, Digital wallets, UPI, Unstructured Supplementary Service Data (USSD), Immediate Payment Services (IMPS), Real Time Gross Settlement (RTGS), National Electronic Fund Transfer (NEFT), Aadhar Enabled Payment System (APES) and Mobile banking. Our daily lives are impacted due to digital payment system and it also offers additional new services. The cashless transactions are increasing day by day in country according to RBI bulletin.

3.1. Modes Of Digital Payments

1. **Payments Cards**- credit and debit cards are the most common types of payments. These plastic cards comply with ISO/IEC 7810 ID-1 standards.⁴⁰ Cardholder's accounts are electronically linked with payment cards in this system. Card is the means of authentication of cardholder and the account can be deposit or loan or credit account. Card Verification Value (CVV Number) and Expiry date is the information required for making card payments. CVV is used in cards to identify owner's identity and minimizing the risk of fraud. Two factors of authentication is required for these cards. These factors of authentication includes Knowledge factor (PIN), Possession factor (ID card, Smart phone) and Inherence factor (Fingerprint, face or voice).⁴¹ The payment cards include-
 - a. **Credit card**- credit card introduced by first public bank is by Central Bank of India. Line of credit (credit limit) is created by the issuer of card for the card holder on which he/she can borrow. Repayment can be done by cardholder by paying full outstanding balance by

⁴⁰ A. Martha Franciska & Dr. S. Sahayaselvi, 'An Overview On Digital Payments, International Journal of Research' [2017] e-ISSN: 2348-6848, 2103

⁴¹ *ibid*

the payment due date or to repay a smaller amount (minimum amount), by that specific date.

- b. **Debit card**- Citi bank introduced debit card. Fund is withdrawn directly from the account of cardholder when any purchase is made through debit card.⁴²
 - c. **Smartcard**- smart cards are the magnetic strip cards with chips to enhance security and offer new services. These cards storage of thousands of times of information than any normal magnetic strip cards. These are highly secure cards which are more reliable and perform multiple functions.⁴³ A lot of personnel information like- medical history, banking details and personal preferences are stored in this card.
2. **Unstructured Supplementary Service Data (USSD)** - USSD is a protocol used by GSM cellular telephones to communicate with the service provider's computer. This is also known as "Quick codes" or "Feature codes". Asterisks (*) are the beginning of USSD message typically followed by digits that comprises of commands or data. Additional asterisk is used to separate group of digits.⁴⁴ Number sign (#) is used to terminate the message. USSD channel is used for innovative payment services *99#. This helps in conducting mobile banking transaction without data, even feature phones can be used to do the same using USSD. An instant messaging service is generally associated with USSD. MPIN/IFSC code/Aadhaar number/Account number is the information required for USSD transactions.
 3. **Aadhaar Enabled Payment Service (AEPS)** - aadhaar online authentication leveraged by the AEPS system and this system also enables Aadhaar Enabled Bank Accounts (AEBA) to be operated in anytime-anywhere banking mode through Micro ATMs. This system is controlled by the National Payments Corporation of India (NPCI). AEPS is a way to get money from the bank account.⁴⁵ Neither signature nor debit card is required to get money through this system. Following informations are required to get money through AEPS transaction –

⁴² ibid

⁴³ Supra note 19

⁴⁴ A. Martha Franciska & Dr. S. Sahayaselvi, 'An Overview On Digital Payments, International Journal of Research' [2017] e-ISSN: 2348-6848, 2104

⁴⁵ A. Martha Franciska & Dr. S. Sahayaselvi, 'An Overview On Digital Payments, International Journal of Research' [2017] e-ISSN: 2348-6848, 2105

- a. Aadhaar Number
 - b. Bank Issuer Identification Number or Name
 - c. Finger Print
4. ***Unified Payments Interface (UPI)*** - UPI is a platform for each and every payment system in India. This was a much need platform for enabling universal, low cost digital payment system both for paying and receiving money by consumers, businesses and merchants. The owner, operator, service provider and coordinator of UPI network are NPCI. To facilitate digital payments through mobile phones architecture and a set of standard Application Programming Interface (API) is enabled by UPI⁴⁶.

The key features of UPI⁴⁷ are-

- a. All the transactions in UPI are conducted through personal phone. These transactions includes person to person, person to entity and entity to person transactions. The request for payments can be made very easily without sharing personal and bank account details, even UPI helps in maintaining several banking relationships through one UPI App.⁴⁸
- b. The transactions can be initiated by both sender or receiver i.e. is payer or payee. The payment can be made “push” as well as received “pull” through mobile phone.
- c. The payment can made without providing sensitive personal information like- bank account details or other credentials on third party websites and apps as VPA has created for UPI. So, the transactions are done using multiple identifiers like- VPA, Aadhar card number, bank account number etc.
- d. APIs are provided for enabling transactions on UPI platforms, this creates a fully interoperable system across every bank, financial institutions and payment systems without having and limited or closed system. These APIs allow innovations by payment service providers to build customized payment service providers to build customized payment solutions for businesses and functionality rich mobile apps for consumers without having change the core API structure.⁴⁹

⁴⁶ NPCI's UPI- Product booklet <<https://www.npci.org.in/PDF/npci/upi/Product-Booklet.pdf>> accessed on 15th October 2022

⁴⁷ Gochhwal Rahul, 'Unified Payment Interface- An Advancement in Payment Systems' [2017] AJIBM-07, 1174-1191

⁴⁸ ibid

⁴⁹ ibid

- e. 2-factor authentication is used by UPI for safe and secure payment transaction through smart phones.
5. **Digital Wallets**- A way to carry money digitally or in digital format is digital wallet. Digital wallet application shall have debit and credit card information linked with it to transfer money online. Services like- balance enquiry, passbook/ transaction history, ass money, accept money, pay money etc. are offered by digital wallets. Most banks have their e-wallets and some private companies e.g.- Paytm, freecharge, mobikwik, ICICI Pockets, Axis Bank Lime, Jio Money, SBI Buddy etc.⁵⁰
6. **Point of Sale Machines**- Point of sale machine has made it easier for cashier to ring up sales and keep tabs on transactions. Time and place where retail transactions are completed is POS. After exchange of goods or provision of services the point when merchant receives the payment from the customers.⁵¹ The receipt is provided by merchant after receiving payment. A retail point of sale system typically includes a cash register (which in recent times comprises a computer, monitor, cash drawer, receipt printer, customer display and a barcode scanner) and the majority of retail POS systems also include a debit/credit card reader.
7. **Mobile Banking**- different types of financial transactions conducted remotely using mobile phones by the customers of banks and different financial institutions through the services called mobile banking. The earliest mobile banking services used SMS known as SMS banking.⁵² In 1999, smart phones with Wireless Application Protocol (WAP) introduction supported enabling use of the mobile web, firstly European banks started offering mobile banking on this platform. The same year PayBox the European company financially supported by Deutsche Bank started mobile banking. Cost reduction of mobile devices & data plans as well as increase in network speed created base for growth of mobile banking. Obtaining bank account details and listing of latest transactions, electronic bill payments, and fund transfers between a customer's or other's account are

⁵⁰ Supra Note 24

⁵¹ A. Martha Franciska & Dr. S. Sahayaselvi, 'An Overview On Digital Payments, International Journal of Research' [2017] e-ISSN: 2348-6848, 2106

⁵² A. Martha Franciska & Dr. S. Sahayaselvi, 'An Overview On Digital Payments, International Journal of Research' [2017] e-ISSN: 2348-6848, 2106

some of the transactions done through mobile banking.⁵³ Ex – iMobile for ICICI bank, Kotak Bank App for Kotak Mahindra bank, SBI freedom app for State bank of India.

8. **Electronic Clearing Services (ECS)** - the bulk payment requirements of corporate and other institutions was fulfilled after introduction of ECS scheme by RBI under 1990s. These bulk payments include – salary, interest, dividend payments etc. on the specified value date customer account is credited with amount this facility is known as ECS (Credit). Utility company's repetitive and periodic collections are effected by ECS (Debit) scheme introduced by RBI. The mandated banks debit the count of consumers and pass the money to the utility companies on repetitive and periodic manner facilitating the consumers or subscribers. This minimizes the use of paper instruments tremendously as well as improves efficiency and customer satisfaction.⁵⁴
9. **National Automated Clearing House (NACH)** - NACH is an electronic banking service to facilitate interbank, high-volume, electronic transactions of repetitive and periodic nature and bulk transactions. For ex- distribution of subsidies, dividends, interest, salary, pension etc. mainly it is used by banks, financial institutions, corporate and government for transfer and collection of funds.⁵⁵
10. **Real Time Gross Settlement (RTGS) System**- this RTGS system was introduced by RBI in the year 2004 to settle inter- banks payments and customer transactions above Rs. 2 lacs. RTGS is a funds transfer system where transfer takes place between one bank to another bank in real time and one gross basis. There is no waiting period for completion of transaction. One to one basis of settlement of transactions is done without bunching number of transactions together. The transactions are irrevocable and final after being processed.⁵⁶
11. **Immediate Payment Service (IMPS)** - IMPS is the payment service introduced by the NPCI. This now a multi channel and multi dimensional remittance platform evolved after launch in year 2010. The platform processes Person to Person, Person to Account and

⁵³ ibid

⁵⁴ ibid

⁵⁵ A. Martha Franciska & Dr. S. Sahayaselvi, 'An Overview On Digital Payments, International Journal of Research' [2017] e-ISSN: 2348-6848, 2108

⁵⁶ ibid

Person to Merchant remittances and transactions as well as this can be initiated from mobile, internet as well as ATMs in India.⁵⁷

12. **Internet Banking**- range of financial transactions done through banks or financial institution's website through an electronic payment system known as Internet Banking. In early 1980s, online banking was first introduced in New York, US.⁵⁸ Citibank, Chase Bank, Chemical Bank and Manufactures Hanover were four major banks which offered home banking services. In 1983, Chemical introduced its pronto services for individuals and small businesses has enabled individual and small business clients to maintain electronic checkbook registers, see account balances and transfer funds between checking and saving accounts. Internet banking services was first provided in India by ICICI bank. Account number and Indian Financial System Code (IFSC) are the information required for internet banking. 11 digit alpha numeric codes which identify the bank branch participating in any RBI regulated fund transfer system are called IFSC. Beneficiary registration is required for the transactions. Person who receives benefit from a particular entity or person is called beneficiary. Beneficiary name, account number, bank address and fund transfer limit is to be provided for registration of beneficiary's information. Services provided by internet banking are-

- a. **Bill Payment service**- payment of telephone bills, insurance premium bills, electricity bills, credit card bills etc. are the internet banking facilities payment provided to customers. Each bank has tie-ups with various utility companies, services providers and insurance premium bills as each bank has tie-ups with various utility companies, service providers and insurance companies, across the country.⁵⁹
- b. **Railway pass**- Railway has tied up with ICICI bank and so the railway pass for local trains is available in online.
- c. **Recharging the prepaid phone**- By just selecting the mobile number and the amount for recharge, phone recharge can be done within few minutes.
- d. **Shopping**- with a range of all kind of products, online shopping and the payment is also made conveniently through the account.

⁵⁷ ibid

⁵⁸ ibid

⁵⁹ A. Martha Franciska & Dr. S. Sahayaselvi, 'An Overview On Digital Payments, International Journal of Research' [2017] e-ISSN: 2348-6848, 2109

3.2. Structure of Digital Payment System

Before understanding the basic structure background of this digital payments structure needs to be understood. According to the type of financial rules and regulations followed by in the market, mobile payment solutions are classified accordingly.⁶⁰ There are 3 types of mobile payment market:

- a. **Highly Regulated Markets** - here mobile payment services are only offered by banks. Mobile phone numbers are linked with bank account of customers, wherever payment is made by customer the amount is debited from the account. Ex- India.⁶¹
- b. **Moderately Regulated Market**- here private companies are allowed to operate mobile payment services as licensed money transmitters. So, consolidated accounts are allowed to operate. Ex- USA.⁶²
- c. **Minimally Regulated Markets**- subscriber's cash is TSP account is allowed to be handled by Telecommunication Service Providers (TSPs) also, TSP is allowed to accept and disburse cash from its outlet. Ex- Kenya

Information can be sent and received through mobile phones. Typically information are sent and received through Short Message Service (SMS), Unstructured Supplementary Services Delivered (USSD) and WAP/GPRS on GSM mobile phones. Encryption of messages before sending provides security for SMS. SSL is used to secure GPRS but, USSD can be only used to send alerts and non-financial information as it is not possible to secure it.⁶³

Standardized format of messages caring inter-bank transaction and financial information are sent through a TCP channel. Two messaging standards are followed in India, the ISO 8583 and the Structured Financial Messaging System (SFMS) to be used in the mobile payment process. Indian banks use SFMS based on SWIFT and ISO 7775 for settlements.

⁶⁰ Deepti Kumar, Timonthy A. Gonsalves and others, 'Mobile Payment Architectures for India' [2010] NCC-2010, 410

⁶¹ ibid

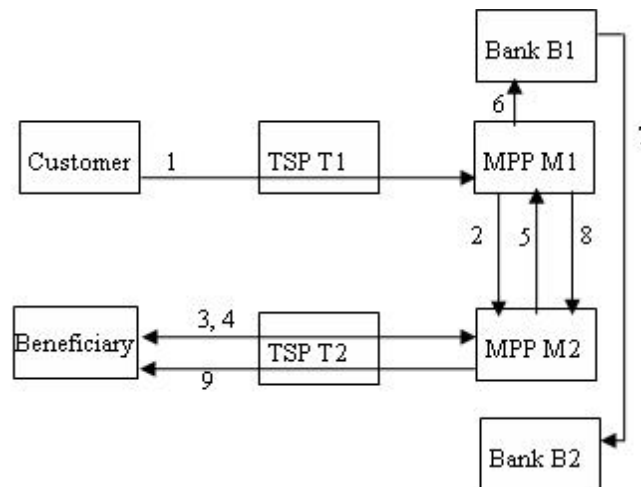
⁶² ibid

⁶³ Deepti Kumar, Timonthy A. Gonsalves and others, 'Mobile Payment Architectures for India' [2010] NCC-2010, 411

For payment and real time transactions ISO 8583 is used by Indian banks; for example, ATM and credit card payments. Both formats can be used in transaction through mobile payments.⁶⁴

Firstly, we will discuss the mobile payments architectures for highly regulated markets. Interoperability, universality and simplicity is supported by this design. The functions which are not traditional is involved in mobile payments. Financial transactions between mobile phone customers are facilitated by Mobile Payment Provider (MPP). It depends on bank whether the MPP functions will be owned by it or it will be outsourced to a third party.⁶⁵

Outline of Mobile Payment Process includes a customer is an account holder in a Bank B1 and is linked with a Telecom Service Provider T1 and a MPP M1. A Beneficiary is an account holder in a Bank B2, is linked with a Telecom Service Provider T2 and an MPP M2. The customer may wish to pay some amount of money to the beneficiary.⁶⁶ This process of payment can be initiated by the customer or the beneficiary; it is called push or the pull process of payment respectively. The party initiating the payment is called initiating party and the other party is called second party.



⁶⁴ ibid

⁶⁵ ibid

⁶⁶ Deepti Kumar, Timonthy A. Gonsalves and others, 'Mobile Payment Architectures for India' [2010] NCC-2010, 413

End-to-end logical flow of a mobile payment transaction⁶⁷

In case of Push process of Payment, the customer through mobile payment app (M1) enters the amount to be paid and mobile number of beneficiary. Information of mobile number and the amount is sent to customer through message in his MPP M1. After finding beneficiary's account, payment request is sent to M2. M2 obtains the authorization from the beneficiary and the transaction is routed to the customer's MPP. Inter-bank transfer of fund is initiated after receiving the information about customer's bank B1 and all payment details through M1. Recall this is a pull process of payments which is initiated by a beneficiary.⁶⁸

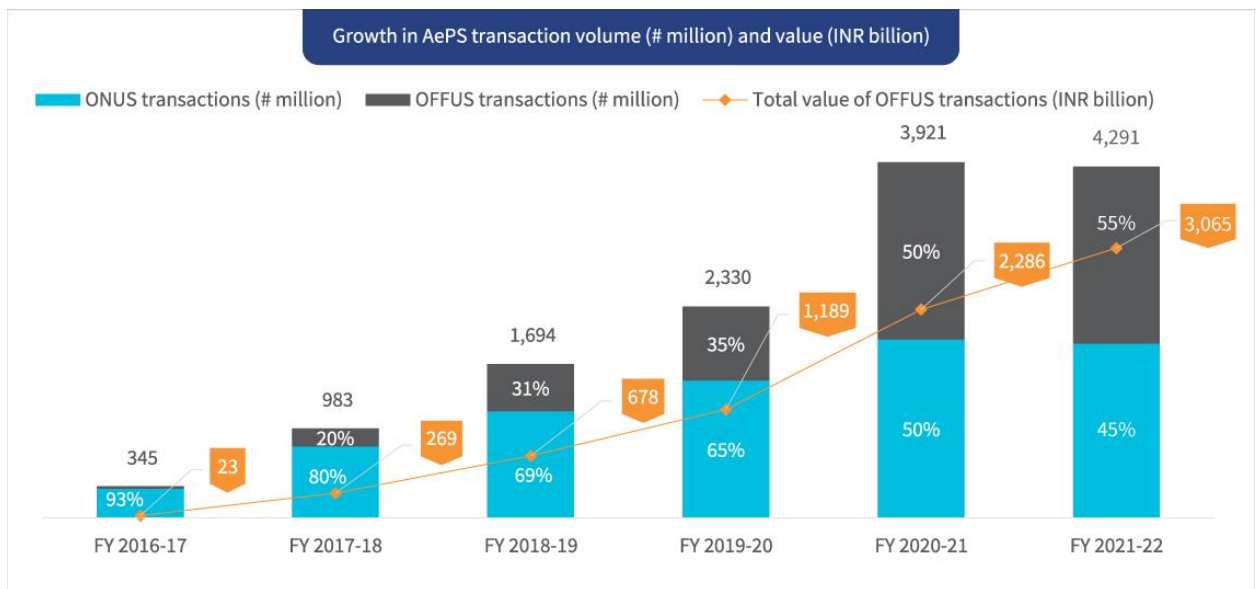
3.3. Future Prospects Of Digital Payments System In India

India has been leading the digital payment system as system developed here is enabling the digital payments. Unified Payments Interface is highly advance system which many countries want to replicate. Growth of digital payments in India is rapid as the transactions increased from 23.4 billion in 2019 to 46.7 billion in July 2022. This is result of transactions in several digital payment products such as- UPI and Aadhaar-enabled Payment Systems (AePS). The number majorly increased due to first time users of these products as well as growing apprehension of relating handling of cash during pandemic. Indian payment ecosystem transformed because of improvement in payment infrastructure, disrupted information and communications technology, regulatory framework, a conducive policy environment, and a greater focus on customer-centricity. Aadhaar –enabled Payment System and BHIM Aadhaar Pay, UPI and Bharat Bill Payments System, card- based payment system such as RuPay and debit card are the major digital payments products available in India.

⁶⁷ Deepti Kumar, Timonthy A. Gonsalves and others, 'Mobile Payment Architectures for India' [2010] NCC-2010, 412

⁶⁸ *ibid*

AePS transactions increased from 113.8 million in 2018 to 404.45 million in July 2022. This is a tremendous increase of 290 million.⁶⁹ It happened due to an increase in withdrawal of money, thanks to increased domestic remittances and government's emergency cash transfer programs.⁷⁰



The volume and value of UPI transactions grew at 119% and 138% of Compound Annual Growth Rate in past 5 years, from 2017-18 to FY 2021-22. Indian digital payment system driven by UPI with 300 million active users and 57 billion average monthly transactions.⁷¹ Person-to-person and Person-to-Merchant transactions are safely done through UPI. In 2022, UPI123Pay⁷² was launched by NPCI to facilitate the transactions among users who don't have Smartphone and internet available. The users with feature

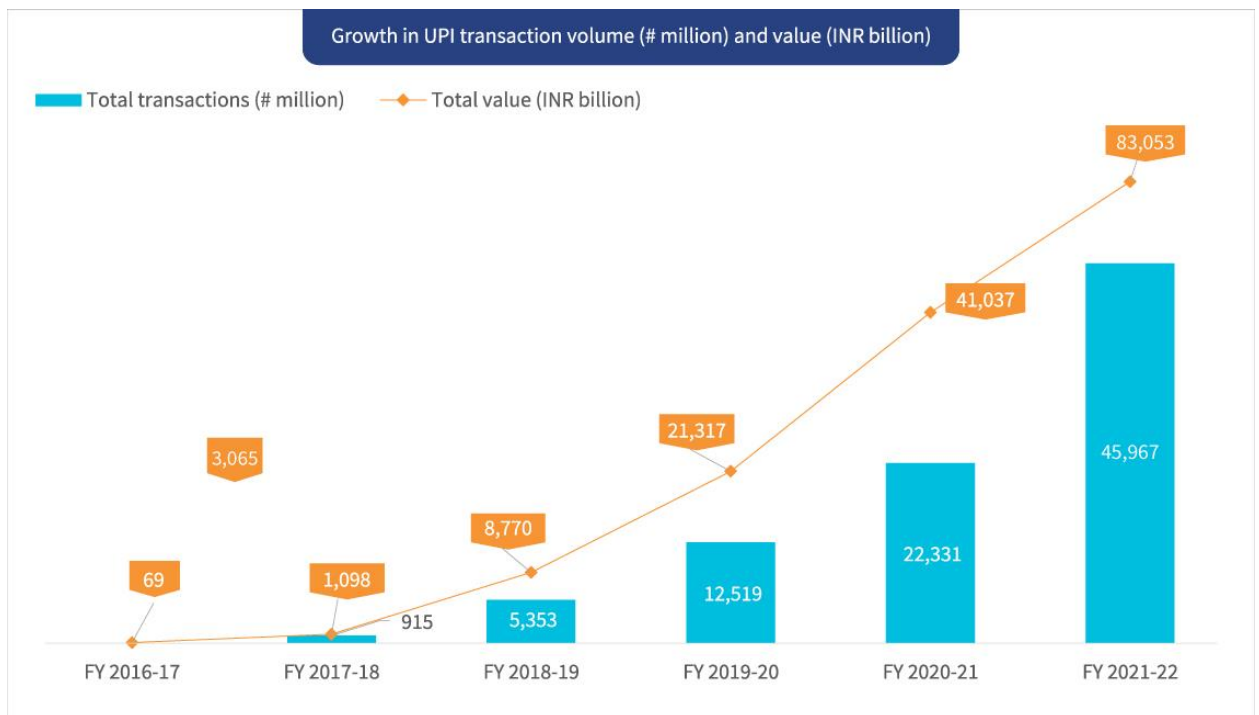
⁶⁹ NCPI Product Statistics <<https://www.npci.org.in/what-we-do/aeps/product-statistics/2022-23>> accessed on 26th May 2023

⁷⁰ Govt. launches mega cash transfer to fight Covid-19 <<https://timesofindia.indiatimes.com/india/govt-launches-mega-cash-transfer-to-fight-covid-19/articleshow/74975904.cms>> accessed on 27th May 2023

⁷¹ Surge in UPI transactions <<https://www.fortuneindia.com/enterprise/upi-transactions-surge-86-ytd-to-844-bn/106342>> accessed on 26th May 2023

⁷² NCPI product review <<https://www.npci.org.in/what-we-do/upi-123pay/product-overview>> accessed on 24th April 2023

phones now use UPI through Interactive Voice Response (IVR). This provided wider range of reach to UPI in India.⁷³

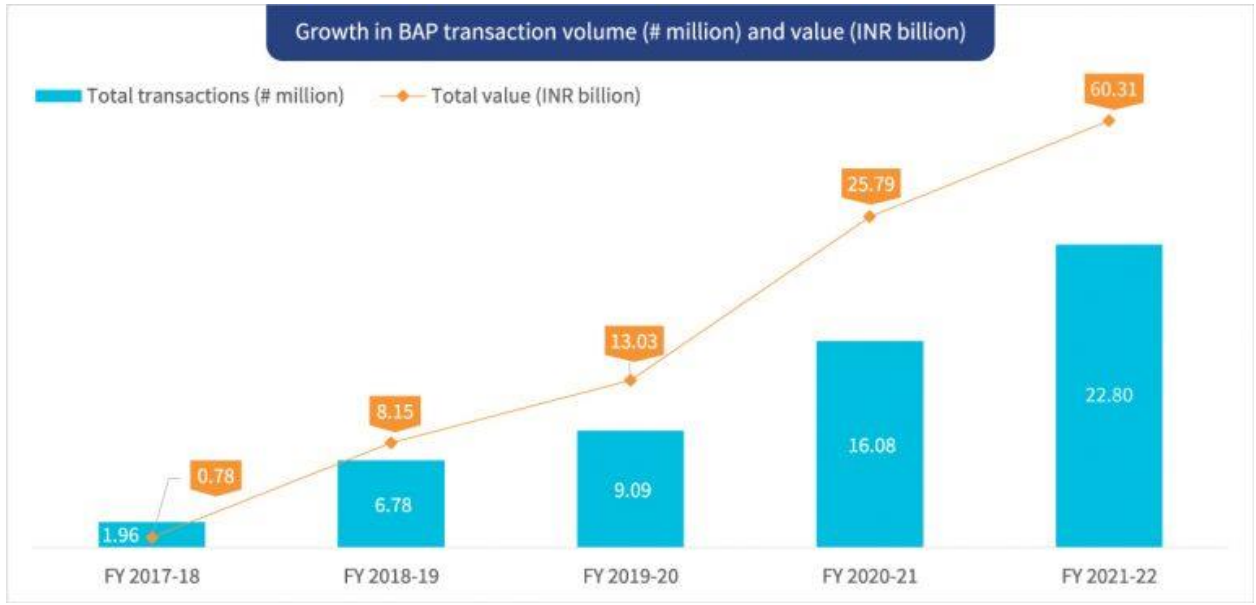


BHIM Aadhaar Pay (BAP) is the merchant version of AePS. Unlike UPI, merchants are enabled to receive payments through Aadhaar authentication from their customers. There is 91% of increase in volume of BHIM Aadhaar Pay in past 5 years. Data shows the increase in average transaction value from Rs. 398 million in 2017-2018 to Rs. 3,189 million in 2021-2022.⁷⁴ So, this is a clear indication that large size transactions are done through BAP. Semi-urban and rural population (merchants and consumers) adopted BAP largely due to its cash back offered till December 2019.⁷⁵

⁷³UPI Product statistics <<https://www.npci.org.in/what-we-do/upi/product-statistics>> accessed on 25th May 2023

⁷⁴ AEPS System, <<https://www.npci.org.in/what-we-do/aeeps/product-statistics/2020-21>> accessed on 24th May 2023

⁷⁵ Adoption of BAP in outskirts of India, <https://www.meity.gov.in/writereaddata/files/gazette_16.05.2018.pdf> accessed on 24th May 2023



Bharat Bill Pay System (BBPS)⁷⁶ has truly simplified the complexity of multiple payment bill recurring industry into one consolidated platform. Now, the multiple billers can conveniently receive payments anytime from this single platform. The volumes of transactions have grown with 62% over past 5 years which clearly shows the preference of customers is BBPS for payment of bills. Categories beside utility bills and airtime top-ups, such as education fees, loan repayments, insurance, fees for cooking gas, municipality taxes, and subscription fees are the additional 19 categories added with 19,500 unique billers in BBPS⁷⁷.

⁷⁶ Bharat bill payment system, <https://www.npci.org.in/PDF/npci/bbp/Bharat%20Bill%20Payment%20SystemProcedural%20Guidelines%20Ver%201.1_0.pdf> accessed on 25th May 2023

⁷⁷ Bharat bill pay, <<https://www.npci.org.in/what-we-do/bharat-billpay/product-statistics>> accessed on 25th May 2023

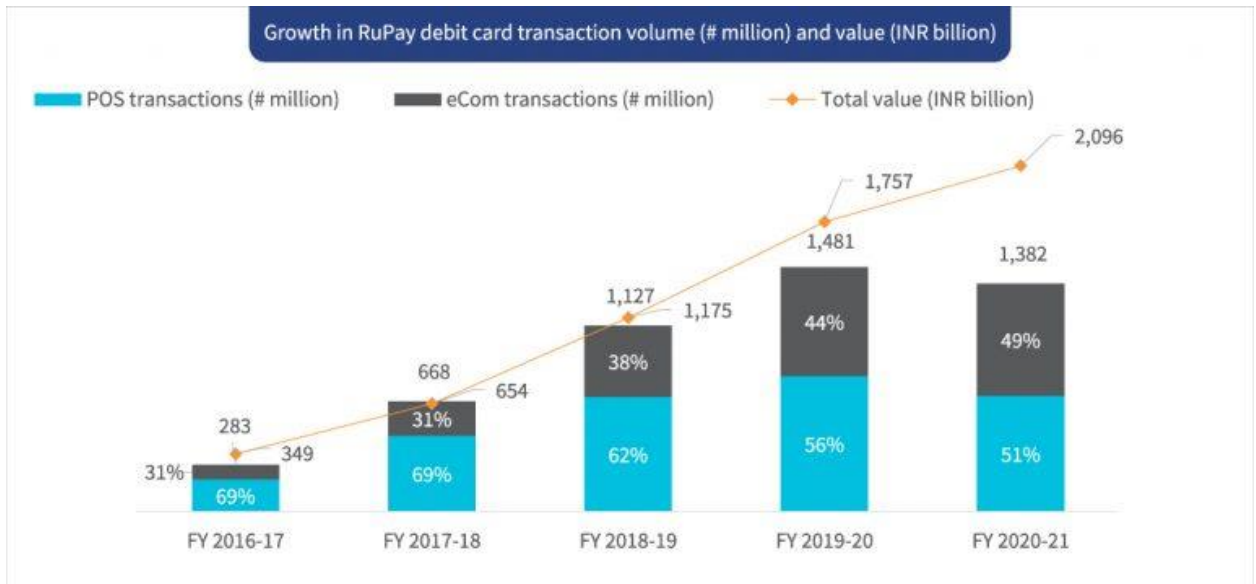


RuPay is Indian card payment network⁷⁸. The processing fees are very low also it is widely accepted at ATMs, PoS devices, and e-commerce across India. The market share of RuPay in total issued debit cards are increased from 17% in 2017 to 60% in 2020.⁷⁹ 94 billion cards are being issued by 1224 banks. Over past 5 years transaction volume has grew by 388%⁸⁰.

⁷⁸ RuPay, <<https://www.rupay.co.in/>> accessed on 23rd May 2023

⁷⁹ Digital Payments booklet, <<https://rbidocs.rbi.org.in/rdocs/Publications/PDFs/PSSBOOKLET93D3AEFDEAF14044BC1BB36662C41A8C.PDF>> accessed on 23rd May 2023

⁸⁰ RuPay, <<https://www.npci.org.in/what-we-do/rupay/live-members>> accessed on 23rd May 2023



On 5th November 2020, the NPCI had declared 30% market cap on total volume of UPI transactions for all third-party app providers (TPAPs)⁸¹. Beginning on 1st January 2021, the cap is calculated on rolling basis per the total volume of UPI transactions during the preceding three months. The alerts are sent to TPAPs by NCPI firstly, when volume of transaction reaches 25%- 27% and secondly, when it crosses 27% through mail⁸².

The on-boarding of new customers must be stopped immediately after reaching 30% cap by TPAP. Still PhonePe, Paytm and Google Pay are dominant in market. Until March 2022, they collectively hold 94.8% of the total UPI transactions as well as 93 % of total value of same. This cap is to ensure positive customer experience offered by UPI and discourage monopolization of digital payment landscape in country.

⁸¹ NCPI defined operating norms for UPI market, <<https://www.livemint.com/news/india/npci-defines-operating-norms-for-upi-market-cap-11616751545305.html>> accessed on 23rd May 2023

⁸²NCPI cap on UPI transactions, <<https://inc42.com/buzz/all-you-need-to-know-about-npcis-30-cap-on-upi-transactions/>> accessed on 23rd May 2023

CHAPTER 4- UNIFIED PAYMENTS INTERFACE FRAMEWORK ANALYSIS

In Indian banking system, major structural changes has been brought through enhanced usage of Information and Communication Technology (ICT). ICT has enabled a variety of electronic payment mechanism, commonly called digital payment services within which UPI has gained popularity. UPI platform is used for sending and receiving money without revealing bank account details, using Virtual Payment Address (“VPA”). These UPI transactions are done only if, user have bank accounts and have registered it on UPI apps like- Google pay, PhonePe, Paytm, BHIM etc.

UPI has universal uses as individuals can make and receives payments through their personal mobiles, pre-authorized multiple recurring payments can be done with one-time secured authentication, through UPI pin payments can be made in one go by the bank sponsored UPI application, this helped in decreasing physical process of transactions.

Participants of UPI ecosystem are NPCI, banks, Bank Account holders/ customers, merchants, Corporate. NPCI is the owner, network operator, service provider and coordinator of the UPI Network. Banks and payment banks with an RBI- approved mobile banking license and IMPS capability are eligible for UPI. Any customer who is on-boarded by a bank with a UPI enabled account and a UPI ID can utilize the services. Participating merchants are those who are on-boarded by their banks to accept UPI enabled payments from customers. UPI also provides the ability for large technology companies, 3rd party processors, and aggregators to connect to banks and provide extensive services to end consumers.⁸³

4.1. Structure of Unified Payment Interface

NPCI hosted and developed a unified interface on which UPI works. This unified interface ensures payment settlements across bank accounts using IMPS and Aadhar

⁸³ Gochhwal Rahul, ‘Unified Payment Interface- An Advancement in Payment Systems’ [2017] AJIBM-07, 1174-1191

Enabled Payment System (AEPS).⁸⁴ Banks, financial institutions or other entities that provide UPI services connect to the NPCI's unified interface through standard API's to enable transactions from VPA avoiding the need to share account details or credentials. Personal phones are always used for payment authentications and authorization in case of UPI. Any-to-any interoperable payments can be accomplished using standard set of APIs, since this layer offers a unified interface.

All APIs are exposed as stateless service over HTTPS using XML input and output and all entities consuming UPI services must ensure idempotent behavior for all APIs. Once the request is sent through UPI, response is sent back separately via corresponding response API as these APIs are asynchronous in nature. After the request is queued, the API calls can be returned to caller immediately.⁸⁵ Transaction ID set by the originating point helps in setting all request-response correlation. Callers are expected to call the API with a unique transaction ID for which response is sent via a response API exposed by the caller. Same API is used for instant payment as well as delayed payment. Without waiting in a blocking mode, APIs can be scaled.

In UPI ecosystem, there is a set of standard APIs exposed to various participants. These APIs are useful in a set of financial and non-financial transactions. To ensure entire system is functioning in an automated fashion there are set of Meta APIs.⁸⁶ These allow PSPs to validate accounts during customer onboarding, validating addresses for sending and collecting money, provide phishing protection using white listing APIs etc.⁸⁷

Some of the key APIs to enable UPI transactions⁸⁸ are-

- a. **Payment API:** This is used to initiate Pay Request (Push Payment) and Collect Request (Pull Payment) and also this primary API is used for routing the transaction. The API contains remitter and beneficiary details.

⁸⁴ Gochhwal Rahul, 'Unified Payment Interface- An Advancement in Payment Systems' [2017] AJIBM-07, 1174-1191

⁸⁵ *ibid*

⁸⁶ NCPI's UPI- Product booklet <<https://www.npci.org.in/PDF/npci/upi/Product-Booklet.pdf>> accessed on 15th October 2022

⁸⁷ *ibid*

⁸⁸ NCPI's UPI- Product booklet <<https://www.npci.org.in/PDF/npci/upi/Product-Booklet.pdf>> accessed on 15th October 2022

- b. **Authorization & Address Translation APIs**- APIs are used to abstain appropriate authorization details and translate the specific Virtual Payment Address to the common global addresses (Bank Account Number and IFSC Code, Aadhaar number). This allows users to simply provide such virtual (tokenized) address to others (individuals, entities etc.) without having to reveal actual account details.
- c. **Keys List APIs**: These APIs enable secure capture and communication of credentials to authenticate transactions by various entities in the UPI ecosystem. These APIs are used to request for and cache the account providers and other entities list of public keys. Trusted and certified NPCI libraries and utilities are used for credential capture and PKI public key encryption at capture time.⁸⁹

4.2. The Unified Payments Interface Ecosystem

The UPI ecosystem mainly includes the major entities and structures responsible for the smooth functioning of the UPI. Here we will be discussing in detail about Payment Service Players banks, Virtual Payment Address, NPCI Central Mapper.⁹⁰

4.2.1. Payment Service Players

Payment Service Players (**PSP**) provides UPI Apps by facilitating UPI payments. Banks, Payments Banks and other third party software providers of banks which acquire customers are consisted in PSPs and provide the UPI payment services through their mobile apps.⁹¹ These PSP UPI apps use UPI libraries and utilities to facilitate customer registration, creation of VPA and provide payment services to the customers. Customers can use any app of UPI they not bond to use the app of their own bank's app.⁹² Moreover,

⁸⁹ *ibid*

⁹⁰ Gochhwal Rahul, 'Unified Payment Interface- An Advancement in Payment Systems' [2017] AJIBM-07, 1174-1191

⁹¹ *ibid*

⁹² Gochhwal Rahul, 'Unified Payment Interface- An Advancement in Payment Systems' [2017] AJIBM-07, 1174-1191

the payer and payee PSP UPI app can be different. PSP UPI App enable following type of transactions for users⁹³;

- a. ***Non-Financial Transaction***- These transactions include customer registration on UPI platform, VPA creation, Set and Change MPIN, OTP requests and bank balance check status of a transaction from the PSP UPI App incase of any issue.
- b. ***Financial Transactions***- These transactions include Push and Collect payments based on VPA, Push transactions based on Account Number and IFSC Code and Push transactions based on Aadhaar Number.

4.2.2. Virtual Payment Address

Every payment transaction requires source account details to make the debit and destination bank details to make the credit. The users can create their VPA for their bank accounts as enabled by UPI. The abstract form to represent and identify the bank account details are through Virtual Payment Address.⁹⁴ So, to make any debit and credit transactions it is important to resolve VPA with your actual bank account. These VPAs are denoted as “xyz@psp” here, xyz can be a unique name and psp is the name of the payment service player that is the applications being used to create VPA.⁹⁵ VPA is stored in the PSP database while the bank account number and IFSC Code (Global Address) is stored in the NPCI Mapper.⁹⁶ Address translation algorithms is exposed by PSPs with NPCI to enable it to decode the VPA into valid bank account details. Thus, The VPA is resolved by the respective PSP UPI Apps while the Account Number and IFSC Code is resolved against the VPA by NPCI Central Mapper. This is a unique feature in UPI since it removes the need to know the full bank details of parties making a transaction. Users can exchange their Payment Address which is sufficient to make the transaction.

4.2.3. NPCI Central Mapper

⁹³ ibid

⁹⁴ NCPI's UPI- Product booklet <<https://www.npci.org.in/PDF/npci/upi/Product-Booklet.pdf>> accessed on 15th October 2022

⁹⁵ Gochhwal Rahul, 'Unified Payment Interface- An Advancement in Payment Systems' [2017] AJIBM-07, 1174-1191

⁹⁶ ibid

To route the payment instructions on mobile number, the central mapper is used. The customer's mobile number, bank accounts, aadhaar number and VPA is maintained central mapper of association with these by the NPCI. Thus, the sending and receiving of money is allowed from mobile number without knowing the destination account details by the central mapper.⁹⁷

Apart from UPI, Aadhaar Payments, National USSD Platforms (NUUP) and IMPS also use this central repository for routing payments. NPCI central mapper is being used by Aadhaar Payment Bridge System (APBS) which helps in transferring direct benefit transfers to individuals on the basis of their aadhaar number.⁹⁸ As aadhaar is linked with the bank accounts of individuals in central mapper this allows aadhaar number to become a payment address in itself.

4.3. Fundamentals of Unified Payments Interface

UPI is a platform for each and every payment system in India. This was a much need platform for enabling universal, low cost digital payment system both for paying and receiving money by consumers, businesses and merchants. The owner, operator, service provider and coordinator of UPI network are NPCI. To facilitate digital payments through mobile phones architecture and a set of standard Application Programming Interface (API) is enabled by UPI⁹⁹. The increasing adoption of smart phones and internet to enable this mobile based instant payment system is leveraged through UPI. This has made mobile phone primary device for transaction of money, as UPI allows the sending and receiving money from bank accounts using phone.¹⁰⁰ IMPS are used to enable immediate payment and settlement between financial institutions involved in transaction. UPI helps in creation Virtual Payment Address (VPA) for everyone having bank account, and then he/she can start transacting through mobile phone.¹⁰¹ This VPA is an individual's unique payment identity and decreases the need to share bank account details

⁹⁷ *ibid*

⁹⁸ Gochhwal Rahul, 'Unified Payment Interface- An Advancement in Payment Systems' [2017] AJIBM-07, 1174-1191

⁹⁹ NPCI's UPI- Product booklet <<https://www.npci.org.in/PDF/npci/upi/Product-Booklet.pdf>> accessed on 15 October 2022

¹⁰⁰ *ibid*

¹⁰¹ *ibid*

while initiating the transactions. UPI is a cost effective digital payment medium unlike issues cards to large population in a country like-India. UPI with mobile phones makes it cost effective for transaction of money.¹⁰²

4.3.1. Improvements brought by UPI in Digital Payment System

The improvements brought by UPI in the existing digital payment system¹⁰³ are-

- a. ***Pull based mobile transaction-*** The existing digital payment transactions which includes cards or online payment mediums where allowing push based transactions i.e. transactions which was only initiated by the customers. So, the pull based transactions were not possible as the no mechanism was there to allow merchants to initiate payment requests which customers can approve and pay. UPI is only platform which enables both push and pull based transactions.¹⁰⁴
- b. ***Interoperable User Interfaces-*** UPI allows payment transactions across different interfaces i.e. payment request can be initiated by one interface and the transaction can be authorized by the other interface. For e.g. seller can request payment from website which user can authenticate and pay using a mobile phone.
- c. ***Abstraction of bank details-*** Sensitive bank account details need not be shared to make any financial transactions. Unique virtual payment address can be created by the user which is a unique identity of the user to make or receive the payment. This helps in making payment securely without sharing any sensitive data.
- d. ***Safety with one click- 2 factor Authentication-*** The transactions are enabled through single click in UPI here, customers just need to enter the PIN on mobile phone through UPI App to make transaction. This is different from other digital payment systems as there is a need to enter card details, username, passwords, OTPs etc. on the device of third party or website to make transactions. In UPI the authorizations and authentications are done by the user's personal mobile phone.

¹⁰² ibid

¹⁰³ Gochhwal Rahul, 'Unified Payment Interface- An Advancement in Payment Systems' [2017] AJIBM-07, 1174-1191

¹⁰⁴ ibid

- e. **Mobile first approach**- UPI is designed to be cost effective medium which eliminates the cost of creating a hardware infrastructure for consumer like- cards etc. so, this embraces the smart phone users in country. In India, majority of population has mobile phones and bank accounts¹⁰⁵.
- f. **Other mobile payment systems**- There are e-wallets which work in their own slots i.e. the payer and payee in this case should be using same platform or app. Here the money needs to be preloaded into the wallet account from bank account which will remain there until and unless it is redeemed back into the bank account.

4.4. Transaction in Unified Payments Interface

There are two types of transactions in UPI-

- a. **Pay Request (Push Payment)** - The user initiate this transaction to push money into bank account of beneficiary. Account number and IFSC Code are used to make this push payment as well as Aadhar number or the VPA of beneficiary is also used.¹⁰⁶
- b. **Collect Request (Pull Payment)** - This transaction is initiated by the beneficiary to pull amount from payer by using VPA. The expiry time limit to collect request can also be defines by the user. The collect request will be received by the payer on his/her PSP UPI App which he will authenticate using 4 or 6 digit PIN to complete the transaction.¹⁰⁷

4.4.1. Transacting Parties in Unified Payments Interface

The maximum number of parties in UPI transactions can be four. These four parties in transaction include two PSPs which provide the UPI interface through the UPI Apps one each for remitter and beneficiary and two banks, one each of the remitter and the

¹⁰⁵ Gochhwal Rahul, 'Unified Payment Interface- An Advancement in Payment Systems' [2017] AJIBM-07, 1174-1191

¹⁰⁶ NCPI's UPI- Product booklet <<https://www.npci.org.in/PDF/npci/upi/Product-Booklet.pdf>> accessed on 15 October 2022

¹⁰⁷ ibid

beneficiary respectively. The two PSPs facilitate the transaction and enable debit from the remitter's bank account and credit into the beneficiary's bank account.¹⁰⁸

4.4.2. Transaction Authorization

There are two factors of authentications for all digital transactions in India. The transactions are authorized and authenticated on the personal mobile phone of the user in case of UPI. The hand bound mobile device fingerprint which is authenticated by UPI is the first factor.¹⁰⁹ Then, the authentication is done by four or six digit MPIN created by the user is the second factor. These libraries are available for all major mobile operating systems viz. android, iOS and Windows. These libraries allow secure capture of credentials like OTP and MPIN.¹¹⁰ The secured credentials are captured by the NPCI libraries. The second credentials (MPIN) are sent to the issuer bank for authentication and upon successful authentication a transaction to complete.

4.4.3. Transaction Flow of UPI Payments

Here we will discuss about the process from registration of customers and banking account registration till transaction flow. This will basically give us an idea about the whole transaction process of UPI.

I. Customer Registration

- a. Users can download any PSP UPI application from app discovery platforms like- Google Play or Apple App Store on mobile phone with mobile number registered with their bank.¹¹¹
- b. The PSP UPI application will send an encrypted outward SMS from the user's mobile phone automatically to check the authenticity of the mobile number registered with user's bank and to enable hard binding

¹⁰⁸ Gochhwal Rahul, 'Unified Payment Interface- An Advancement in Payment Systems' [2017] AJIBM-07, 1174-1191

¹⁰⁹ *ibid*

¹¹⁰ *ibid*

¹¹¹ NCPI's UPI- Product booklet <<https://www.npci.org.in/PDF/npci/upi/Product-Booklet.pdf>> accessed on 15 October 2022

of the mobile device with the mobile number. This hard binding of the device acts as a device fingerprint.¹¹²

- c. User can now create unique Virtual Payment Address which will be unique payment ID for the users.

II. Bank Account Registration

- a. Users can register their bank account on the UPI App. The Issuing Bank authenticates the mobile number registered with the bank and, it provides list of all bank accounts registered against the mobile number which is displayed to the user on UPI App.¹¹³
- b. The PSP stores the account details received by the Issuer bank in its database. At this stage, the PSP Database contains the information such as registered mobile number, VPA, Name of user on UPI App and bank name, Account number and IFSC code.¹¹⁴
- c. User now needs to create a MPIN to authenticate the transactions. An OTP Request is generated by the UPI App to NPCI for the newly added account. NPCI request as OTP from the issuer Bank and the Issuer banks send the OTP over SMS on the registered mobile number of the user.¹¹⁵
- d. To establish the personal bona fide of the user, the user is asked to enter the last 6-debit card number, expiry date, OTP received on the registered mobile number. In order to create the PIN, user enters the desired MPIN on NPCI library embedded in the UPI App.¹¹⁶
- e. The card details and OTP is authenticated by the Issuer Bank and UPI application sends this MPIN to NPCI which in turn send it to issuer bank by encrypting it. The Issuer bank decrypts the encrypted MPIN with its Private Key and confirms the setting of the MPIN.¹¹⁷

¹¹² *ibid*

¹¹³ Gochhwal Rahul, 'Unified Payment Interface- An Advancement in Payment Systems' [2017] AJIBM-07, 1174-1191

¹¹⁴ *ibid*

¹¹⁵ *ibid*

¹¹⁶ Gochhwal Rahul, 'Unified Payment Interface- An Advancement in Payment Systems' [2017] AJIBM-07, 1174-1191

¹¹⁷ *ibid*

III. Transaction Flow

- a. To make a push Payment (Pay Request) the user needs to enter either the VPA or the Account number and IFSC Code or Aadhaar Number of the beneficiary.
- b. User enters the MPIN on NPCI libraries embedded in the UPI app. MPIN is encrypted using NPCI public key and sent to UPI which is decrypted using NPCI private key. NPCI again encrypts the MPIN using Issuer Bank's Public key and sends it to the Issuer Bank which then decrypts the MPIN using its own Private Key. Issuer Bank then authenticates the MPIN and debits the remitter's bank account and credits the Beneficiary's bank account.¹¹⁸
- c. Similarly in case of Pull Payment (Collect Request) user makes a collect request by entering the VPA of the payer. Beneficiary's UPI App sends the request to NPCI which in turn sends the request to Remitter's PSP for resolution and authorization.¹¹⁹

Payer needs to enter MPIN on Payer PSP UPI App to authenticate the payment. On successful PIN authentication by the Issuer Bank, the amount is debited from the bank account of the payer and instantly credited into the bank account of the Beneficiary

¹¹⁸ NCPI's UPI- Product booklet <<https://www.npci.org.in/PDF/npci/upi/Product-Booklet.pdf>> accessed on 15 October 2022

¹¹⁹ NCPI's UPI- Product booklet <<https://www.npci.org.in/PDF/npci/upi/Product-Booklet.pdf>> accessed on 15 October 2022

CHAPTER 5- REGULATION OF DIGITAL PAYMENT SYSTEM IN INDIA

Financial system in country is transforming due to technological innovations that is why payments are mostly impacted by these innovation. Earlier it mainly impacted the larger payment system but, now huge retail transactions are conducted digitally this revolution has enabled households and businesses to make and receive payments. These efforts have recognized the rising number of people adopting digital payments, especially during pandemic.

5.1. The Payments and Settlements System Act, 2007

The increase in consumer shift towards digital payments as well as it's given value proposition, key enablers shall be reassessed to create conducive ecosystem for sustaining usage of digital payments by retail consumers. Legal and regulatory framework is one of conducive key enablers. The Payment and Settlement System Act, 2007 (PSS Act) is the primary law for governing digital payments. This was enacted in year 2007 when digital payments market in India was at its nascent stage. 280 circulars and notifications have been issued by RBI under PSS Act. This clearly showcase that entire regulatory framework is developed through secondary legislation without proper guidance from primary statute. Ex- the regulatory framework related to e-wallets and payment aggregators authorized by PSS Act but subordinated legislation regulates the substantive provisions for operating payment services, obligations relating to risk management, consumer protection, interoperability etc.¹²⁰

This law was mainly enacted to systematically regulate payment systems also, provides the power to regulate financial systems. Policy goals and legal provisions critical to growth of a retail payments sector are not taken into account by the PSS Act.¹²¹ The existing Gap is sought to be addressed by RBI in case of primary law under which directions are issued several times, regulatory or policy response is not optimal in this

¹²⁰Digital Payment Laws in India, <<https://theprint.in/opinion/why-indias-stagnated-law-for-digital-payments-must-be-redesigned/752753/>> accessed on 28th May 2023

¹²¹ ibid

case. International best practices of several countries standards are still not achieved, along with policy intervention, undertaken efforts to modernize their payment law to adapt to faster growing sector.

So, the reassessment of PSS Act is required to fulfill the needs of developments taken place in the retail payments sector in India. Modern retail payment service laws in India that is built on the principles of proportionate regulation and balances regulatory flexibility with well-established statutory mandates that can promote competition, innovation and consumer protection.¹²²

“The sec. 18 of this act is related to electronic, non-electronic, domestic and international payment’s regulation and policies”¹²³. “The section 10 (2) discuss about the power to determine and issue guidelines for the efficient management of payments system”¹²⁴.

The emergence of technologies has changed the payment landscape extensively; this has lead towards technology led payment solutions after enactment of PSS Act. This Act has not gone through any important changes despite this development. There were only few amendments done related to protection of consumer funds and finality of payment and settlement instructions.¹²⁵

The redesigning of PSS Act related to digital payment system is required for adopting new payment products and services also evolution of payment sector.

PSS Act shall be redesigned to adapt new payment services and evolution of payments sector. There shall be enactment of separate law to regulate payment activities. This clearly showcases the requirement for amendment of Act.

- I. As the payment sector is continuously growing, the law proposed shall adopt an approach which is principles based. The standard should be set by the primary statute for regulated entities to conduct its business accordingly. There should

¹²² Supra note 99

¹²³ Payments and Settlement System Act, 2007

¹²⁴ ibid

¹²⁵ Supra note 99

flexibility provided to regulator for expanding on principles through sub-ordinate legislation. Certainty for business can be promoted through this.

- II. New and emerging payment services faced by consumers shall be included in definition of ‘payment services’. This identification will provide clarity in new businesses as well as it will be helpful in regulating it effectively.
- III. The regulation should be risk based i.e. the regulation is proportionate to the risk posed by a payment service. So that emerging businesses could innovate without undue regulatory intervention. The law should provide a two-tiered regulatory structure with authorization requirements for payment service providers (PSPs) and a designation framework for systemically important payment systems.¹²⁶
- IV. The law proposed for regulating digital payment system shall provide-
 - a. Operational Risk Management principles;
 - b. PSPs should have consumer protection information related to confidentiality of data, grievance redressal, disclosure of information, liability for unauthorized transaction etc.
 - c. Objectivity and non-discrimination as a criteria payment system infrastructure should have open access ensured by framework.
 - d. Interoperability of payment solution and designated payment system shall have specific provision.
- V. The appointment of TPSPs by PSPs and liability of PSPs shall be clarified by law. Risk assessment should be undertaken by PSPs of such providers and same should be informed to RBI.¹²⁷

Regulatory framework is a key enabler for the promotion of digital payments as it helps in sustained use of digital payments by all customer segments.

¹²⁶Modernizing law payment services in India, <<https://blogs.law.ox.ac.uk/business-law-blog/blog/2021/11/modernising-law-payment-services-india>> accessed on 28th May 2023

¹²⁷ ibid

5.1.1. Framework for Outsourcing of Payment and Settlement- related Activities by Payment System Operator

This framework was implemented by the RBI under circular dated 3rd Aug, 2021 under section 10 (2) read with section 18 of PSS Act.¹²⁸ Non- bank PSOs are covered under this framework to manage the risk in outsourcing the payments and settlement related activities. Various risks including- compliance risk, contractual risk, cyber security risk, legal risk, operational risk, strategic risk etc. are associated with outsourcing process of payments and settlement.

The provision of framework includes, “The core management activities of PSOs shall not be outsourced, including risk management and internal audit; the process of outsourcing shall be critically processed by the PSOs; due diligence shall be exercised in respect of outsourcing; the terms and condition governing the contract between the PSO and the service provider shall be carefully vetted by legal counsel of PSO; digital ID shall be provided to people having access to IT environment for continuously tracking them till termination”.¹²⁹

5.2. Reserve Bank of India Regulations Related to Digital Payments System

In digital payments system RBI plays very important role to cope with the various issues. RBI has issued circulars and notifications for the smooth and proper functioning of digital banking. On focusing upon the RBI circulars we can understand the role of RBI in digital payments system.

5.2.1. Role of RBI Circular and Master Directions in Digital Payments System

While adopting the policies in every year, RBI issued a master circular as guidelines which help to understand about the RBI’s monetary policy of the particular year. RBI updates its guidelines on every year so that the government, commercial banks, and the general public able to know about the monetary policies of RBI for that particular year. It

¹²⁸ Payment and Settlement System Act, 2007

¹²⁹ Framework for Outsourcing of Payment and Settlement- related Activities by Payment System Operator < <https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=12136&Mode=0> > accessed on 15th May 2023

is incorporation of all guidelines directives or instrument on some of the particular subject which consolidate all relevant matters time to time documented officially. As RBI has issued master circulars on digital payment system for smooth functioning of same and to make it secure for the customers. It tries to cover all the risks attached with the digital payments.

5.2.2. Consumer Protection- Limited Liability of Customers in Unauthorized E-Banking Transaction

This circular of July, 2017 mainly focuses upon the protection of the customers by limiting the liability of the customers by various ways in relation to unauthorized e-banking. It involves various instances including the zero liability and limited liability of customers which made this circular more fruitful for the customers.¹³⁰ The main points mentioned under circular are-

- I. Under this circular the e-banking transactions are divided into two-
 - i. Online payments/ Remote transactions (this include the transactions which doesn't involve the physical payment instrument at the time of transaction like mobile banking, internet banking)
 - ii. Proximity/face-to-face transactions (this transaction involve the physical payment instrument like ATM)¹³¹
- II. Banks have to register their customers for SMS and e-mail alerts. It is mandatory for all banks to register customer's phone number and emails against their account details, so that they can inform them if any authorized electronic transaction taken place via customer's account. Moreover the customer will get 24*7 banking services if they registered their phone number or email id with bank account.

¹³⁰ Customer Protection- Limiting Liability of Customers in Unauthorized Electronic Banking Transactions, <https://rbi.rg.in/Scripts/BS_CircularIndexDisplay.aspx?ID=11040> accessed on 28th May 2023

¹³¹ *ibid*

- III. Most importantly this circular focuses upon the zero liability and limited liability of the customer under some of the circumstances. The circumstances are-
- i. The customer is entitled for zero liability if,
The negligence or contributory fraud or deficiency taken place in the part of the bank.
 - a. Third party breach taken place where the deficiency lies neither with the customer or with the banks but it lies in the system, and if the customer informs the bank within 3 working days from receiving the notification from the bank regarding the unauthorized transaction.
 - ii. A customer shall be liable for the loss due to the unauthorized transaction (limited liability of customer), if –
 - a. “The loss taken place due to the negligence of the customer such as where he has shared the payment credentials, the customer will bear the entire loss until he reported of the unauthorized transaction to the bank. The responsibility regarding loss occurring after the reporting of the unauthorized transaction shall be borne by the bank.”¹³²
 - b. Third party breach taken place where the deficiency lies neither with the customer nor with the bank but it lies in the system, and if the customer will not inform the bank within 4 to 7 working days from receiving the notification from the bank regarding the unauthorized transaction, then the customer limitedly liable for that deficiency, and if the liability of the reporting of the customer goes beyond 7 working days then the liability of the customer will determine by the bank’s board approved policy.
- IV. In case of unauthorized electronic banking transaction, the burden of proving the liability of customer shall lie in the bank.

¹³² ibid

5.2.3. Master Direction on Digital Payment Security Controls

On February 18, 2021 RBI provided this master direction for regulated entities to establish proper structure of governance and to provide minimum standards of security controls for digital payments in India. “This includes the guidelines for the Internet banking, mobile payments, card payments, consumer protection, and grievance redressal mechanism”¹³³. “The applicability of this direction on regulated institutions including-scheduled commercial banks (excluding Regional Rural Banks), Small Finance banks, Payments Banks, Credit Card issuing NBFC”¹³⁴

Separate policies shall be formulated by registered entities for different digital payments products which later becomes a part of or included in overall product policy. “Mechanics, clear definition of starting point, critical intermittent stages/ points and end point in the digital payment cycle, security aspects, validations till the digital payment is settled shall be included in the digital payments product and services.”¹³⁵

“Risk Assessment with regard to safety and security of the digital payments product and related process must include-

- a. Technology based solution,
- b. Vulnerabilities attached to the digital products and remedial action to be taken by the entity,
- c. Checking the dependence on TPSP,
- d. Tracking the risk arising out of integration of digital payments platform”¹³⁶

In case of generic security control, the digital payments channel in case of communication protocol shall follow the secure standards. In this ecosystem appropriate level of encryption and security will be present. Hidden cookies or any other client side storage information shall not be hidden in the web application providing digital payments

¹³³Master direction on Digital Payments security control, <<https://www.rbi.org.in/scripts/NotificationUser.aspx?Id=12032&Mode=0>> accessed on 30th May 2023

¹³⁴ Master direction on Digital Payment security control <<https://www.rbi.org.in/scripts/NotificationUser.aspx?Id=12032&Mode=0>> accessed on 30th May 2023

¹³⁵ ibid

¹³⁶ Master Direction on Digital Payments Security control <<https://www.rbi.org.in/scripts/NotificationUser.aspx?Id=12032&Mode=0>> accessed on 30th May 2023

products or services. In Application Security Life Cycle (ASLC) provides that the digital payments product include multi-tier application architecture, which segregates application database and presentation layer shall be implemented. The security shall be embedded within the digital payments product applications. Security objective shall be explicitly defined by the registered entities.

In case of fraud risk management, the suspicious transactions shall be indentified and the registered entities must document the configuration aspect identifying the suspicious activity and implement the rules detective types of control, mechanism to alert the customer in case of failed authentication. As per applicable parameters shall be monitored by the system alerts and defense mechanism shall be activated. There shall be additional level of authentication related to brute force attacks etc shall be used to protect vulnerable website of internet banking.¹³⁷

Hence these are some of the basic guidelines or instruments given by RBI in the form of master circular or reports or notification for the smooth running of digital payments system in India.

5.2.4. Regulation related to Digital Wallet

According to the report of RBI, electronically stored pre-paid value issued by authorized 'issuer' and issuer has the liability for the stored value is called e-money. Central authority of country back the value denominated in currency.

Prepaid Payment Instruments (PPIs) - "Payment instrument that facilitate purchase of goods and services, including financial services, remittance facilities etc. against the value stored on such instruments" is called PPIs. They can be of three types:

- a. ***Closed system payment instruments***: the holder receives from entity issue it to facilitate the purchase goods and services from issuer itself. Example includes brand's gift card.
- b. ***Semi-closed payment instruments***: for purchase of financial services, remittance facility and other goods and services this instrument is used at a

¹³⁷ ibid

group of identified merchants locations or establishments which have a specific contract with the issuer to accept the PPIs as payment instruments. Cash withdrawals are not permitted by these instruments, irrespective of it is issued by banks or non-banks.

- c. ***Open System PPIs***: it is issued by banks and are used at any merchant for purchase of goods and services this also includes financial services, remittance facilities etc.

The semi-closed payment instruments includes digital wallets which is a reloaded instrument issued only in electronic form. “Master Direction on Issuance and operation of Prepaid Payment Instruments” provides for regulatory framework for digital wallets, issued by RBI under section 18 read with section 10 (2) of the Payment and Settlement System Act, 2007. For the first time non- bank entities were permitted to issue semi-closed instruments under 2009 guidelines. Since then several amendments are done in these guidelines.

After demonetization, RBI provided a comprehensive set of directions to be followed by the operation of online payments by private entities. So, major changes were done in master directions in 2017 and further in year 2019 after feedback from major stakeholders. With increase in number of private entities operating digital wallets, some key issues addressed by master directions are-

- a. ***Eligibility criteria***- Companies incorporated under Companies Act, 1956 or Companies Act, 2013 can issue and operate PPIs after receiving authorization from RBI. According to regulation 3 (1)¹³⁸, entities are required to seek authorization from DPSS of the RBI by submitting application in prescribed manner.
- b. ***Capital Requirements***- the approval requires RBI to look into net-worth of an entity. Minimum paid-up capital requirement is of Rs. 5 Crores and minimum positive net worth required is of Rs. 1 crore for non-banking entities in pre-2017

¹³⁸ Payment and Settlement System regulation, 2008

directions. Now, there is no requirement of minimum paid-up capital but, minimum positive net worth requirement has been increased upto Rs. 5 Crore.

At the time of submitting of the application for approval the minimum requirement of positive net worth is to be satisfied in latest audited balance sheet. All times balance sheet shall be maintained. Additionally, within 3 years of RBI authorization, entity has to achieve minimum net worth of Rs. 15 crore which shall be maintained all time.

- c. **KYC requirements**- Based on level of KYC compliances two types of semi-closed PPIs can be issued by issuers. First is issued with minimum or limited KYC. Mobile number of customer verified through OTP, self declaration of name and government identification number for authentication of account is included in minimum details of KYC.

PPIs with limited KYC compliances can be only used for purchasing goods and services but, bank transfers and interoperability of the instrument is not permissible. Amount of fund loaded cannot exceed ten thousand rupees in a month and one lakh rupees in a financial year. This should be mandatorily converted into full-KYC compliant within 18 months.

Fund transfer back to source, bank account transfers as well as transfer to beneficiaries of up to 1 lakh rupees per month is allowed in case of full KYC compliant PPIs apart from purchasing goods and services.

- d. **RBI Master Direction on Know Your Customer (KYC)** – It shall be adhered by entities operating a digital wallet. Sound framework for the prevention of money-laundering is provided in Master Directions and compliance with Prevention of Money Laundering Act, 2002 and the Prevention of Money-Laundering (Maintenance of Records) Rules, 2005 framed is necessary since the non-bank issuers are essentially in the business of operating a payment systems.
- e. **Security of Payments** - data shared during transaction by customers is properly protected, that's why RBI has emphasized on strong risk management system. Now, entities also issue an Information Security Policy approved by their Board as per guidelines. To prevent fraudulent transactions some of the mandatory requirements are-

- Same login provided by PPI issuer for its wallet and its other services, this information needs to be clearly conveyed to the holder.
- Multiple invalid attempts to log in should be restricted.
- Customer's consent is required through authentication in every payment transaction also, alerts should be sent out for every transaction.
- In new PPI account 'cooling period' for fund transfer is a requisite as per norms. Alerts are sent to the customers to review the new additions and prevent erroneous transactions.

5.3.National Payments Corporation India Regulations Related to Digital Payments System

NPCI is the regulatory body and owner of UPI. It has various role and responsibilities which include the right to either operate or maintain the UPI network on its own or provide or operate necessary services through third party service providers. It provides and maintain network infrastructure relevant to the operation of the UPI platform, it revises the UPI architecture and its procedural guidelines as and when required, it also issues circular from time to time to disclose major decisions, to relevant stakeholders.

5.3.1. Regulatory Framework of UPI in India

The regulatory framework of UPI will mainly discuss about the NCPI and RBI circulars relating to the dispute redressal mechanism, Upper limit of UPI transactions as well as role and responsibilities of NCPI, TPAP and PSP banks.

I. *Dispute Redressal Mechanism*

- a. Third Party Appliance Provider¹³⁹ (TPAP) for ex- Amazon Pay, Google Pay, CRED, PhonePe, Samsung Pay etc. and Payment Service Provider¹⁴⁰ (PSP) for

¹³⁹ TPAP is a service provider and participates in UPI through PSP Bank.

¹⁴⁰ PSP is banking company that is a member of UPI and connects to the UPI platform for providing UPI payment facility to the PSP and TPAP which in turn enables the Users and merchants to complete payment transactions over UPI.

ex- Axis Bank, HDFC, ICICI Banks etc. Applications on which the any end consumers of UPI can raise their complaints.¹⁴¹

- b. The complaint can be raised after selection of relevant UPI transactions by the end user or customer.¹⁴²
- c. A complainant shall raise the complaint with the relevant TPAP firstly, with respect to UPI related grievances/complaints of the end-user customers onboarded by the PSP Bank/TPAP (if the transaction is made through TPAP App). In case the complaint/grievance remains unresolved, the next level for escalation will be the PSP Bank, followed by the bank (where the customer have his/her bank account) and NPCI, in the same order. After exercising these options, the end-user customer can approach the Banking Ombudsman and/or the Ombudsman for Digital Complaints, as the case may be.¹⁴³
- d. These complaints can be related to any transaction i.e. fund transfer and merchant transactions.
- e. The status or update relating to the complaints shall be communicated to the consumers by the TPAP or PSP on the respective UPI App used by the customer.

5.3.2. Upper Limit of UPI Transaction

Upper limit of transaction through UPI is 2 Lacs ¹⁴⁴. But, different TPAP follow different upper limit of transactions as per PSA guidelines. Some of those limitations are as follows¹⁴⁵-

¹⁴¹ UPI dispute resolution mechanism < <https://www.npci.org.in/what-we-do/upi/dispute-redressal-mechanism>> accessed on 28th November 2022

¹⁴² *ibid*

¹⁴³ *ibid*

¹⁴⁴ Transactions in UPI, < <https://economictimes.indiatimes.com/wealth/save/does-i-need-to-register-a-beneficiary-before-transferring-funds-through-upi-what-is-maximum-i-can-transfer/my-upi-transaction-has-failed-but-my-bank-account-has-been-debited-/slideshow/91737946.cms>> accessed on 28th November 2022

¹⁴⁵ Google pay support, <<https://support.google.com/pay/india/answer/9616021?hl=en>> accessed on 28th November 2022

Bank Name	Bank Type	UPI transaction limit	UPI daily limit
Allahabad Bank	Public Sector Bank	25000	100000
Apna Sahakari Bank	Cooperative Bank	100000	100000
Axis Bank	Private Bank	100000	100000
State Bank of India	Public Sector Bank	100000	100000
Union Bank of India	Public Sector Bank	100000	200000
ICICI Bank	Private Bank	10000 (Rs. for Google Pay users) 25000 for Google Pay users)	10000 (Rs. for Google Pay users) 25000 for Google Pay users)
Karnataka Vikas Grameena Bank	Regional Rural Bank	25000	25000

5.3.3. *Functional Responsibilities of Entities in UPI Ecosystem*

Here we will be discussing about the responsibilities of major three entities which includes NPCI, TPAP and PSP Banks responsible for the UPI transactions in India.

I. Role and Responsibilities of NPCI

- a. ***Regulation of UPI***- The rules, regulations, guidelines, and the respective roles, responsibilities and liabilities of the participant related to UPI is prescribed by NCPI. This also includes transaction processing and settlement, dispute management and clearing cut-offs for settlement.¹⁴⁶
- b. ***Approvals and Security of UPI*** - The participation of Issuer Bank, PSP Banks, TPAP and Prepaid Payment Instrument issuers in UPI is approved by NCPI.¹⁴⁷ Safe and secure UPI system or network is ensured by NPCI.¹⁴⁸

¹⁴⁶Role and responsibility of NCPI, < <https://www.npci.org.in/what-we-do/upi/roles-responsibilities>> accessed on 28th November 2022

¹⁴⁷ ibid

¹⁴⁸ ibid

- c. **Settlement and audit of members**- An online transaction routing, processing and settlement service to member participating in UPI is provided by NPCI.¹⁴⁹NPCI can either directly or through a third party, conduct audit on UPI participants or call for data, information and records, in relation to their participation in UPI.
- d. NPCI provides the banks participating in UPI access to system where they can download reports raise chargeback's, update the status of UPI transactions etc.

II. **Role and Responsibility of PSP Bank**

- a. **Registration of end-users** - PSP Bank, either through its own app or TPAP's app. On boards and registers the end-user customers on UPI and links their bank accounts to their respective UPI ID.¹⁵⁰
- b. **Authentication of customers** - The responsibility for authentication of the end-user customer at the time of registration of such customer, either through its own app or TPAP's app is on the PSP Banks.¹⁵¹
- c. **On-boarding TPAP** - They engage and on-board the TPAP's to make the TPAP's UPI app available to the end-user customers.¹⁵²PSP Banks has to ensure that TPAP and its systems are adequately secure to function on UPI platform.
- d. **Storage of data** - PSP Bank stores all the payments data including UPI Transactions Data Collected for the purpose of facilitating UPI transactions, only in India.
- e. PSP Bank is responsible to give all UPI customers an option to choose any bank account from the list of Banks available on UPI platform for linking with the customer's UPI ID.¹⁵³
- f. **Grievance redressal**- PSP Bank is responsible to put in place a grievance redressal mechanism for resolving complaints and disputes raised by the end-user customer.¹⁵⁴

¹⁴⁹ Role and responsibility of NPCI <<https://www.npci.org.in/what-we-do/upi/roles-responsibilities>> accessed on 28th November 2022

¹⁵⁰ ibid

¹⁵¹ ibid

¹⁵² ibid

¹⁵³ Role and responsibility of NPCI <<https://www.npci.org.in/what-we-do/upi/roles-responsibilities>> accessed on 28th November 2022

¹⁵⁴ ibid

III. Role and Responsibility of TPAP

- a. **Compliance of requirements** - TPAP is responsible to comply with all the requirements prescribed by PSP Bank and NPCI in relation to TPAP's participation in UPI.¹⁵⁵ TPAP is responsible to ensure that its system is adequately secure to function on the UPI.
- b. **Compliance of regulations** - TPAP is responsible to comply with all applicable laws, rule, regulations and guidelines etc. prescribed by any statutory or regulatory authority in relation to UPI and TPAP's participations on the UPI platform including all circulars and guidelines issues by NPCI in this regard.¹⁵⁶
- c. **Storage of data** - TPAP has to store all the payments data including UPI Transaction Data collected by TPAP for the purpose of facilitating UPI transactions, only in India.
- d. TPAP is responsible to facilitate RBI, NPCI and other agencies nominated by the RBI/NPCI, to access the data, information, systems of TPAP related to UPI and carry out audits of TPAP, as and when required by RBI and NPCI.¹⁵⁷

5.4. Grievance Redressal Mechanism

Various grievance redressal mechanisms plays important role in settlement of complaints and providing justice to consumers. This includes internal grievance redressal bodies of the bank, the banking ombudsman and the consumer forum.

5.4.1. Internal Grievance Redressal Body of banks

The Banking Code and Standard Boards of India (BCSBI) came up with a code called Code of Banks Committee to customers which although enacted in this year of 2006 but amended with the new banking system in the year 2018.¹⁵⁸ This code is enacted in order to place a least standard of fair and transparent banking system throughout the country.

¹⁵⁵Role and responsibility of NCPI, < <https://www.npci.org.in/what-we-do/upi/roles-responsibilities>> accessed on 28 November 2022

¹⁵⁶ ibid

¹⁵⁷ ibid

¹⁵⁸ Grievance redressal mechanism, <<https://www.bcsbi.org.in/GrievanceRedressal.html>> accessed on 28 May 2023

In case of any issue it becomes compulsory for the customers to approach the concerned branch first if any kind of problem arose or in relation to frauds. The grievance can be informed to concerned bank through e-mail or call. After registration of complaint banks investigate the matter and inform the customer within 30 days of receiving the complaint. The ombudsman and any other authority are unable to handle any e-fraud cases of the customers if the customers do not inform the bank before complaining the matter to any other authority.

After complaining to the concerned branch if the problem is unresolved at the branch level, one can move to the zonal or the regional office of the concerned bank for advice. If the zonal office does not give any response within 30 days or if the customer is not satisfied with the particular result he can take help of other authorities like ombudsman, consumer redressal forum or courts.

5.4.2. Banking Ombudsman

In cases when banks fail to provide satisfactory services to customers or become unsuccessful to safeguard their rights of the customers. So, for the redressal of complaints of the customer, the banking ombudsman was formed under the guidance of RBI, in terms of section 35A of the Banking Regulation Act, 1949.

5.4.2.1. Banking Ombudsman Scheme, 2006

This scheme of 2006 has been implemented from 1st January, 2006 by replacing the scheme of 2002. As per the preamble of the scheme, the scheme has been introduced to resolve the various complaints of the customers in relation to some of the services rendered by the bank with some suitable solution. The scheme is mainly operating under the guidance of the RBI. The RBI even can suspend the scheme, if it thinks for, in general or specific bank.

- I. ***Appointment***- The authority for the appointment of the officer of ombudsman is upon the RBI. RBI appoints their one or more senior ranked officer like- Chief

General Manager or General Manager as ombudsman. He/she is appointed for the term not more than 3 years.¹⁵⁹

II. *Grounds of grievance under ombudsman*- the grounds for complaint included under the clause 8 of the scheme. This clause was amended in 2017 and included different deficiencies including the internet banking issues. Along with the other ground the ground for complaint in relation to digital payments system are-

- i. If the banks or any of its subsidiaries does not adhere the instructions of RBI in operations of ATM/debit card or any other pre-paid card services in relation to-
 - a. “Although the account debited but the specified amount of cash does not dispensed by ATM’s
 - b. Account debit more than once for one withdrawal in ATMs or for POS transaction
 - c. Less/Excess amount of cash dispensed by ATMs.
 - d. Debit in account without use of the card or details of the card
 - e. Use of stolen/cloned cards

III. Any other kind of deficiencies as per the guidance of RBI”¹⁶⁰

- i. If the banks or any of its subsidiaries does not does not adhere the instructions of RBI in operation of credit card services in relation to-
 - a. “Unwanted calls for Add-on Cards, insurance for cards etc.
 - b. Charging of Annual Fees on Cards issues free for life
 - c. Wrong Billing/ Wrong debits.

¹⁵⁹ RBI, ‘RBI amends Banking Ombudsman Scheme: Includes Complaints relating to Misselling and Mobile/Electronic Banking’ June 23, 2017; press Release: 2016-2017/3473

¹⁶⁰ Banking Regulation Act, 1949

- d. Aggressive calls/ unsuitable approach of recovery by recovery agent together with non-observance of RBI guidelines on engagement of recovery agent.
 - e. Incorrect reporting of credit information to Credit Information Bureau.
 - f. Postponement or failure to review and correct the credit status on account of wrongly reported credit information to Credit Information Bureau.
 - g. Any other complaints in relation to credit cards.”¹⁶¹
- ii. If the bank non-obedient towards the guidelines of the RBI in terms of e-banking or mobile banking in relation to-
 - a. Breakdown or delay in online payment or fund transfer.
 - b. Unlawful electronic payment or fund transfer.

IV. Rejection of complaint- the authority may reject the complaint on some specific grounds mentioned under clause 13 of the scheme. These grounds are-

- i. Not under the specific grounds mentioned under the ombudsman scheme. [clause 13 (a)]
- ii. The given information and adjudication before the ombudsman was not appropriate for adjudicating such complaint. [clause 13 (d)]
- iii. The authority found that there was no such heavy damage or loss in the part of the complaint and it is found that for the inconvenience of the complainant for which such damage taken place. [clause 13(g)]
- iv. The complaint is filed without sufficient clause. [clause 13 (e)]
- v. If it is not followed with the application by the complainant with diligence. [clause 13 (f)]
- vi. If the matter is beyond the jurisdiction (pecuniary) of the ombudsman. [clause 13 (c)]

¹⁶¹ ibid

- vii. If the amount proposed for recovery is more than 20 lakh.
- viii. If the complainant did not file the complaint before the bank prior to filing with ombudsman.
- ix. If the same case is pending before any court or tribunal.

5.5. Cyber Security Laws and Regulations in India

Earlier, one of the products of digital payment system the UPI Apps use to provide only e-wallet facilities to consumers which was pull transactions as the customers could only deposit the money in e-wallets using debit cards but, could not deposit money from e-wallets to bank accounts.¹⁶² Later, NCPI certified these apps to free transfer money instantly between different bank accounts of users through UPI.

Overall the weakest link is digital payment system registration only requires knowledge of phone number and the ability to receive one message on that phone number. So, the attacking software or application only requires providing OTP during registration and for stealing the user's UPI PIN. As, banks in India do not cross check or verify the number registered by the user and accept any number registered. This increases the threat of registering every debit card in family on one app and uses the same for transactions which can be really dangerous.

The modus operandi of cyber crimes relating to digital payments are -

- a. **Phishing Links**- Third party phishing website is created which is similar to the original website and its links are circulated through messages, e-mails, social media etc. after clicking on any of these links the user's personal information or sensitive personal information are shared such as UPI PIN, OTP, Passwords.¹⁶³
- b. **Vishing calls**- Imposter calls are done by the fraudsters through telephone or social media posing as employee of the bank or of UPI application Company.

¹⁶² Kumar Renuka, Kishore Sreesh & ors., 'Security Analysis of Unified Payment Interface and Payment Apps in India' [2020] IJRSET -9, 339-375

¹⁶³ RBI's A Booklet on Modus Operandi of Financial Fraudsters < <https://cms.rbi.org.in/>> accessed on 25 November 2022

They pressurize or trick the customers to share confidential information important for unauthorized transactions such as- OTP, Password, UPI PIN etc.¹⁶⁴

- c. ***Frauds due to use of unknown/unverified mobile apps***- The crimes are conducted through certain app links circulated through messages, e-mails, social media etc. after clicking on these links the unknown or unverified apps are downloaded in phone etc. This downloaded app gives complete access of the phone to fraudster and every detail stored in devices.¹⁶⁵
- d. ***A fraud using screen sharing app or remote access***- These screen sharing apps helps fraudsters watch and control phone of consumers as well as gain access of phones. This is done to carry unauthorized transfers of funds.¹⁶⁶
- e. ***SIM swap or SIM cloning***- The fraudsters try and get access to the original SIM card of user and obtain duplicate which they use to receive OTP and to carry out unauthorized transactions. They also collect other information stored in SIM.¹⁶⁷
- f. ***Scam through QR code scan***- Fraudsters often contact the user's and trick them to scan the QR code using the app on phone of the customer. The customer unknowingly authorizes the fraudsters to withdraw money from their account by scanning QR code.¹⁶⁸

The users register on UPI Apps following the protocol provided by NCPI. This registration can be on any UPI Apps of user's choice, and finally enable transactions.¹⁶⁹ But, there transactions are not fully secured and have several security threats. Some of the potential security threats created due to problem in basic design of UPI are-

- a. **Unauthorized registration using the consumer's phone**- The hacker can install an app in customer's phone and keep attacking until he gets all information related to bank accounts and registration on UPI of consumer. Later hacker will get all transactions diverted to his account with unauthorized registration.¹⁷⁰

¹⁶⁴ ibid

¹⁶⁵ ibid

¹⁶⁶ RBI's A Booklet on Modus Operandi of Financial Fraudsters <<https://cms.rbi.org.in/>> accessed on 25 November 2022

¹⁶⁷ ibid

¹⁶⁸ ibid

¹⁶⁹ ibid

¹⁷⁰ ibid

- b. The Bank account details of a user of UPI Apps are revealed by UPI protocol in any default, given the user's cell number and no bank related credentials.
- c. Device hard-binding, the first factor, relies on data that is easily harvested from a device. The UPI does not use any secret for this step.¹⁷¹
- d. Device binding mechanism is weak which allows a user to bind his/her phone with a phone number registered to the bank account to another user.
- e. Setting the UPI PIN, the second factor, requires partial debit card information printed on the card, which is not a secret. The debit card PIN, a secret. The debit card PIN, a secret a user shares with the bank, is never used. This is a lower bar as online and in-store purchase requires the entire card number and the debit card PIN.¹⁷²
- f. When transferring an existing user's UPI accounts to a new phone, UPI does not require the user to provide any bank-related credentials or the printed debit card information to authorize transactions from the new phone. The UPI protocol relies on the UPI PIN alone.¹⁷³
- g. On third-party apps, the pass-code, the third factor, is managed by the third party app server and hence easy to bypass. An attacker can bypass the pass-code requirement by setting up an attacker controlled profile (using attacker credentials) with the app. In this case, UPI effectively relies only on two factors device binding and UPI PIN.¹⁷⁴
- h. The bank account number leaked from the default work-flow of any of the third-party apps is enough to reset a user's pass-code on another UPI app.

5.5.1. RBI's notification on "Consumer Awareness- Cyber Threats and Frauds"

RBI on 28th January, 2022 in a press release named "Consumer Awareness – Cyber Threats and Frauds" cautioned citizens against the cyber crimes. This specified to be

¹⁷¹ *ibid*

¹⁷² UPI Payments- Top security issues & possible way around <<https://community.nasscom.in/communities/digital-transformation/fintech/upi-payments-top-security-issues-possible-way-arounds-an-opinion.html>> accessed 20 November 2022

¹⁷³ Kumar Renuka, Kishore Sreesh & ors., 'Security Analysis of Unified Payment Interface and Payment Apps in India' [2020] IJIRSET -9,

¹⁷⁴ *ibid*

aware of fraudulent messages, spurious calls, unknown links, false notifications; unauthorized QR Codes etc. also, promised help in securing concessions/expediting response from banks and financial service providers in any manner.¹⁷⁵

RBI has mentioned all the above mentioned modus operandi through which the fraudsters are attempting to get the entire confidential details like- user id, login/transaction password, OTP, UPI PIN and other personal information. Also, urged public to practice safe digital banking by taking precautions, while carrying out digital transactions.¹⁷⁶

They shared the safe digital banking practices which includes- “Never share your account details such as account number, login ID, passwords, UPI PIN etc; Always access the official website of the bank or e-wallet provider or contact branch for any banking related issues; do not download any unknown app; transactions involving receipt of money do not require scanning barcodes/ QR codes or entering MPIN; Always access the official websites for contact details; check URLs and domain names received in e-mails/SMSs for spelling errors; if you receive any OTP for transactions which is not initiated by you do not share it with anyone; Do not share the password of your e-mail linked with your bank account; Do not be misled by advices intimating deposit of money on your behalf with RBI for foreign remittances etc”.¹⁷⁷

5.5.2. Regulatory Framework Relating to Cyber Security

Here we will be discussing mainly about the regulations of IT Act in context of major cyber crimes relating to digital payment system. This includes unauthorized access to computer system networks, Denial of Services, Crime Relating to Data Alteration or Destruction, Identity Theft and Impersonation and Skimming.

5.5.2.1. Unauthorized Access to Computer System or Networks

“Computer relating offenses” in India are dealt under Section 66 of *IT Act*. It states, “If any person, dishonestly or fraudulently, does any act referred to in section 43”, “he shall

¹⁷⁵ RBI’s notification on Consumer Awareness – Cyber Threats and Frauds < <https://cms.rbi.org.in/>> accessed on 25 November 2022

¹⁷⁶ *ibid*

¹⁷⁷ *ibid*

be punishable with imprisonment for a term which may extend to three years or with fine which may extend to five lakh rupees or with both”¹⁷⁸. And section 43 of *IT Act* states “penalty and compensation for damage to computer, computer system etc.”¹⁷⁹

The *IT Act* has dealt with unauthorized access in section 43 (a) where the person “without the permission of the owner or any other person, who is in-charge accesses computer without authorization”, would entail civil consequences.¹⁸⁰ So, owner’s authorization is most important in case of accessing computer or other electronic devices. Even, not any actual damage, either data or information damage or computer damage, is required for liability under section 43 (a) of the Act and mere “unauthorized access” is enough.¹⁸¹ This specifies that provision related to “unauthorized access” is stringent.

Hacking was earlier used to “refer to crime under section 43 of *IT Act* but at the same time, ethical hacking was considered legal and is also being taught by various experts at schools and colleges.” Therefore, it becomes very important to demarcate between “good or bad hacking”.

¹⁷⁸ Information Technology Act, 2000, s 66

¹⁷⁹ Penalty and compensation for damage to computer, computer system, etc. -If any person without permission of the owner or any other person who is in-charge of a computer, computer system or computer network,-(a) Accesses or secures access to such computer, computer system or computer network [or computer resource];

(b) Downloads, copies or extracts any data, computer data base or information from such computer, computer system or computer network including information or data held or stored in any removable storage medium;

(c) Introduces or causes to be introduced any computer contaminant or computer virus into any computer, computer system or computer network;

(d) Damages or causes to be damaged any computer, computer system or computer network, data, computer data base or any other programmes residing in such computer, computer system or computer network;

Disrupts or causes disruption of any computer, computer system or computer network;

Denies or causes the denial of access to any person authorized to access any computer, computer system or computer network by any means;

Provides any assistance to any person to facilitate access to a computer, computer system or computer network in contravention of the provisions of this Act, rules or regulations made there under;

Charges the services availed of by a person to the account of another person by tampering with or manipulating any computer, computer system, or computer network,

Destroys, deletes or alters any information residing in a computer resource or diminishes its value or utility or affects it injuriously by any means;

(j) steal, conceals, destroys or alters or causes any person to steal, conceal, destroy or alter any computer source code used for a computer resource with an intention to cause damage; he shall be liable to pay damages by way of compensation to the person so affected.

¹⁸⁰ Information Technology Act, 2000, s 43 (a)

¹⁸¹ *ibid*

In the case of *Abhinav Gupta V. State of Haryana*¹⁸², the court observed that although the terms ‘hacking’ directly is not incorporated in the IT Act, yet it can be said that it is covered under the wider ambit of “computer related offenses”.

5.5.2.2. Denial of Services

A denial of service attack is characterized by “an explicit attempt by attackers to prevent legitimate users of services from using those services”. Section 43 (f) of the *IT Act* specifically provides for “penalty in case anyone is found guilty of causing denial of access” and therefore any act concluding into denial of access would be covered by “sub-section (f) of section 43” the *IT Act*.¹⁸³

5.5.2.3. Crime Relating to Data Alteration or Destruction

There are four kinds of programs available: namely virus, worms, Trojan horse and Logic Bombs which strike on the computer or its data by way of transmitting programs designed to destroy, alter, damage, or even send across data residing in the computer and with the growth of the internet, the threat has multiplied many-fold. Quite easily can one knowingly or unknowingly transfer such programs via e- mail.¹⁸⁴ With the technological advancement the computers and data stored in it are negatively impacted, as in cyber world data is gold. So, there is always a danger of stealing.

A virus can be regarded as “a program that searches out other programs are executed, the embedded virus is executed too, thus propagating the infection and on the other hand, a worm is a program that propagates itself over a network reproducing itself as it goes and unlike a virus, worm does not require a medium to propagate itself and infect others”.¹⁸⁵

Trojan horse can be regarded as- “a malicious, security-breaking program that is disguised as something benign, such as a program to find and destroy viruses”.¹⁸⁶ On the other hand, “a logic bomb is “a code surreptitiously inserted into an application or operating system that cause in to perform some destructive or security compromising

¹⁸² 2008 CrLJ 4536

¹⁸³ Information Technology Act, 2000, s 43 (f)

¹⁸⁴ Rakesh Aggrawal & A.P. jaiswal, *Cyber Laws* (1st ed. 2011)

¹⁸⁵ *ibid*

¹⁸⁶ *ibid*

activity whenever specified conditions are met and another way to enter into a computer is creating a backdoor”.¹⁸⁷

The *IT Act* covers the area of introduction of viruses, etc. it provides that, “if any person without permission of the owner or person in-charge of a computer contaminant or computer virus into any computer, computer system or computer network, he shall be liable to pay damages by way of compensation to the person so affected”.¹⁸⁸

Further, section 43 (i) of *IT Act* deals with “punishment for destruction or alteration of information in a computer resources by the owner or person in charge of computer or computer system”¹⁸⁹ and section 43 (j) of the Act states that- “if any person without permission of the owner or any other person who is in-charge of a computer, computer system or computer network teal, conceals, destroys or alters any computer source code used for a computer resources with an intention to cause damage, then he shall be liable to pay damages by way of compensation to the person so affected”.¹⁹⁰

5.5.2.4. Identity Theft and Impersonation

The *IT Act* provides that – “the identity of a person shall be deemed to have been stolen when any unique identification of a person (such as her electronic signature or password) is fraudulently or dishonestly used. The Act prescribes a penalty of imprisonment of up to 3 years and fine which may extend to 1 lakh rupees”.¹⁹¹

¹⁸⁷ *ibid*

¹⁸⁸ Information Technology Act, 2000, s 43 (c); Explanation (i) to 43 of the IT Act further defines "Computer contaminant" means any set of computer instructions that are designed-

(a) To modify, destroy, record, transmit data or programme residing within a computer, computer system or computer network; or (b) By any means to usurp the normal operation of the computer, computer system, or computer network; and Explanation (iii) states "computer virus" means any computer instruction, information, data or programme that destroys, damages, degrades or adversely affects the performance of a computer resource or attaches itself to another computer resource and operates when a programme, data or instruction is executed or some other event takes place in that computer resource.

¹⁸⁹ IT Act, 2000, s 43 (i); section 43 (i) states that- if any person without permission of the owner or any other person, who is in-charge of a computer, computer system or computer network destroys, deletes or alters any information residing in a computer resource or diminishes its value or utility or affects it injuriously by any means, then he shall be liable to pay damages by way of compensation to the person so affected.

¹⁹⁰ Information Technology Act, 2000, s 43 (j)

¹⁹¹ Information Technology Act, 2000, s 66C

The *IT Act* provides that – “whoever, by means of any communication device or computer resources cheats by impersonation, shall be punished with imprisonment of upto 3 years and with fine which may extend to 1 lakh rupees”.¹⁹² The IPC further provides that “any person who cheats by impersonation shall be punishable with imprisonment of up to 3 years and/or fine”.¹⁹³

In *Sandeep Varghese V. State of Kerala*,¹⁹⁴ section 65, 66, 66A, 66C, 66D of *IT Act* and section 419, 420 of *IPC* were applied to make the accused liable for impersonating an existing web address.

5.5.2.5. Skimming

It is an offence wherein “skimmers use skimming machines or in other words cloning machines to commit credit cards frauds and the fake card which is cloned card is used to make illegal transactions involving purchase of goods and services on internet or indulge in gambling or purchase of pornographic materials”.¹⁹⁵ This offence would fall under section 66, 66C, and 66D of the *IT Act* read with sections 419 and 420 of the *IPC*

¹⁹² Information Technology Act, 2000, s 66D

¹⁹³ Indian Penal Code, 1860, s 419

¹⁹⁴ (2010) 2 KLJ 458

¹⁹⁵ Information and communication technology
<https://epgp.infliber.ac.in/epgdata/uploads/epgp_content/law/07_information_and_communication_technology_/09_new_cyber_crimers/et/5746_et_09_et.pdf> accessed on 29 October 2022

CHAPTER 6- COMPARITIVE ANALYSIS OF REGULATIONS RELATED TO DIGITAL PAYMENT SYSTEM BETWEEN INDIA AND USA

Recent developments in Digital Payments System in both India and U.S will have far-reaching impact in economy and society of both the countries. This is also going to impact the traditional payments and settlement system. the instant payment systems offers efficient and faster payment based of the existing system of payments and settlements which makes it inclusive payments process. On the backdrop of this system we will study the basics of payments and settlement in U.S. as well as laws and regulations relating to same. This will further compared to understand the issues relating to laws and regulations of both the countries.

6.1. Money and Payments in United States

Three core functions are served by money.¹⁹⁶Firstly, it is used to price goods and services. Secondly, it must be served as the medium of exchange. Thirdly, it must serve as store of value. This clearly shows that the value of money can be preserved over time. Public and private money are the two forms of money. Central bank money primarily comes under U.S. Public money, this mainly federal reserve issued liability.¹⁹⁷For everyday transaction this money is used in form of currency or Federal Reserve note. Treasury issues coin which is also included in public money. On the other hand, Private Money includes “commercial bank money”, commercial bank accounts are dominated by

¹⁹⁶ A historical source for this taxonomy (along with a fourth function, standard of value) is W. Stanley Jevons, *Money and the Mechanism of Exchange* (1875). U.S. coins and currency, including Federal Reserve notes, are “legal tender,” meaning that these instruments are valid payment for debts, taxes, and other dues. See Jess Cheng & Joseph Torregrossa, *A Lawyer’s Perspective on U.S. Payment System Evolution and Money in the Digital Age* < <https://www.federalreserve.gov/econres/notes/feds-notes/a-lawyers-perspective-on-us-payment-system-evolution-and-money-in-the-digital-age-20220204.htm>.> accessed on 28 May 2023

¹⁹⁷ Treasury securities are often considered another form of public money, although generally not used for payment. Consequently, the definition abstracts from Treasury securities, although the substitutability of money with Treasury securities should be considered. See Arvind Krishnamurthy & Annette Vissing-Jorgensen ‘The Aggregate Demand for Treasury Debt’ [2012] 120 *J. Pol. Econ.* 233; Stefan Nagel ‘The Liquidity Premium of Near-Money Assets’ [2016] 131 *Q. J. Econ.* 1927

dollar balances.¹⁹⁸ Private money also includes the other liabilities of non-banks such as balance held with fintech companies etc. both private and public money has been co-existing in U.S from long back. But, the safety and liquidity of both public and private money differ while consumers may pay for the same goods and services with liquid currency or bank deposit equally at ease. No credit or liquidity risk is present in central bank money so, this eliminates the risk of transaction uncertainty, financial stability and supporting economic activities. But, liquidity or credit risk may be presented by private money as per solvency or liquidity of the issuer of money and government's backstop. On demand private money can be converted into public money on one-to-one basis. So, private money is susceptible to escape especially when solvency or liquidity of assets or liabilities of the private issuer come into question and holders try to convert it all into public money. Though it is mitigated in case of federally and state chartered insured depository institutions.¹⁹⁹

6.1.1. Payment systems

Exchange of goods and services for enabling the economy is facilitated by Payment systems. For transferring money there is specific set of rules and processes in a payment system. In the process of “clearing” sharing and verifying the information in payments in done and in “settlement” transfer of funds to discharge the obligation is done.²⁰⁰ This process of clearing and settlement in the payment system requires-

¹⁹⁸ Board of Governors of the Federal Reserve System, Money & Payments: The U.S. Dollar in the Age of Digital Transformation <<https://www.federalreserve.gov/publications/files/money-and-payments-20220120.pdf>> accessed on 28 May 2023. In this context, the term “bank” refers to state and federally chartered depository institutions. Transactions within the same institution (e.g., between two customers of the same bank) settle in the liabilities of that institution.

¹⁹⁹Under the BSA framework, U.S. financial institutions, including banks and money services businesses (MSB), are generally required to fulfill a number of core obligations, including record-keeping, reporting suspicious activity, monitoring transactions, establishing and executing customer identification programs, verifying customer identities, and maintaining anti-money laundering/countering the financing of terrorism (AML/CFT) programs. Financial Crimes Enforcement Network, The Bank Secrecy Act, <<https://www.fincen.gov/resources/statutes-and-regulations/bank>> accessed on 28 May 2023

²⁰⁰ See Bank for International Settlements Committee on Payments and Market Infrastructures, Correspondent banking, Glossary, <<https://www.bis.org/cpmi/publ/d00b.htm?m=2266>> accessed on 2 June 2023. Board of Governors of the Federal Reserve System, Federal Reserve Policy on Payment System Risk <https://www.federalreserve.gov/paymentsystems/files/psr_policy.pdf> accessed on 2 June 2023; Board of Governors of the Federal Reserve System,

- a. Parties to the transaction as well as participants which includes- senders, receivers and one or more financial institutions.
- b. Assets for transfer among participants.
- c. Procedure and obligation associated with the transaction.

Generally, consumers and businesses use “retail payment system” and “wholesale payment system” in accessed by financial institutions. The high volume of transactions with lower value is conducted by consumers and businesses in case of retail payment systems. Larger value transactions conducted by government agencies and financial institutions is supported in case of wholesale system.

Simplest form of payment is physical currency and it is universally acceptable without any additional charge or transaction fees. Also, privacy of users is not threatened in physical currency transactions. But, in case of transaction of large amount cash have drawbacks as it may get lost or destroyed, a lot of them can't be audited.²⁰¹ Capitalizing on anonymity, portability and liquidity of cash transactions many criminal activities like- terrorism, money laundering etc. for which financial institution have taken steps.²⁰² On the other hand, Non-cash payment system which includes debit and credit cards, large value fund transfer system and ACH Operators. This system offers transferability without any limitation on value and geographical distance, traceability, also permission of automation of payment and request of payment is provided. As in case physical currency some non- cash transactions also settles the transactions in real time and on transaction-by-transaction basis which know as “gross settlement”.²⁰³ “Net settlement” are the transactions of non-cash payment done on predetermined time. Central banks money is involved in the non-cash payment transactions regardless of net or gross settlement. This

²⁰¹ Under the Bank Secrecy Act (BSA) and implementing regulations, financial institutions and any nonfinancial trade or business must file a report concerning a transaction, or series of related transactions, in excess of \$10,000 in currency.

²⁰² Department of the Treasury, 2022 National Terrorist Financing Risk Assessment <<https://home.treasury.gov/system/files/136/2022-National-Terrorist-Financing-Risk-Assessment.pdf>> accessed on 2 June 2023

²⁰³ Board of Governors of the Federal Reserve System, Fedwire Funds Services, <https://www.federalreserve.gov/paymentsystems/fedfunds_about.htm> accessed on 2 June 2023

system is administered centrally, which is governed by rules mutually agreed and process defined for dispute resolutions, errors and fraudulent transactions.

6.1.2. Cross-border payment systems

Transaction of money between person and business present in two different jurisdictions is cross border payments. Typically cash, debit or credit card, wire or ACH transfer is used for making cross-border payments in US. Correspondent banking network is used to settle the cross border payments²⁰⁴, for batch of retail payments net basis and for wholesale payments per transaction basis²⁰⁵. “Correspondent banking system helps card network to settle cross-border payments with each transaction relying on the issuing bank of the payer and the acquiring bank of the payee. Remittance service providers can also rely on correspondent banking networks to send remittances to their destination, especially when the payment destination is an affiliated entity. Other remittance providers with operations at both the origin and destination of a payment may settle transactions on their own books, in a closed-loop system. For wholesale payments, large private cross-border payments platforms provide cross- border and foreign exchange mechanisms for financial institutions on their own platform, but local central bank-operated payment infrastructure, such as fedwire in the US, underpins final settlement.”²⁰⁶

New ways for payments to cross borders is created by central banks, legacy financial service providers, and new entrants to financial services. Cross-border payments space is being entered by financial technology companies, particularly for peer-to-peer payments. “For example, the remittance market is entered by financial technology companies, allowing consumers to fund “mobile wallets” online with their bank accounts and credit

²⁰⁴ Correspondent banking can be defined as arrangements where one bank (correspondent) holds deposits owned by other banks (respondents) and provides payment and other services to those respondent banks. Bank For International Settlements Committee on Payments and Market Infrastructures, Correspondent banking <<https://www.bis.org/cpmi/publ/d147.pdf>> accessed on 2 June 2023

²⁰⁵ Financial Stability Board, Enhancing Cross-Border Payments <<https://www.fsb.org/wp-content/uploads/P090420-2.pdf>> accessed on 2 June 2023

²⁰⁶ Robert Lindley, Reducing Foreign Exchange Settlement Risk, BIS Quarterly Review <https://www.bis.org/publ/qtrpdf/r_qt0809g.pdf> accessed on 2 June 2023

or debit cards and to send money directly to foreign mobile wallets.²⁰⁷ However, these providers often must still rely on correspondent banks for settlement or provide “on us” settlement, in which both legs of a foreign exchange transaction are settled on the books of a single bank. Finally, even when available, not all commercial banks offer these services on competitive terms, or at all, to retail consumers. In addition, the total number of active correspondent banking relationship and active corridors has declined over the past decade.”²⁰⁸

6.1.3. Intermediaries

Banks and non-bank institutions providing payment services and issues money of private forms are the intermediaries. These intermediaries are often involved in payments and money. Customers, businesses and non-bank intermediaries receive money issued by bank as deposits and other liabilities. Some of the money help by banks for depositors are available on demand. Customers can make or receive payment from customers of other bank as transfer of money is allowed by banks through payment services. Conversion of deposit balance into paper currency is allowed to customers as banks facilitate the distribution of cash from Federal Reserve to bank customers.²⁰⁹ Custody of money, issuance and transfer of money are the functions of non-bank intermediaries. At international level, the mobile number linked payment services are developed by telecom. Network of authorized agents, retailers are managing the user’s non-bank balance as mobile payment system, SMS messaging is used to make payments and transfers.²¹⁰

²⁰⁷ Florian Seeh, How New Entrants Are Redefining Cross-Border Payments, <https://www.ey.com/en_us/banking-capital-markets/how-new-entrants-are-redefining-cross-border-payments.> accessed on 2 June 2023

²⁰⁸Bank for International Settlements, New Correspondent Banking Data – The Decline Continues <https://www.bis.org/cpmi/paysysinfo/corr_bank_data/corr_bank_data_commentary_1905.htm.> accessed on 2 June 2023

²⁰⁹For example, bank customers often obtain cash using a debit card attached to an ATM network. In turn, makes an ATM withdrawal, a bank converts a portion of the customer’s deposit balance into cash on a one-for-one banks order cash from their Federal Reserve Bank, which consists of a request for reserve balances to be converted into paper currency.

²¹⁰Of note, while nonbank intermediaries clear payments, final settlement usually occurs in central bank money using a bank sponsor.

To mitigate the threat of terror financing and money laundering financial intermediaries also play important role under U.S. laws and regulation.²¹¹ “To protect user privacy, regulated U.S. financial institutions are generally required to maintain the security and confidentiality of customer information and prevent unauthorized disclosure of customer financial information”²¹² if financial information is required to be obtained by U.S. government, specific procedure needs to be followed by authorities, to provide protection against unwarranted government scrutiny and surveillance.²¹³

6.1.4. Instant Payment

Small inter-bank transfer where funds are instantly available is known as instant payment system or retail instant payment system.²¹⁴ This system is ultimately settled in central bank reserve balances although it usually uses bank deposits money, as in other retail payment system. Clearing House’s RTP Network (RTP launched in 2017 and the FedNow Service launched in 2023 are the instant payment system in U.S.²¹⁵

RTP participants are currently federally insured depository institutions.²¹⁶ Foreign banks branches in U.S. and U.S. depository institutions can access the services of FedNow. The

²¹¹ Under the BSA framework, U.S. financial institutions, including banks and money services businesses (MSB), are generally required to fulfill a number of core obligations, including record-keeping, reporting suspicious activity, monitoring transactions, establishing and executing customer identification programs, verifying customer identities, and maintaining anti-money laundering/countering the financing of terrorism (AML/CFT) programs. Financial Crimes Enforcement Network, The Bank Secrecy Act <<https://www.fincen.gov/resources/statutesandregulations/banksecrecyact#:~:text=The%20Currency%20and%20Foreign%20Transactions,detect%20and%20prevent%20money%20laundering.>> accessed on 2 June 2023

²¹² Financial institutions are also required to inform customers how their information could be shared. Financial Modernization Act of 1999 or the Gramm-Leach-Bliley Financial Services Modernization Act

²¹³ Right to Financial Privacy Act, 1978

²¹⁴ Bank for International Settlements Committee on Payments and Markets Infrastructures, Developments in Retail Fast Payments and Implications for RTGS Systems <<https://www.bis.org/cpmi/publ/d201.pdf>> accessed on 2 June 2023; Bank for International Settlements Committee on Payments and Markets Infrastructures, Fast Payments – Enhancing The Speed and Availability of Retail Payments <<https://www.bis.org/cpmi/publ/d154.pdf>> accessed on 2 June 2023

²¹⁵The Federal Reserve, About the FedNow Service, <<https://www.frbservices.org/financialservices/fednow/about.html>> accessed on 2 June 2023; The Clearing House, RTP Network Frequently Asked Questions <<https://www.theclearinghouse.org/payment-systems/rtp/institution.>> accessed on 2 June 2023

²¹⁶ The Clearing House, RTP Network Frequently Asked Questions, Some have expressed concern regarding access to these services. Faster Payments in the United States, Hearing before the Senate Committee on Banking, Housing, and Urban Affairs

participant eligibility range in instant payment system is broadened for enhancing speed and efficiency, competition, and payments inclusion for cross-borders payment.²¹⁷ Cross-border payments in not currently focused by FedNow though it can be done in future. Although, there is a need to properly address the bigger risk came from increased use of instant payments. For example, increased risk of loss occurs with the irreversible payment in instant payment system. “Financial institutions that provide instant payments may need to manage incremental financial and operational risk, including those related to intraday liquidity, anti money laundering/countering the finance of terrorism (AML/CFT) compliances, and fraud detection, prevention, and response.” Transaction cost can be decreased due to high level of interoperability in this system, but cyber risk, risk of operations, counterparty and new illicit fiancé may be introduced. Different customer identification is required for institutions directly participating in instant payment system under AML/CFT obligations; this could complicate the efforts made to create whole smooth functioning.

Instant payment system has been launched by 60 jurisdictions across the continent from 2001.²¹⁸ Real-time gross or deferred net settlement is the different features of these systems. Also, transaction value limitation and others is the different design feature of the system. Shared directory services gets payments systems integrated by several central banks in country. Competition, speed and efficiency is enhanced due to integration which facilitates interoperability between participating financial institutions and payment service providers.²¹⁹ “Ways to link instant payment system is jurisdiction also, as a part of the G20 cross-border payments roadmap and new multilateral platform’s feasibility and arrangements related to cross-border payments.”²²⁰

²¹⁷ Bank for International Settlements Committee on Payments and Markets Infrastructures, Improving Access to Payment Systems for Cross-Border Payments: Best Practices for Self-Assessments <<https://www.bis.org/cpmi/publ/d202.pdf>> accessed on 4 June 2023

²¹⁸ Bank for International Settlements Committee on Payments and Markets Infrastructures, Developments in Retail Fast Payments and Implications for RTGS Systems, supra 210

²¹⁹ The Design of Digital Financial Infrastructure: Lessons from India <<https://www.bis.org/publ/bppdf/bispap106.pdf>> accessed on 4 June 2023

²²⁰ Financial Stability Board, Enhancing Cross-border Payments: Stage 3 Roadmap <<https://www.fsb.org/wp-content/uploads/P131020-1.pdf>> accessed on 4 June 2023

6.2. Regulatory Framework in United States

Whether they are being provided by banks is dependent in part on how payments are federally regulated. Federal bank regulate the variety of prudential regulation, enforcement and supervision of the banks. Service providers to the bank mainly non-bank payment processors are subject to similar regulation and supervision (not enforcement) by the bank regulators. A money transmitter at the state level by state agency regulates the non-bank company which doesn't provide services to banks. Also, subject to applicable laws and regulation the Department of the Treasury's Financial Crimes Enforcement Network regulates the federal level money service business. The Electronic Fund Transfer Act (P.L. 95-630)²²¹ regulate the services subject to federal consumer protection regulation; Bank Secrecy Act (P.L. 91-508)²²² regulates anti-money laundering requirements; and several state licensing, safety and soundness, anti-money laundering and consumer protection requirements.²²³

The main issue is whether the retail payment service provider companies are regulated efficiently and effectively or not. States largely regulate the non-bank money transmission. As per some experts regulation regime of state-by-state are suitably designed for protection against risk presented by traditional money transmitter ex-western union so this ill-suited for new and tech focused new payment companies.²²⁴ Though state regulators mention their recent efforts to coordinate and streamline state standards and affirm that they are best positioned to regulate these companies based on their experience.²²⁵ "A greater federal role in payment regulation could impose more or less stringent standards (with federal preemption of state regulation, in the latter case) than any given state's current standard"

²²¹ P.L. 95-630

²²² P.L. 91-508

²²³ U.S. Department of the Treasury, A Financial System That Creates Economic Opportunities: Nonbank Financials, Fintech, and Innovation, Executive Order 13772 Report to the President [2018] 144-146 <<https://home.treasury.gov/sites/default/files/2018-08/A-Financial-System-that-Creates-Economic-Opportunities—Nonbank-Financials-Fintech-and-Innovation.pdf>. > accessed on 5 June 2023

²²⁴ Benjamin Lo "Fatal Fragments: The Effect of Money Transmission Regulation on Payments Innovation," Yale Journal of Law and Technology [2017] vol. 18, no. 1, 111-141.

²²⁵ Conference of State Bank Supervisors, Vision 2020 for Fintech and Nonbank Regulation, video <<https://www.csbs.org/vision2020>> accessed on 5 June 2023

Making certain non-banking payment companies to enter into bank regulatory regime may solve the concern related to fragment and burdensome present system. “Two potential mechanism are under consideration that could allow a technology- focused payment company to be federally regulated- the Office of the Comptroller of the Currency (OCC) special purpose national bank charter and a state- level industrial loan company (ILC) charter with Federal Deposit Insurance Corporation (FDIC) insurance”. If any direct access avenue is provided to success Fed wholesale payments system both the mechanisms can be particularly desirable for payments firm. Though mechanisms we discussed are subject to contentious debate and controversies.

“The OCC and proponents of the special purpose charter generally view the character as a way to free companies from what they assert is the unnecessarily onerous regulatory burden of being subject to numerous state regulatory regimes while not overly relaxing regulation- under the special purpose charter, the companies would become subject to the OCC’s national bank regulatory regime.”²²⁶ “The opponents state the OCC does not have the authority to charter these types of companies and that doing so would inappropriately allow fintech firms offering fast payment services to circumvent important state-level consumer protections.”²²⁷ To block the granting of such charter the state regulators have filed a lawsuit.²²⁸ This legal uncertainty has become a discouraging factor that’s why no companies have applied for such charter.²²⁹

²²⁶ Office of the Comptroller of the Currency (OCC), “OCC Begins Accepting National Bank Charter Applications From Financial Technology Companies,” press release, July 31, 2018 <<https://www.occ.gov/news-issuances/news-releases/2018/nr-occ-2018-74.html>> accessed on 5 June 2023; and Testimony of Nathaniel Hoopes, executive director of the Marketplace Lending Association, U.S. Congress, House Committee on Financial Services, Subcommittee on Financial Institutions and Consumer Credit, Examining Opportunities and Challenges in the Financial Technology (“Fintech”) Marketplace < <https://financialservices.house.gov/uploadedfiles/hhrg-115-ba15-wstate-nhoopes-20180130.pdf>> accessed on 5 June 2023

²²⁷ Conference of State Bank Supervisors, “CSBS Responds to Treasury, OCC Fintech Announcements,” press release, July 31, 2018, <<https://www.csbs.org/csbs-responds-treasury-occ-fintech-announcements>> accessed on 2 June 2023

²²⁸ Conference of State Bank Supervisors, “CSBS Sues OCC Over Fintech Charter,” press release, October 25, 2018 <<https://www.csbs.org/csbs-sues-occ-over-fintech-charter>> accessed on 2 June 2023 and Jonathan Stempel “New York Sues U.S. to Stop Fintech Bank Charters <<https://www.reuters.com/article/us-usa-treasury-fintech-lawsuit/new-york-sues-u-s-to-stop-fintech-bank-charters-idUSKCN1LU21O>> accessed on 5 June 2023

²²⁹ Rachel Witkowski, “Google and PayPal Explored OCC’s Fintech Charter, Then Walked Away,” [2019] American Banker, 342

The commercial firms like- retailers, manufacturers or tech companies are allowed to own banks that's why these ILC charters are controversial. Separate banking and commerce through policies historically adopted in U.S. and since 2006 approval for insurance for a new ILC has not been done by FDIC.²³⁰

6.2.1. Cyber Security

Fraudulent payments made using account and identities of the user and money theft are some of risk exposing users and all the methods of payment. Although new risks are introduced with advancement of technology on one hand and it has also reduced some other risks on the other hand. For ex- in case of theft of cash very limited recourse is left with the victim but, in case of theft of payments card he/she has an option of cancelling the card and will not be held liable for the fraudulent purchases.²³¹ But, the identity thieves could open and use line of credit in victim's name after stealing the card information without the knowledge of the user.

Similarly, new payment technologies reduce certain risks but create others. For example- the need of carrying cards is eliminated by digital wallets so, risk of theft is reduced as well as sensitive information can be protected at the point of sale through tokenization. But, malware software may lead to gain of unauthorized access of device that is fraudulent charges. The information is existing only on one card is protected in comparison to when it is stored on multiple websites, apps and devices as it creates more opportunity for the hackers to steal the info.²³²

The potential risk has risen after various incidents of compromise of sensitive information in various financial and non-financial companies also this has raised question

²³⁰ Independent Community Bankers of America (ICBA), Industrial Loan Companies: Closing the Loophole to Avert Consumer and Systemic Harm <<https://www.icba.org/docs/default-source/icba/advocacy-documents/reports/ilc-white-paper.pdf>. > accessed on 6 June 2023

²³¹ P.L. 95-630, The Electronic Fund Transfer Act, limits consumer liability to \$50; see 15 U.S.C. §1693g. In practice, banks and credit card companies often do not hold consumers liable for any amount to foster customer satisfaction.

²³² European Union Agency for Network and Information Security, Security of Mobile Payments and Digital Wallets <https://www.enisa.europa.eu/publications/mobile-payments-security/at_download/fullReport.> accessed on 6 June 2023

related to implementation of stricter cyber security by the policy makers.²³³ “Some of possibilities policy changes may include-

- a. Enacting a federal breach notification law,
- b. Creating federal cyber security standards, or
- c. Increasing federal authority to penalize companies that fail to adequately protect consumer data.”

6.2.2. Data Privacy

The information in detail is collected related to transaction which includes amount of each transaction, date and time, name of business or person receiving the amount by the payment system.²³⁴ Due to this collected information a lot of data related to consumer can be revealed through analysis such as- address, gender, age, race, ethnicity and approx. income. For targeting the product market of consumer or related work these data are very useful for the business.²³⁵ This also increases the risk of fraud as scammers can use this data.²³⁶ Use of personal data and proliferation in its availability is created due to electronic payment system this leads to policy concerns for the companies regarding use of data and raises questions like- “whether the consumers shall have more control over use of data and whether they understand that their data will be used.”

Improvement in consumer outcomes can be done with the use of payment’s data. Payment tracks, automate saving and budgeting, and more efficient shopping for financial products are facilitated by personal financial management apps or other digital

²³³N. Eric Weiss ‘The Equifax Data Breach: An Overview and Issues for Congress’ and CRS Report R43496, N. Eric Weiss and Rena S. Miller ‘The Target and Other Financial Data Breaches: Frequently Asked Questions’ < <http://www.ftc.gov/os/2013/03/130306mobilereport.pdf>. > accessed on 5 June 2023

²³⁴ Federal Trade Commission (FTC), Paper, Plastic... or Mobile? An FTC Workshop on Mobile Payments, FTC Staff Report <<http://www.ftc.gov/os/2013/03/130306mobilereport.pdf>. > accessed on 5 June 2023

²³⁵ For more information on data brokers’ and lead generators’ use of consumer financial data, see Bureau of Consumer Financial Protection (CFPB), Mobile Financial Services: A Summary of Comments from the Public on Opportunities, Challenges, and Risks for the Underserved <https://files.consumerfinance.gov/f/201511_cfpb_mobile-financial-services.pdf. > accessed on 5 June 2023

²³⁶ CFPB, Mobile Financial Services: A Summary of Comments from the Public on Opportunities, Challenges, and Risks for the Underserved <https://files.consumerfinance.gov/f/201511_cfpb_mobile-financial-services.pdf.> accessed on 5 June 2023

tools as per the need of the user.²³⁷ Application for loans or other banking products can be facilitated by the financial institutions when consumers in future share this data with them.²³⁸ The major concern after evaluating the benefits and privacy concerns of this system is how much access of consumer's info. shall be provided to companies.

Use of new technology has increased the pace of payments lead to difficulty in privacy policy disclosure to consumers as it is important element of privacy policy. For example, according to the Bureau of Central Financial Protection (CFPB), stakeholders state that “providing disclosures that are clear and sufficient for consumers to make informed decisions is difficult in the mobile environment due to small screens, which may make it difficult to read long, technical disclosure documents.”²³⁹ In the new digital environment clear privacy policy and more control of consumers on use of their data can be an important consideration as per stakeholders.²⁴⁰

6.2.3. Consumer Protection

Important consideration while developing new system for retail payments can be consumer protection.²⁴¹ “Issue of concern is also raised with the benefits of development of new technology, this includes-

- a. Consumer liability for fraudulent payment

²³⁷ For more information on payment apps, see FTC, What's the Deal? An FTC Study on Mobile Shopping Apps < <https://www.ftc.gov/system/files/documents/reports/whats-deal-federal-trade-commission-study-mobile-shopping-apps-august-2014/140801mobileshoppingapps.pdf>> accessed on 5 June 2023, Mobile Financial Services: A Summary of Comments from the Public on Opportunities, Challenges, and Risks for the Underserved < https://files.consumerfinance.gov/f/201511_cfpb_mobile-financial-services.pdf> accessed on 5 June 2023

²³⁸ FinRegLab, The Use of Cash-Flow Data in Underwriting Credit: Empirical Research Findings <https://finreglab.org/wp-content/uploads/2019/07/FRL_Research-Report_Final.pdf> accessed on 5 June 2023

Note that the Dodd-Frank Wall Street Reform and Consumer Protection Act (P.L. 111-203) provides for consumer rights to access information, codified at §12 U.S.C. 5533.

²³⁹ CFPB, Mobile Financial Services: A Summary of Comments from the Public on Opportunities, Challenges, and Risks for the Underserved <https://files.consumerfinance.gov/f/201511_cfpb_mobile-financial-services.pdf> accessed on 23 June 2023

²⁴⁰ CFPB, Mobile Financial Services: A Summary of Comments from the Public on Opportunities, Challenges, and Risks for the Underserved <https://files.consumerfinance.gov/f/201511_cfpb_mobile-financial-services.pdf> accessed on 5 June 2023

²⁴¹ For a more detailed discussion of payment dispute resolution processes, see FTC, Paper, Plastic... or Mobile? An FTC Workshop on Mobile Payments, FTC Staff Report <<http://www.ftc.gov/os/2013/03/130306mobilereport.pdf>> accessed on 5 June 2023

b. Consumer error or non receipt of goods resolution”.²⁴²

The Electronic Fund Transfer Act²⁴³, “currently implemented by the CFPB through Regulation E, is the most relevant consumer protection law applying to financial payments.”²⁴⁴ Consumers who engage in electronic fund transfers is protected by Regulation E. consumer disclosure is mandated, for unauthorized transfer by consumer liability is limited, and maintaining procedures for resolving errors. For new faster payment system other regulations may also be relevant which depends on its structure. For example, the Expedited Funds Availability Act (P.L. 100-86),²⁴⁵ currently implemented by the Federal Reserve as Regulation CC,²⁴⁶ prescribes how quickly banks must make funds available to customers.

“When developing a new faster payment system, congress and federal regulators may consider how a new system should comply with relevant regulations, such as Regulation E”.²⁴⁷ Regulators decide to update the regulation so that it can be tailored as according to structure of new system. For example, “all aspects of system could not covered in the present regulation on consumer protection, leaving consumers at the risk of financial loss, with any recourse or clear recourse for payment settlement dispute or other negative impact.”²⁴⁸ For new payment system, nine consumer protection principles were release by CFPB in 2015.²⁴⁹ Though since 2015, no rule making or other initiative has been taken by the CFPB after release of these principles

²⁴² Supra Note 240

²⁴³ P.L. 95-630.

²⁴⁴ 12 C.F.R. s 1005

²⁴⁵ Title VI of P.L. 100-86.

²⁴⁶ 12 C.F.R. Part 229.

²⁴⁷ 12 C.F.R. s 1005.

²⁴⁸ For example, accounts attached to a new payment system may not be insured by the FDIC. For more information, see CFPB, Mobile Financial Services: A Summary of Comments from the Public on Opportunities, Challenges, and Risks for the Underserved <https://files.consumerfinance.gov/f/201511_cfpb_mobile-financial-services.pdf> accessed on 5 June 2023

²⁴⁹ The CFPB’s nine consumer protection principles are (1) consumer control over payments, (2) strong data and privacy standards, (3) fraud and error resolution protections, (4) transparency, (5) disclosed and clear costs, (6) accessible broadly for consumers to use, (7) funds available faster for consumers to use, (8) security and payment credential value, and (9) strong accountability mechanisms that effectively curtail system misuse. See CFPB, Consumer Protection Principles: CFPB’s Vision of Consumer Protection in New Faster Payment Systems <https://files.consumerfinance.gov/f/201507_cfpb_consumer-protection-principles.pdf> accessed on 5 June 2023

Other option of consumer policy can be financial education. There is a need of digital financial literacy with the introduction and development of new technology in the fields of payments and finance as consumers may require certain new skills, this includes “knowing how to use devices to safely access financial products and services via digital channels in ways that help consumers achieve their financial goals, protect against financial harm and enhance ability to know where to get help.”²⁵⁰ Older consumers and consumers from lower income group can be included in this new payment system through this of financial education.²⁵¹

6.3. Policy Issues in Regulatory System of United States

RTP has been introduced in many countries and some are in the process of same.²⁵² According to Fed chair Jerome Powell, “the U.S. is far behind other countries in terms of having real time payments available to the general public.”²⁵³ Ability to receive funds quickly will be beneficial for the consumers and businesses, and bigger share of the payments will be done by the mobile or online through technology. As discussed above the financial access will be more beneficial for the lower income group as well as liquidity constraint consumers.²⁵⁴ Whether Fed entry in this market is desirable is the major concern regarding the Federal Reserve and RTP.

Mainly three principles are there on which Fed base its decision of whether to introduce new payment system or system features:

²⁵⁰ CFPB, Mobile Financial Services: A Summary of Comments from the Public on Opportunities, Challenges, and Risks for the Underserved <https://files.consumerfinance.gov/f/201511_cfpb_mobile-financial-services.pdf> accessed on 5 June 2023

²⁵¹ CFPB, Mobile Financial Services: A Summary of Comments from the Public on Opportunities, Challenges, and Risks for the Underserved <https://files.consumerfinance.gov/f/201511_cfpb_mobile-financial-services.pdf> accessed on 5 June 2023

²⁵² Nacha, The U.S. Path to Faster Payments: Final Report Part One, The Faster Payments Task Force Approach <<https://fasterpaymentstaskforce.org/wp-content/uploads/faster-payments-final-report-part1.pdf>> accessed on 5 June 2023

²⁵³ Federal Reserve, Transcript of Chair Powell’s Press Conference, July 31, 2019 <<https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20190731.pdf>> accessed on 5 June 2023

²⁵⁴ Aaron Klein, The Fastest Way to Address Income Inequality? Implement a Real Time Payment System, Brookings Institute <<https://www.brookings.edu/research/the-fastest-way-to-address-income-inequality-implement-a-real-time-payment-system>> accessed on 5 June 2023

- a. “The federal Reserve must expect to achieve full recovery of cost over the long run.
- b. The federal Reserve must expect that its providing the service will yield a clear public benefit, including, for example, promoting the integrity of the payments system, improving the effectiveness of financial market, reducing the risk associated with payments and security-transfer services, or improving the efficiency of the payments system.
- c. The service should be one that other providers alone cannot be expected to provide with reasonable effectiveness, scope and equality.”²⁵⁵

Over the ²⁵⁶introduction of FedNow shareholders are divided. In presence of competing privacy

System whether Fed is justified to create a RTP system in the leading question.²⁵⁷ There is fear of duplicative use of resources, crowding out private sector initiative already underway by FedNow.²⁵⁸ Fed will support the private sector initiative at the retail level is the ground for support by the Treasury Department.²⁵⁹ According to ICBA, “others including many small banks, fear that aspect of payment and settlement systems exhibit some features of a natural monopoly (because of network effects), and, in the absence of FedNow, private-sector solutions could result in monopoly profits or anticompetitive behavior, to the detriment of financial institutions accessing RTPs and their customers (merchants and consumers).”²⁶⁰ Based on clearing house’s plans at that time, the Justice

²⁵⁵ Federal Reserve, Policies: The Federal Reserve in the Payment System, 1990 <https://www.federalreserve.gov/paymentsystems/pfs_frpayssys.htm.> accessed on 7 June 2023; The Fed states that it will take more than 10 years to fully recover costs for FedNow. See Federal Reserve, Federal Reserve Actions to Support Interbank Settlement of Faster Payments, Docket No. OP-1670 <<https://www.federalreserve.gov/newsevents/pressreleases/files/other20190805a1.pdf>. > accessed on 5 June 2023

²⁵⁶ *ibid*

²⁵⁷ Thomas Wade, Primer: What Is A Real-Time Payments System, And Who Should Operate It? American Action Forum Insight <<https://www.americanactionforum.org/insight/primer-what-is-a-real-time-payments-system-and-who-should-operate-it/>.> accessed on 5 June 2023

²⁵⁸ The Clearing House, comment letter, Docket No. OP-1625 <https://www.federalreserve.gov/SECRS/2019/February/20190207/OP-1625/OP-1625_121418_133156_423844567989_1.pdf.> accessed on 5 June 2023

²⁵⁹ U.S. Department of the Treasury, A Financial System That Creates Economic Opportunities <https://home.treasury.gov/sites/default/files/2018-08/A-Financial-System-that-Creates-Economic-Opportunities—Nonbank-Financials-Fintech-and-Innovation_0.pdf. > accessed on 5 June 2023

²⁶⁰ ICBA, comment letter, Docket No. OP-1625 <<https://www.federalreserve.gov/SECRS/2019/March/20190315/OP-1625/OP>

Department in a letter to clearing house stated that it is not challenging the clearing house's RTP system in 2017.²⁶¹ In case of natural monopoly whether it optimal to have a single provider or multiple providers, especially when one of the competitors are government, from social perspective. User cost can be decreased as multiple providers increase the competition in the market, though duplicative infrastructure may consume more resources.

For other policy targets the competition between the Fed and the private sector also have mixed implications related to RTP.²⁶²

- a. **Innovation**- limiting the private sector's willingness to invest in innovations as the Fed's unique cost structure could decrease the success of private sector so, competition could increase innovation the way it generally does.
- b. **Ubiquity**- historically not a single payment system has ever achieved ubiquity, so ubiquity of RTP according to Fed arguably is its involvement as it is involved with all the banks in country. If banks decide to wait for Fed instead of joining clearing house's network then the achievement of RTP will be delayed in next few years as Fed enters into RTP.
- c. **Interoperability**- the ability to make payments across different systems is called interoperability. Difficulty exists in achieving interoperability with operating companies, but if no RTP system is ubiquitous, with the increased ubiquity in competing system the ability of any two given institutions to interoperate is improved. The competing Fed and clearing house system has currently achieved the interoperability by successfully functioning on making payment across ACH network. Though it was a desirable goal of Fed in its proposal, it did not commit to ensure interoperability.²⁶³

1625_121418_133342_402680988614_1.pdf> accessed on 5 June 2023; Open Payment Network, comment letter, Docket No. OP-1625 <https://www.federalreserve.gov/SECRS/2019/April/20190408/OP-1625/OP-1625_121418_133340_452781016249_1.pdf.> accessed on 5 June 2023

²⁶¹ U.S. Department of Justice, Letter Re: The Clearinghouse Payments Company LLC Business Review Request < http://business.cch.com/ald/tch_business_review_letter_0.pdf.> accessed on 5 June 2023

²⁶² See Aaron Rosenbaum et al, Faster Payments: Market Structure and Policy Considerations, Federal Reserve, Working Paper no. 2017-100 <<https://www.federalreserve.gov/econres/feds/files/2017100pap.pdf>.> accessed on 10 June 2023

²⁶³ Federal Reserve, "FAQs," <<https://www.federalreserve.gov/newsevents/pressreleases/files/other20190805a2.pdf>.> accessed on 10 June 2023

- d. **Equity**- the access to system of clearing house has been provided on equal terms to all the banks, regardless of size, if system is owned by large banks then these terms may change this shows that the clearing house is properly attempting to achieve equity. Though FedNow cannot be equitable as they are providing heavy discount for existing payment system as pointed out by the clearing house.
- e. **Security**- Good security features might give any edge to parties in competition, even though it is difficult to coordinate the security across competing system. There is only “single point of failure” when system has one provider, so operational and systematic risks is reduced in competing RTP system as per Fed. Problems of monitoring cyber-security in private system is pointed out by the repeated breaches at large financial institutions, even government is losing against data breaches a lot of times. The Fed states that “participating banks would continue to serve as a primary line of defense against fraudulent transactions, as they do today....” Under FedNow.²⁶⁴

Payment and settlement system of banks are being used intraday and overnight but, the Fed and by extension the taxpayers are prone to risk because of its provision of intraday and overnight credit which cannot be uncollateralized. The amount due and amount available in account can be mismatched due to the time lag between the payment and settlement because fed payment and settlement system is being used. So, to avoid settlement failures intraday credit for a fee is extended by Fed. During financial crisis in 2007-2009 the daily overdrafts peaked at \$ 186 billion, in recent years has been relatively low.²⁶⁵ The use of intraday credit can be increased due to introduction of real-time payments with deferred settlement. Reduction in financial stability can be seen as a result of elimination of intraday credit, to reduce systematic risk to the banking system the fed provides this credit.²⁶⁶

²⁶⁴ Federal Reserve, Federal Reserve Actions to Support Interbank Settlement of Faster Payments, August 5, 2019, Docket No. OP-1640 <<https://www.federalreserve.gov/newsevents/pressreleases/files/other20190805a1.pdf>> accessed on 10 June 2023

²⁶⁵ Data available the Fed <https://www.federalreserve.gov/paymentsystems/psr_data.htm> accessed on 10 June 2023

²⁶⁶ The Clearing House’s RTP system also has access to Fed intraday credit through Fedwire Funds Service

6.4. Comparative Analysis of Laws and Regulations

The comparative analysis between Indian and U.S. legislation is taken as both democratic nations are developing in the space of digital payment system as fast pace. This has shown that both countries are developing the legal and regulatory framework for smooth functioning of the system.

- a. ***Digital Payments System Regulation*** - In U.S. States largely regulate the non-bank money transmission. As per some experts regulation regime of state-by-state are suitably designed for protection against risk presented by traditional money transmitter ex- western union so this ill-suited for new and tech focused new payment system. Whereas, in India the payments and settlements are centrally regulated by RBI for banks and non-banks both so that risks can be properly examined and regulated without any confusing legislation by different states. This doesn't create any chaos among the parties of digital payment system.
- b. ***Laws and regulations relating to Cyber Crime*** - In case of cyber crimes, the U.S. has enacted specific legislations for different cyber crimes specialized to tackle different issues. In case of credit card fraud in U.S. there is a separate legislation i.e. Federal Credit Card Law that stipulates the consumer. The Fair Credit Billing Act will apply to billing errors on credit cards, unauthorized charges, charges for goods and services. This act is an attempt to minimize the credit card fraud in US. Whereas, in India doesn't have any specific laws relating to specialized issues related to digital payment system. The IT Act, 2000 deals with cyber crime but a lot of issues are not covered in the act. The circular of RBI against the cyber threat are being not as effective to protect the consumers from the threat. This shows that we do not have a strong legislation to deal with the threat of cyber crimes in relation to digital payment system in India.
- c. ***Laws and regulations relating to Consumer Protection*** - The Electronic Fund Transfer Act²⁶⁷, "currently implemented by the CFPB through

²⁶⁷ P.L. 95-630.

Regulation E, is the most relevant consumer protection law applying to financial payments.”²⁶⁸ Consumers who engage in electronic fund transfers is protected by Regulation E. consumer disclosure is mandated, for unauthorized transfer by consumer liability is limited, and maintaining procedures for resolving errors. But, this does not cover all the issues related to new payment system in U.S. Whereas, In India the Consumer protection act, 1986 does not deal with the issues relating to digital payments system. It specifically talks about providing justice to consumers by establishing forums under section 9 of the act.

- d. ***Laws and Regulations relating to Data Privacy***- Use of new technology have increased the pace of payments lead to difficulty in privacy policy disclosure to consumers as it is important element of privacy policy. In U.S. according to the Bureau of Central Financial Protection (CFPB), stakeholders state that “providing disclosures that are clear and sufficient for consumers to make informed decisions is difficult in the mobile environment due to small screens, which may make it difficult to read long, technical disclosure documents.”²⁶⁹ In the new digital environment clear privacy policy and more control of consumers on use of their data can be an important consideration as per stakeholders.²⁷⁰ Whereas, in India steps are already taken by the RBI to protect the data of the consumers as the new policy framework for non- banks Payments System Operators (PSO) under PSS Act. Under this framework “the PSO has to report unusual cyber attack incidents to RBI within 6 hours of detection, all the individuals having access to IT environment will have digital id and shall be maintained and monitored till termination, the core management activities shall not be outsourced”.²⁷¹

²⁶⁸ 12 C.F.R. s. 1005

²⁶⁹ CFPB, *Mobile Financial Services: A Summary of Comments from the Public on Opportunities, Challenges, and Risks for the Underserved* <https://files.consumerfinance.gov/f/201511_cfpb_mobile-financial-services.pdf> accessed on 10 June 2023

²⁷⁰ CFPB, *Mobile Financial Services: A Summary of Comments from the Public on Opportunities, Challenges, and Risks for the Underserved* <https://files.consumerfinance.gov/f/201511_cfpb_mobile-financial-services.pdf. > accessed on 10 June 2023

²⁷¹ RBI Notification <<https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=12136&Mode=0>> accessed on 15th June 2023

This shows that the laws and regulations of both the countries are lagging in some or the other aspects. As we know, Indian Digital Payment System is way ahead the U.S programmes as they are planning to implement RTP by 2023-24 we have already have our UPI which have both push and pull function connected with the bank account of users. U.S is still struggling on regulation of digital payments as each state have regulatory legislation for same which is not suitable for the new payments system, data privacy of consumers are not protected with regards to digital payments system. On the other hand, India is still struggling to legislate specific laws related to cyber crimes and consumer protection with regards to issues of digital payment system.

CHAPTER 7- CONCLUSION & SUGGESTION

India has brought structural changes in banking system with the use of advancement of technology. Banking system has sifted large portion from paper mode to virtual mode. The ICT has enabled variety of electronic payment mechanism, commonly called digital payment services.

The launch of NCPI in December 2008 to established proper infrastructure for payments and settlement in country is the important milestone towards development of digital payment system in India. Booklet released by RBI on Payment Systems titles “Journey in the Second Decade of the Millennium”. This specifies the developments in payment systems in the country in year 2010 to 2020. This period has witnessed the expansion of digital payments, including introduction of wallets. This has impacted the behavior of consumers and resulted in the transformation of the payment ecosystem in India.

Digital payment system currently include Banking cards, Digital wallets, UPI, Unstructured Supplementary Service Data (USSD), Immediate Payment Services (IMPS), Real Time Gross Settlement (RTGS), National Electronic Fund Transfer (NEFT), Aadhar Enabled Payment System (APES) and Mobile banking. Our daily lives are impacted due to digital payment system and it also offers additional new services. The cashless transactions are increasing day by day in country according to RBI bulletin.

Now mobile phone has become the payment device due to digital payment system as it helps in making and accepting payment transactions. Every bank account holder in India has now being able to use digital payment system. The UPI is widely acceptable in retail payment system as smaller amount of money can be sent through UPI without any additional charges. UPI has made the payment system simplified and do not require any details of the parties like- account number, IFSC code etc. it only requires VPA. This makes UPI as most advanced payment system in world. The UPI has enabled the interoperability between different banks in country through APIs so that they can smoothly communicate and easily proceed through the banking system in the country. Unlike traditional payment system, in digital payments there are no intermediaries which clearly are one factor of reduction of cost in digital payments transactions and even

settlement cost is very low. The transactions in digital payments are completed within seconds as well as they are safe. So, the ample amount of security is provided to the users of digital payment system. This has allowed huge population of India to be part of the digital economy which is a sign of development of country. We have seen how India delinquently moved towards electronic mode of payments with given socio-economic set-up in country.

As discussed above the growth of digital payments in India is rapid as the transactions increased from 23.4 billion in 2019 to 46.7 billion in July 2022. This is result of transactions in several digital payment products such as- UPI and Aadhaar-enabled Payment Systems (AePS).

The legal and regulatory framework related to digital payment system in India includes PSS Act, regulations and circulars by RBI and NCPI, grievance redress i.e. banking ombudsman scheme as well as cyber security legislation. The increase in consumer shift towards digital payments as well as its given value proposition, key enablers shall be reassessed to create conducive ecosystem for sustaining usage of digital payments by retail consumers. Legal and regulatory framework is one of conducive key enablers. The Payment and Settlement System Act, 2007 (PSS Act) is the primary law for governing digital payments. Modern retail payment service laws in India that is built on the principles of proportionate regulation and balances regulatory flexibility with well-established statutory mandates that can promote competition, innovation and consumer protection. The new framework for PSO is implemented for protection of user's data in country.

The functioning of digital payment system in India is mainly regulated by RBI and NCPI. RBI has issued master circulars and notifications on digital payment system for smooth functioning of same and to make it secure for the customers. It tries to cover all the risks attached with the digital payments. The circulars including Consumer Protection- Limited Liability of Customers in Unauthorized E-Banking Transaction, Master Direction on Digital Payment Security Controls, Master Direction on Issuance and operation of Prepaid Payment Instruments etc. regulates various issues relating to digital payment system in India. These issues include the risk management, liability of customers,

protection against fraud, protection of consumer's data, issues related to digital wallet, KYC etc. The regulatory framework of UPI will mainly discuss about the NCPI relating to the dispute redressal mechanism, Upper limit of UPI transactions as well as role and responsibilities of NCPI, TPAP and PSP banks. The wide acceptance of UPI by the population of country expresses its need to be properly regulated by law or regulation. The dispute redressal mechanism for UPI is specified by the NCPI which requires prior settlement of dispute by the PSP or TPAP. The complaint can further be sent to banking ombudsman or ombudsman for digital complaint if it remains unresolved at the initial stage.

Every consumer requires grievance redressal in system so that issues can be resolved and justice shall be delivered. This includes internal grievance redressal bodies of the bank, the banking ombudsman and the consumer forum in case of digital payments system. In cases when banks fail to provide satisfactory services to customers or become unsuccessful to safeguard their rights of the customers. So, for the redressal of complaints of the customer, the banking ombudsman was formed under the guidance of RBI. Specific grounds are provided for complaint included under the clause 8 of the ombudsman scheme.

The cyber crimes relating to digital payment system has been increasing day by day. Even, the RBI on 28th January, 2022 in a press release named "Consumer Awareness – Cyber Threats and Frauds" cautioned citizens against the cyber crimes. As, there are various ways used by the unethical hackers such as – phishing calls, vishing links, QR code scanning scam, screen sharing apps etc. are being used to know the UPI details and PIN so, that fraudsters can easily use the money from the account of victim. The simple structure of UPI has made way easy for the fraudsters. Even the RBI has urged public to practice safe digital banking by taking precautions, while carrying out digital transactions. But, no strong steps have been taken to protect the cyber security of the people using digital payments. Neither a step to change or strengthen the structural framework nor the step to strengthen regulatory framework has been taken by the government. Also, the regulations of IT Act in context of major cyber crimes relating to digital payment system shows they challenge system is facing. This includes

unauthorized access to computer system networks, Denial of Services, Crime Relating to Data Alteration or Destruction, Identity Theft and Impersonation and Skimming is discussed.

The comparative analysis between Indian and U.S. legislation is taken as both democratic nations are developing in the space of digital payment system as fast pace. This has shown that both countries are developing the legal and regulatory framework for smooth functioning of the system. The comparison clearly shows that Indian Digital Payment System is way ahead the U.S programmes as they are planning to implement RTP by 2023-24 we have already have our UPI which have both push and pull function connected with the bank account of users. U.S is still struggling on regulation of digital payments as each state have regulatory legislation for same which is not suitable for the new payments system, data privacy of consumers are not protected with regards to digital payments system. On the other hand, India is still struggling to legislate specific laws related to cyber crimes and consumer protection with regards to issues of digital payment system.

Suggestion

The important suggestion coming to the end of this dissertation relating legal framework of digital payment system in India are-

- a. The regulations by RBI and NCPI relating to Digital payment System are not enough for products used by huge population of country. Legislature must seriously make an effort to legislate law relating to Digital Payment System in India. This law must cover basic definitions, role of different players in ecosystem, structure and framework of various modes of Digital Payment system. This will provide more clarity and trust in this system of payments and settlements.
- b. Laws dealing with specific issues relating to different aspects of digital payment system including- grievance redressal, consumer protection, data privacy, cyber security shall be legislated and amended with the pace of development in this

area. As we know, this will protect the consumers against crimes relating to money.

- c. The regulations, circulars and master directions relating to digital payment system must support the system. But, these regulations must be clear for general public so that the no chaos and false news can be circulated. This can only be done by structuring and simplifying the language of regulations.
- d. Encourage the use of digital payment system, especially; the uneducated, poor and rural population shall be made aware about the digital payment system as well as the ways to protect themselves from any fraud and other crimes. This will increase the digital literacy resulting into financial inclusiveness in country. Also, people will understand how to use digital payment system and how it will help them.
- e. Prioritization of efforts to improve system flaws and technology for protection of users from cyber crime as this not only results into the financial and data loss of individuals but, also threatens the national security of country.

BIBLIOGRAPHY

List of Books

BARKHA & MOHAN, CYBER LAW AND CRIMES (3ed ed. 2011)

BLACK'S LAW DICTIONARY (6th ed. 1990)

GODBOLE NINA & BELAPURE, CYBER SECURITY (1st ed. 2011)

KAMATH NANDA, LAW RELATING TO COMPUTERS, INTERNET & E-COMMERCE (5th ed. 2015)

KOSSEFF JEFF, CYBERSECURITY LAW (1st ed. 2017)

KUMAR RAKESH & JAISWAL A.P, CYBER LAWS (1st ed. 2011)

ROSENOER JONATHAN, CYBER LAW (1st ed. 1997)

ROWLAND DIANE et al, INFORMATION TECHNOLOGY LAW (4th ed. 2012)

SETH KARNIKA, COMPUTERS, INTERNET AND NEW TECHNOLOGY LAWS (1st ed. 2012)

SINGH RATTAN, LEGAL RESEARCH METHODOLOGY (1st ed. 2013)

VISHWANATHAN APARNA, CYBER LAW (1st ed. 2012)

List of Journals

A. Mahesh & Bhat Ganesh, Digital Payment Service in India- A case study of Unified Payment Interface, IJCSBE, ISSN: 2581-6942, Vol. 5

Kumar Renuka, Kishore Sreesh & ors., 'Security Analysis of Unified Payment Interface and Payment Apps in India' [2020] IJIRSET -9

Martha Franciska & Dr. S. Sahayaselvi, An Overview On Digital Payments, International Journal of Research [2017] e-ISSN: 2348-6848

Deepti Kumar, Timonthy A. Gonsalves and others, 'Mobile Payment Architectures for India [2010] NCC-2010

- Gopalan Sadidaran & Rajan S. Ramkishen, *The Great Monetary Gamble in India* [2017] *Asian Survey*- 57
- Lakshmi Kumar & Swati Dutta, 'Role of Mobile Money in Replacing Cash: A study among Migrant Workers in South India' [2015] *Economic and Political Weekly* Vol.5
- Jess Cheng & Joseph Torregrossa, *A Lawyer's Perspective on U.S. Payment System Evolution and Money in the Digital Age* [2022]
- Kumar Renuka, Kishore Sreesh & ors., 'Security Analysis of Unified Payment Interface and Payment Apps in India' [2020] *IJRSET* -9.
- Lahiri Amartya, *The Great Indian Demonetization* [2020] *AEAJEP*- 34
- Rahul Gochhwal , *Unified payment interface- An advancement in payment systems*, *American Journal of Industrial and Business Management*, 2017, ISSN online: 2164-5175
- K Hari Krishna & Bipin K Deokar, *RuPay Card: An alternative*, *Economic and Political weekly*, 2012, vol. 47
- W. Stanley Jevons, *Money and the Mechanism of Exchange* [1875]
- Arvind Krishnamurthy & Annette Vissing-Jorgensen, *The Aggregate Demand for Treasury Debt*, 120 *J. Pol. Econ.* 233 [2012]
- Stefan Nagel, *The Liquidity Premium of Near-Money Assets*, 131 *Q. J. Econ.* 1927 [2016]
- Rachel Witkowski, "Google and PayPal Explored OCC's Fintech Charter, Then Walked Away," *American Banker*, June 16, 2019.
- Latoya Irby, "How a Zero Fraud Liability Policy Protects Your Credit Card," *The Balance*, July 22, 2019
- Aaron Klein, *The Fastest Way to Address Income Inequality? Implement a Real Time Payment System*, Brookings Institute, January 2, 2019

Thomas Wade, *Primer: What Is A Real-Time Payments System, And Who Should Operate It?* American Action Forum Insight, June 11, 2019

List of Websites

https://loksabhadocs.nic.in/Refinput/Research_notes/English/Digital_Payment_e.pdf

https://www.meity.gov.in/writereaddata/files/gazette_16.05.2018.pdf

<https://www.rupay.co.in>

<https://rbidocs.rbi.org.in/rdocs/Publications/PDFs/PSSBOOKLET93D3AEFDEAF14044BC1BB36662C41A8C.PDF>

<https://www.bcsbi.org.in/GrievanceRedressal.html>

<https://www.thehindubusinessline.com/opinion/why-digital-payment-is-a-publicgood/article34093572.ece>

https://www.federalreserve.gov/paymentsystems/files/psr_policy.pdf

<https://www.federalreserve.gov/econres/notes/feds-notes/a-lawyers-perspective-on-us-payment-system-evolution-and-money-in-the-digital-age-20220204.htm>

<https://cms.rbi.org.in/>

<https://www.federalreserve.gov/publications/files/money-and-payments-20220120.pdf>

<https://home.treasury.gov/system/files/136/2022-National-Terrorist-Financing-Risk-Assessment.pdf>

<https://www.npci.org.in/whatwe-do/upi/product-statistics>

<https://www.fsb.org/wp-content/uploads/P090420-2.pdf>

<https://www.npci.org.in/PDF/npci/upi/Product-Booklet.pdf>

<https://timesofindia.indiatimes.com/blogs/unheard-echoes-of-young-mind-2/upi-indias-story-of-a-financial-revolution/>

<https://www.npci.org.in/what-we-do/upi/dispute-redressal-mechanism>

<https://www.fincen.gov/resources/statutes-and-regulations/bank>

<https://www.bis.org/cpmi/publ/d00b.htm?m=2266>

<https://www.csbs.org/vision2020>

https://www.ey.com/en_us/banking-capital-markets/how-new-entrants-are-redefining-cross-border-payments.

https://www.bis.org/cpmi/paysysinfo/corr_bank_data/corr_bank_data_commentary_1905.htm.

<https://www.fincen.gov/resources/statutesandregulations/banksecrecyact#:~:text=The%20Currency%20and%20Foreign%20Transactions,detect%20and%20prevent%20money%20laundering>.

https://www.enisa.europa.eu/publications/mobile-payments-security/at_download/fullReport.

<https://www.frbservices.org/financialservices/fednow/about.html>

<https://www.theclearinghouse.org/payment-systems/rtp/institution>.

<https://home.treasury.gov/sites/default/files/2018-08/A-Financial-System-that-Creates-Economic-Opportunities—Nonbank-Financials-Fintech-and-Innovation.pdf>.

<https://economictimes.indiatimes.com/wealth/save/does-i-need-to-register-a-beneficiary-before-transferring-funds-through-upi-what-is-maximum-i-can-transfer/my-upi-transaction-has-failed-but-my-bank-account-has-been-debited-/slideshow/91737946.cms>

<https://www.thehindu.com/business/nirmala-sitharaman-waives-mdr-charges-for-some-businesses/article30419546.ece>

<https://timesofindia.indiatimes.com/india/govt-launches-mega-cash-transfer-to-fight-covid-19/articleshow/74975904.cms>

<https://support.google.com/pay/india/answer/9616021?hl=en>

<https://www.npci.org.in/what-we-do/upi/roles-responsibilities>

<https://community.nasscom.in/communities/digital-transformation/fintech/upi-payments-top-security-issues-possible-way-arounds-an-opinion.html>

<https://cms.rbi.org.in/>

<http://www.ftc.gov/os/2013/03/130306mobilereport.pdf>.

https://files.consumerfinance.gov/f/201511_cfpb_mobile-financial-services.pdf.

https://epgp.infliber.ac.in/epgdata/uploads/epgp_content/law/07_information_and_communication_technology_/09_new_cyber_crimers/et/5746_et_09_et.pdf

<https://www.npci.org.in/statistics>

<https://www.ftc.gov/system/files/documents/reports/whats-deal-federal-trade-commission-study-mobile-shopping-apps-august-2014/140801mobileshoppingapps.pdf>

https://files.consumerfinance.gov/f/201511_cfpb_mobile-financial-services.pdf.

https://finreglab.org/wp-content/uploads/2019/07/FRL_Research-Report_Final.pdf.

<https://www.occ.gov/news-issuances/news-releases/2018/nr-occ-2018-74.html>

<https://financialservices.house.gov/uploadedfiles/hhrg-115-ba15-wstate-nhoopes-20180130.pdf>.

<https://timesofindia.indiatimes.com/business/india-business/pay-via-upi-in-10-more-countries/articleshow/86184175.cms>

<https://www.reuters.com/article/us-usa-treasury-fintech-lawsuit/new-york-sues-u-s-to-stop-fintech-bank-charters-idUSKCN1LU21O>

<https://www.business-standard.com/article/current-affairs/india-to-have-1-billion-smartphone-users-by-2026->

deloittereport122022200996_1.html#:~:text=%22The%20total%20cumulative%20shipments%20of,five%20years%2C%22%20it%20said.

https://www.rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=52688

<https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=12051&Mode=0>